BANASTHALI VIDYAPITH

Master of Arts (Sanskrit)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
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lLdr ok³e; dk Hkkjrh; lkLdfrd bfrgkl d ikekf.kd iy[k d :i e n[kk tkrk gA ble on] 0;kdj.k] Hkk"kk'kkL=] n'ku'kkL=] dk0;'kkL= ,o dk0;kfn fo"k;k/kkfjr ,lh vud foe'kkRed ,o fo'y"k.kkRed i)fr;k g] ftudk lEcU/k ekuoh; thou 'kyh ,o 0;fDrRo&fodkl l gA blfy, ;g vko';d g fd Hkkjrh; Kku ijEijk ,o lkLdfrd fojklrh; rÙok l fo|kfFk;k dk voxr djk;k tk,] ftll o Hkfo"; e ikIr voljk dk vkRekul/kuiod Lo; d thou e mi;kx dj ldA

blh mnn'; dk /;ku e j[kr g, vUr'V vu'kklukRed i)fr ,o cgvk;keh mikxek d lkFk lLdr ikB;de dk fuek.k fd;k x;k gA

PROGRAMME EDUCATIONAL OBJECTIVES

- Hkkjrh; lkfgfR;d] lkLdfrd ,o 'kkL=h; fpUru dh ijEijk l voxr djkukA
- lLdr ok³e; d on] 0;kdj.k] dk0;'kkL=] dyk'kkL=] Hkk"kk'kkL=] rd'kkL=] /ke'kkL=] ijk.k ,o bfrgkl lEcU/kh fpUru dk vock/k djkukA
- Hkkjrh; n'ku dh fofo/k 'kk[kkvk d Lo:i l ifjfpr djkdj rkfÙod fo'y"k.k dh ;kX;rk fodflr djukA
- ofnd lkfgR; ,o 'kkL= lkfgR; dk Kku djkdj lorkHkn fodkl djukA
- ikphu ,o vk/kfud lLÑr lkfgR; dk vock/k djkdj lkUn;ck/k dh Hkkouk fodflr djukA
- lLÑr dk0;'kkL= ,o ik'pkR; dk0;'kkL= dk ifriknu dj dk0;'kkL=h; rÙok d eY;kdu ,o fo'y"k.k dh vfHk{kerk dk fodkl djukA
- lLÑr Hkk"kk;h dk'ky dk fodkl dj] lLÑr okX0;ogkj dh {kerk d lkFk ekfyd vfHk0;fDr dh ;kX;rk fodflr djukA

PROGRAMME OUTCOMES

PO1: **lLdr Kku ijkijk & on] n'ku] dk0; ,o dyk'kkL=h; fpru d vk/kkj ij Hkkjrh; Kku ijijk ,o lLdfr fo"k;d le> dk fodkl A**

PO2: **;ktukijd nf"Vdk.k & Hkk"kk lEcU/kh leL;kvk d fo'y"k.k dh {kerk dk fodkl] nk'kfud] lkfgR;d ,o 0;kogkfjd fo"k;k ij ehek lkRed {kerk dk fodkl**

PO3: **leL;k&fo'y"k.k & ikekf.kd ,o 'kk/ki.k KkukUe[k iofRr] l=] 0;k[;k] Hkk";] leh{kk] ioi{k] mRrji{k ,o ehek lk vkfn i)fr;k l dk0;] n'ku ,o lLdfr lEcU/kh fl)kUrk dh 0;k[;kRed] fo'y"k.kkRed {kerk dk fodkl ,o foe'kkRed l'y"k.k l fu"d"kkRed nf"V dk fodkl A 0;RifRr] fuopu] rd] fo"k;ioru eyd i)fr;k }kjk lkfgR;] n'ku ,o lekt lEcU/kh leL;kvk d lek/kku dju dh {kerk dk fodkl A**

PO4: **uokpkjeyd nf"V & lLdr dh vk/kfud fo/kkvk ¼y?kdFkk] miU;kl] Mk;jh] xty] xhr] ixhr vkfn½ ,o mRrj vk/kfudrkokmh] ljpuk ,o mRrj ljpukokmh 0;k[;k i)fr;k d vui;kx dh {kerk dk fodkl A lLdr ok³e; e of.kr uokpkjeyd uohu 'kk/kkRed iofÙk;k ,o i)fr;k l ifjp;A**

PO5: **urRo&dk'ky & f'k{kk d lHkh llk/kuk d v/;;u] fo'y"k.k] foopukijkUr Nk=kvk e dk'ky fodflr djd urRo {kerk dk fodkl A**

PO6: **0;kolkf;d igpku & lLdr ok³e; d vUrxr on onkx] n'ku'kkL=] lkfgR; vkfn d v/;;u l mPp i'kkfud lokvk] v/;kid]0;oLFkkfidk]vuoknd vkfn l lcf/kr vkthfodk dh ikfIrA**

PO7: **lLdr ,o ufrdrk &f'k{kk d pkj lkikuk ¼vkxe] Lok/;k;] ifjppk ,o 0;ogkj½ d ek/;e l lkekftd] ufrd o 0;kogkfjd eY;k d ifr tkx:drk ,o ykdki;kxh –f"Vdk.k dk fodkl A fofo/k lLdr xUFkk ¼lkfgR;] dFkk lkfgR;] ukV;'kkL=] dk0; xUFk½ d v/;kiu }kjk lkekftd lkLdfrd jktuhfr lEcU/kh fofo/k eY;k dk fodkl**

PO8: **lEi/'k.k dk'ky** & **lLdr** Hkk"kk;h **dk'kyk dk fodkl djd] lLdr** okX0;ogkj **dh {kerk d lkFk ekfyd vfHk0;fDr dh ;kX;rk dk fodkl**A

PO9: **lLdr vkj lekt & lLdr** xUFkk **e fufgr eY;k dh f'k{kk d ek/;e l lekt e** Nk=kvk **}kjk mudk ipkj&i lkjA lLdr f'k{kk d ek/;e l fofo/k ink ij vklhu gkdj lekt e lLdrfu"B eY;k dh** LFkkiukA

PO10: **i;koj.k tkx:drk** & _Xonkfn **xUFkk e of.kr i;koj.k lj{k.k** vkfn fo"k;k **d ifriknu l i;koj.k d ifr pruk dk fodkl**A **lLdr lkfgR; e** mfYYkf[kr **i;koj.kh; ,o ikfjfLFkfrdh;** Hkkxkfyd **lnHkk l** Hkxky **,o i;koj.k l lEc) KkukRed ,o mipkjkRed iofÙk dk fodkl**A

PO11: **thoui;Ur f'k{kk** & **lL—r lkfgR; dh fofo/k fo/kkvk e lo= nf"Vxr vk/;kfRed] lkekftd] ufrd] /kkfed] vkfFkd vkfn thou&eY;k dk vock/k dj vkj** mUg **vkpj.k e lefUor dj fo|kFkh viu thou e 0;kogkfjd vui;kx lEcU/kh d'kyrk e vfHkof) dj ldx**kA

,e- ,- iFke lel=

SANS 404 /ke'kkL=] vFk'kkL= ,oa oKkfud 'kkL=

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxe{k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- lL—r 'kkL=k d fofo/k i{kk dk Kku ikIr dj ekfyd fpUru ,o i;kx dh {kerk dk fodkl A
- 'kkjhfjd ,o ekufld fodkl A
- LokLF; d ifr prukRed nf"VA

SANS 403 Hkk"kk 'kkL= ,oa 0;kdj.k

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxe{k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- 0;kdj.k ck/k l 'k) mPpkj.k&vFkkock/k lEcU/kh dk'ky vftr dju kA
- lL—r lkfgR; dk lxerkiod le>u dh ;kX;rk dk fodkl A
- in&ljpuk lEcU/kh l{erkvk dk Kku A

SANS 401 Hkkjrh; n'ku] Hkkx&I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxe{k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- nk'kfud ck/kiod ekfyd fpUru dh {kerk mRiUu gkxh A
- Hkkjrh; n'ku dk ck/k A

SANS 405 ikphu lL—r lkfgR;] Hkkx&I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxsZ'k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- e?knr d ek/;e l Hkkjr dh lkLÑfrd >yd ,o Hkkxkfyd ifjo'k dk KkuA
- dknEcjh d ek/;e l loJ"B lLÑr x| y[kd ck.kHkÍ ,o lLdr x| lkfgR; dk KkuA
- ryukRed nf"Vdk.k dk fodkl A

SANS 407 ofnd lkfgR; ,o Hkkjrh; lL—fr

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxsZ'k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- Hkkjrh; lLdfr dh ,frgkfld le> dk fodkl A
- ofnd lkfgR; ,o Hkkjrh; lL—fr d rF;k ,o of'k"V; dk tkuu dh {kerk dk fodkl A

f}rh; lel=

SANS 402 Hkkjrh; n'kZu] Hkkx&II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxsZ'k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- n'kZu dh fofo/k 'kk[kkvk d Lo:i dk KkuA
- ekfyd fpUruiod rkfÙod fo'y"k.k dh ;kX;rk dk fodkl A
- rkfdd {kerk dk fodkl A

SANS 406 ikphu lLdr lkfgR;] Hkkx&II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxe{k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- nr dk0; ijEijk dk vock/kA
- jktufrd fo'y"k.k dh {kerk dk fodkl A
- v/;;u d ifr ryukRed nf"V dk fodkl

SANS 409 0;kdj.k 'kkL= ,oa vuqokn

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxe{k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- 0;kdj.k dh nk'kfud vo/kkj.kkvk dk KkuA
- Hkk"kk ljpuk d fo'y"k.k dh {kerk dk fodkl A
- okD; ljpuk dh ifØ;k dk vock/kA
- lL—r lkfgR; dk i<u o le>u gr dk'ky e vfHkof)A
- lk/k ,o vlk/k 'kCnk dk KkuA

SANS 408 ofnd lkfgR; ,oa mldk bfrgkl

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxe{k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- ;ton] lkeon ,o vFkoon d v'kk d v/;;u }kjk ofnd lH;rk] lLdr ,o n'ku dk KkuA
- fu#Dr d }kjk ofnd 'kCnk d vFk fu/kkj.k d dk'ky dk fodkl A
- ofnd lkfgR; dk ,frgkfld ifjp;A
- on&onkx e fufgr Kkul Eink d ik;kfxd dk'ky dk fodkl A

CS 421 Introduction to Computer Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	3	0	0	3

Learning Outcomes:

On sussessful completion of the course students will be able to:

- Demonstrate knowledge of the computer system.
- Have the ability to define operating system, databases and Network applications.
- Have an understanding of the proper contents of a computer system and these software tools like MS-WORD, MS-EXCELL, MS-Power Point and Corel Draw.

CS 421L Introduction to Computer Applications Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

r'rh; lel=

SANS 504 lLdr dk0;'kkL= ,o ik'pkR; dk0;'kkL=

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxeu&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- lL—r dk0;'kkL= d fo'k"k fl)kUrk dk vock/kA
- ik'pkR; dk0;'kkL= d fl)kUrk dk ifjp;A
- lkUn;&'kkL=h; rRok d eY;kdu ,o fo'y"k.k dh vfHk{kerk dk fodkl A
- lL—r dk0;'kkL= ,o ik'pkR; dk0;'kkL= d Lo:ixr vUrj o of'k"V; dk igpkuu dh {kerk dk fodkl A

SANS 505 lLdr dk0;'kkL= ,o ml dk bfrgkl

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxe\&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- lL—r dk0;'kkL= l lEc) fof'k"V xUFkk ,o xUFkdkjk dk Kku A
- lL—r dk0;'kkL=h; lEink;k dk KkuA
- dk0;'kkL= dk ,frgkfld ck/kA
- lkfgfR;d xUFkk d fo'y"k.k dh {kerk dk fodkl A

SANS 510 lLdr 0;kdj.ke

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxe\&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- 'kCn&fuek.k ,o okD;&fuek.k dh ifØ;k dk KkuA
- iR;; o dkjdk dk 0;kogkfjd Hkk"kk e i;kx dj ekfyd fopkjk dh ljy ,o Li"V vfHk0;fDr dh {kerk dk fodkl A
- vFk fu/kkj.k dh ifØ;k dk KkuA

SANS 506 lLdr ukV; ,o ukV;'kkL= Hkkx&I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxe\&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- lL—r ukV;'kkL= dk ck/kA
- ukV; jpukvk }kjk ukV; dk'ky dk fodkl dj 0;kogkfjd i;kx {kerk dk fodkl A
- 'kCnk ,o okD; lEcU/kh fo'y"k.kkRed dk'ky e vfHkof)A

prFk lel=

SANS 503 lL—r dk0;'kkL= ,o vydkj

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxe&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- dk0; e vydkj igpkuu dh {kerk dk fodkl A
- dk0;'kkL=h; rŸok dk dk0; e vui;kxkRed dk'kyA

SANS 508 lL—r fucU/kk 0;kdj.kp

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxe&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- 0;ogkjki;kxh 'kCn Hk.Mkj e of) dj 'kCnk d ilxkudy i;kx dh {kerk dk fodkl A
- 0;kdjf.kd nf"V l 'kCnk d ;Fkkfpr i;kx dh ;kX;rk dk fodkl A

SANS 507 lL—r ukV; ,o ukV;'kkL= Hkkx&II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxe&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- ukV; lkfgR; d fo'y"k.k dh {kerk dk fodkl
- ukV;dk'ky dk fodkl dj ekfyd vfHk0;fDr d idk'ku dh {kerk e of)

SANS 516P lLdr lkfj;kstuk

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

fuxle\&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- fo|kfFk;k e 'kk/kkRed vfHk#fp fodflr djukA
- lL—r lkfgR; dh uohu iofŸk;k d ifr fo|kfFk;k e #fp fodflr djukA
- fo|kfFk;k e lL—r uokpkjeyd iofŸk;k dk fodkl djukA
- fo|kfFk;k e vfHk0;fDr dk'ky fodflr djukA

fo"k;k/kkfjr p;fur ikB;Øe leg

SANS 513 ikphu Hkkjr e L=h f'k{kk

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxle&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- Hkkjrh; lLdfr dk KkuA
- Ikphu Hkkjrh; lLdr lkfgR; e fufgr L=h f'k{kk fo"k;d Kku dh ikfIrA
- fu/kkfjr lkfgR; e fo|eku f'k{kk & lEcU/kh eY;k dk ck/k gkxkA

SANS 521 lLÑr Hkk"kk fpUru

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxle&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- lLdr Hkk"kk fpUru ¼0;kdj.kkfn½ d mnHko ,o fodkl l ifjp;A
- LkLdr Hkk"kk d 'k) mPpkj.k dk Kku gkxkA
- lLdr Hkk"kk fpUru d fodkl de] ledkyhu Hkk"kk ,o 0;k[;k i)fr;k dk KkuA

SANS 517 lLdr jfM;k :id

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

fuxle\&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- Nk=k, lLdr lkfgR; dh vk/kfud fo/kkvk l ifjfpr gkxhA
- lLdr jfM;k :idk d ek/;e l Nk=kvk e lLdr lkfgR; d vfHkuo i;kx dh nf"V ikIr gkxhA
- lLdr lkfgR; ,o lpkj rduhd d lk/kuk d mi;kx dh le> dk fodkl A

SANS 518 lLdr lkfgR; ,o i;koj.k foKku

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

fuxle&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- ofnd ,o ykfdd lkfgR; lEcU/kh Kkukock/k e of)A
- i;koj.k pru dk fodkl A
- 'kk/k iofÙk dk :fpiod fodkl A
- lLdr lkfgR; dk vUro"kf;d lEcU/kk dk le>u dh {kerk dk fodkl A

SANS 522 mifu"kn&lkfgR;

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

fuxle\&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- vk/;kfRed o 0;kogkfjd le> fodkl A
- thou eY;k dk KkuA

SANS 523 vfHkuo dk0;'kkL= ,oa mldk bfrgkl

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxkeh&

ikB;Øe dk lQyrkiod v/;;u dk i'pkr fo|kFkh fuEufyf[kr ekeyksa dk gksx&

- ikphu ,oa vokphu dk0;'kkL=h; fpUrukRed fo'y"k.k dju dh {kerk dk fodkl A
- lL—r lkfgR;d&xUFkksa dk0;'kkL=h; vui;kxkRed nf"V dk fodkl A

SANS 519 lLdr lkfgR; dh vk/kfud fo/kk,a

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxkeh&

ikB;Øe dk lQyrkiod v/;;u dk i'pkr fo|kFkh fuEufyf[kr ekeyksa dk gksx&

- dk0;ltuk dk lkUn;ckZk ,oa Hkkoa dk tkxr dj ekfyd vfHk0;fDr dh ;kX;rk dk fodkLk A

SANS 501 vk/kfud lLdr lkfgR; Hkkx&I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

fuxkeh &

ikB;Øe dk lQyrkiod v/;;u dk i'pkr fo|kFkh fuEufyf[kr ekeyksa dk gksx&

- lL—r lkfgR; dh vk/kfud i)fr;k dk Kku A
- vk/kfud lL—r lkfgR; dh x|&i| fo/kk l ifjp;A
- Hkkoa lkUn; ,oa dYiuk lkUn; dk vfHk0;Dr dju dh {kerk dk fodkl A

SANS 502 vk/kfud lLdr lkfgR; Hkkx&II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

fuxsZ'k&

ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkx&

- vk/kfud lLdr lkfgR; dk KkuA
- 'pfj=i/kku ukV;lkfgR; egkukVd d ek/;e l ;okvk dk pkfjf=d fodkl A
- dFkkvk d ek/;e l ekuoh; eY;k dk fodkl A

Lok/;k;k/kkfjr p;fur ikB;Øe leg

SANS 511R Hkkjrh; fyfi & foKku

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	0	2

fuxsZ'k&

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Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	0	2

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SANS 514R lLdr e dyk&fpUru

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	0	2

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Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	0	2

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Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	0	2

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BANASTHALI VIDYAPITH

Master of Arts (Geography)
Master of Science (Geography)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Banasthali Vidyapith is an epitome of tradition and modernity. Vidyapith aims to preserve and inculcate the essential values and ideals of Indian culture. It believes in simple living and high thinking. Our educational ideology is based on the concept of fivefold education focusing on physical, practical, aesthetic, moral and intellectual aspects in order to develop a balanced personality.

Geography studies the earth in relation to mankind. Man's lifestyle is influenced by physical aspects in its immediate surroundings and Geography act as a bridge between man and its environment. Geography is also related to human dimension wherein man using the resources and creates its economic dimension. Various arenas of human aspects such as business, trade, commerce, agriculture, industry, navigation, military operations, spacecraft and administration needs Geography as a foundation.

Master's in Geography provides knowledge about scientific methods and facts from physical and human geography, particularly biogeography, climatology, oceanography, remote sensing, economic and resource geography, population geography, morphometric analysis, regional development & planning and geoinformatics. Furthermore students will gain profound knowledge of current research problems, approaches, and insights regarding the interactions between the environment and society in the context of global change. Students learn to integrate scientific theories, findings, and procedures in order to analyze and model human-environmental systems.

The main objectives of the Post Graduate Geography programme are:

- To illustrate the atmospheric and hydrospheric phenomenon of the earth, geographical dimensions of India, regional development and planning at national & state level.
- To explain contribution of various scholars in the evolution and origin of the discipline along with paradigms, concepts, approaches and social relevance revolutions.
- To develop skills in surveying and explain standard quantitative methods for research in physical and socio- economic aspects.
- To use Geographic Information Systems (GIS), particularly for the purpose of map making, classification, 3D analysis etc.
- To minimize negative impacts of agriculture, mining, industries, urbanization etc. by conveying concept of environmental protection and conservation.
- To develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions.

- To raise sensitivity for ethical codes of conduct, social values with help of eco-feminism, gender equality, social balance and respect for each strata of the society.

Program Outcomes

PO1: **Geography Knowledge:** Explain geomorphic processes involved in landform development, resource distribution, and concept of geographical grid, cosmogony, cosmology and geographical thoughts and concepts; Students have knowledge of atmosphere and hydrosphere as well as the importance of regional planning and associated developmental phenomenon. Analyze drainage basins and their linear, areal and relief aspects. Students can identify, delineate watershed area and extent of erosion to plan for its management.

PO2: **Planning abilities:** Apply surveying techniques with the help of theodolite, dumpy level, total station and GPS for mapping and planning of any area.

PO3: **Design/development of solution for problems:** Development is solution oriented. The program enables them to use several research techniques in portraying the problem at regional national and world forums. The capability to generate solution to most common social, economic, and environmental problems is developed among the future handlers of the society.

PO4: **Problem analysis:** Apply Statistical techniques for data analysis, computation and its representation. Students will become familiar with standard quantitative methods, enabling them to accurately understand the meaning of information and how this information can be used to understand economic and social issues.

PO5: **Modern tool usage:** Use remote sensing and GIS techniques in medical, urban & rural settlements, environment, agriculture, resource, tourism and several other aspects from a geographical perspective. The applications can further enhance research in the discipline and contribute towards a better living environment.

PO6: **Leadership skills:** Fieldwork is an essential component and an ideal setting in which teamwork and leadership skills are developed in young geographers. Geographical Investigations test hypothesis and involve spatial and temporal analysis. Geographers are used to manipulating and interpreting data and preparing reports regarding several aspects of human and physical environment.

PO7: Professional Identity: understand, analyze and contribute towards the discipline adopting professions as a researcher, teacher, cartographer, climatologist, meteorologist and planner.

PO8: Geographical Ethics: Apply ethical principles in personal, professional and social levels. Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO9: Communication: Communicate effectively with the Earth Science community and with society at large, such as, being able to comprehend and write effective, make effective presentations and documentation, and give and receive clear instructions.

PO10: The Geographer and society: Create awareness in society about the conservation and management of Resources; Understand spatial distribution, socio-cultural, economic and administrative aspects of various tribes and races at regional and global level and their problems; Describe and understand political, social, agriculture, population and related problems associated with society and environment.

PO11: Environment and sustainability: Understand resource production, distribution and trade at regional and global level and join hands towards sustainable development of the society.

PO12: Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

First Semester

GEOG 401 Advance Geomorphology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Analyze the relation between geomorphological processes and landscape formation.
- Explain the structure of earth's interior.
- Describe endogenetic and exogenetic activities transforming the earth.
- Apply geomorphological knowledge in research related to land-use, mining and agriculture.

GEOG 404 Economic and Resource Geography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe and develop the approaches to economic and resource geography.
- Describe the resource related issues, map them systematically.
- Explain the interference of world trading blocs in international economics.
- Describe the non-conventional resources and their usability and apprise public about the depletion of resources.

GEOG 405 Geographical Thoughts and Concepts

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of this course, students should be able to:

- Analyze the work of several scholars and their contribution to the field.
- Analyze the historical works and extract geographical information from them.
- Describe the concepts, paradigms and models in Geography.
- Develop an individual approach towards the subject.

GEOG 407 Introduction to Geography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the nature of the subject and understand the geographical knowledge in ancient civilizations.
- Develop an understanding of latitudes, longitudes, rotation, revolution, day and night and seasons.
- Explain human dimensions in geography in context of several tribes and their economic activities.
- Know the human adaptation to the environment in relation to several tribes.

GEOG 402L Cartographic Techniques Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

After the completion of this course, students should be able to:

- Diagrammatically display secondary and primary data through diagrams for all three dimensions.
- Have an understanding of map projections which further helps in cartography.
- Interpret toposheets and open series maps for applied aspects.

- Use the tools of cartography for research purpose.

Second Semester

GEOG 403 Climatology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe climate and climatic factors such as temperature, pressure, insolation and their distribution.
- Describe the origin and location of winds with world map.
- Explain Air masses, fronts, Jet streams and their impacts.
- Explain the relation of climate with agriculture, urban planning and health.

GEOG 406 Geography of India

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Demarcate India physiographically into major divisions and understand seasons prevailing in the country.
- Locate the several mineral, energy and industrial resources on country's map.
- Describe demographic structure of India.
- Describe the geography of Rajasthan, its resources and problems.

GEOG 409 Oceanography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the scope of oceanography and morphology of ocean bottoms of Pacific, Atlantic and Indian oceans.
- Have knowledge about the density, salinity, temperature and its distribution in the oceans.
- Explain Coral Reefs, its types and origin.

- Describe the dynamics of the ocean and marine resources.

GEOG 410 Regional Development and Planning

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe planning, its types and need.
- Explain region as a concept and describe its types.
- Delineate and demarcate regions with statistical techniques.
- Measure development statistically and have an understanding of development programmes currently existing in the county.

GEOG 408L Morphometric Analysis Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After the completion of this course, students should be able to:

- Relate river actions and the topography of the region.
- Calculate linear, areal, relief and slope related parameters.
- Analyse the nature of river, its structure, direction of flow.
- Analyse the drainage basin, erosional work of any river and its impact over the landscape.

Third Semester

GEOG 504 Political Geography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Develop an approach to study political geography.
- Describe growth of the states and concept of Geopolitics.
- Differentiate between state and nation and also explain geopolitical issues with special reference to Sino India and Indo Pak.
- Discuss world political and environmental issues.

GEOG 507 Research Methodology and Quantitative Techniques

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Analyse the importance of research in geography.
- Design a research proposal and have an understanding about its structure and collection techniques for primary and secondary data.
- Calculate measures of central tendency, dispersion and correlate two phenomenons.
- Test the hypothesis of varied samples sizes and nature.

GEOG 510 Systematic Agricultural Geography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe approaches to study agricultural geography.
- Apprise farmers about new farming techniques, influencing patterns and environmental degradation caused by agriculture.
- Demarcate any region according to world classification systems through statistical techniques.
- Classify land on several parameters and discuss the nature of agricultural problems of the nation.

GEOG 509L Surveying Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

After the completion of this course, students should be able to:

- Handle the surveying instruments- Theodolite, dumpy level and Indian Clinometer.
- Measure the angles and survey different areas through triangulation and traverse method.
- Plot the longitudinal profile of any region through dumpy level.
- Conduct a field survey of any region.

Fourth Semester

GEOG 501 Environmental Geography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe approaches to study environment.
- Describe several environmental cycles, food chain, pyramids and energy flow.
- Depict the consequences of pollution and hazards and suggest measures to control them.
- Create awareness about the need of biodiversity conservation.

GEOG 506 Remote Sensing and GIS

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the concepts of aerial photography, Remote sensing and GIS.
- Develop background knowledge of platforms, sensors, thermal and microwave remote sensing.
- Describe concepts related to electromagnetic radiation, Spectral Signatures, thermal and microwave remote sensing.
- Apply Geospatial techniques in fields of cartography, environmental management, vegetation monitoring, forest cover depletion etc.

GEOG 516L Remote Sensing and GIS Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After the completion of this course, students should be able to:

- Perceive the depth through pocket stereoscope.
- Interpret the aerial photographs and generate Land use and Land cover map with the help of mirror stereoscope.
- Determine height, scale of aerial photographs.
- Georeference any map, create thematic maps, generate DEM and slope maps.

Discipline Electives

GEOG 502 Geography of Rural Settlements

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Develop an approach to study rural settlements.
- Depict the evolution of settlements and relate it to the geographical factors.
- Describe rural morphology, its meaning and types.
- Describe house types, hierarchy of rural settlements and rural centers.

GEOG 503 Medical Geography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Depict spatial and temporal development of medical geography.
- Relate the course with other social sciences and develop an interdisciplinary approach.

- Relate natural, social and environmental factors with human health and diseases.
- Use statistical methods for assessing health.

GEOG 511 Tourism Geography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Propagate the idea of ecotourism and sustainable tourism.
- Depict the social and economic benefits of tourism in any tourist site.
- Explain tourism potential of deprived places.
- Describe the tourism on national and state level.

GEOG 512 Urban Geography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students should be able to:

- Depict the development of cities and relate with the classical theories of growth of cities.
- Describe the evolution and origin of cities.
- Classify cities functionally into different zones.
- Describe models in urban geography with special reference to the work of Christaller and Losch.

GEOG 505 Population Geography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of this course, students should be able to:

- Map the world in terms of density, distribution and other demographic aspects.
- Differentiate between demographic characteristics of developing and developed nations and factors posing that difference.
- Have a theoretical background about population growth and migration.
- Depict the trends of urbanization and demographic structure of India.

GEOG 508 Social Geography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of this course, students should be able to:

- Develop an approach to study social geography.
- Describe social processes, social strata's and organizations.
- Relate society and culture, understand cultural realms and regions.
- Analyze the current status of women in India and suggest measures for improvement.

Reading Electives

ENVS 512R Agroforestry

	L	T	P	C
Max. Marks : 100				
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe agroforestry and agroforestry interventions.
- Assess the role of Agroforestry as a sustainable land-use activity.
- Describe Nutrient cycling and role of agroforestry in soil and water conservation
- Describe various energy plantation methods.

ENVS 513R Energy Resources and Conservation

	L	T	P	C
Max. Marks : 100				
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the non-conventional sources of energy.
- Explain concepts on energy utilization and conservation.
- Emphasize energy conservation strategies in residential, industrial and transportation sector.
- Describe National Energy Policy.

ENVS 515R Man and Environment

	L	T	P	C
Max. Marks : 100				
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the complex interactions of humans and ecological systems in the natural world.

- Synthesize and apply a wide range of scientific literature in the ecological and environmental science.
- Interpret a wide range of scientific literature in ecology and environmental science.
- Apply the information in the realms of environmental sciences and sustainability.

ENVS_517R Water and Sustainable Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Classify major causes of exploitation of water resources, particularly in the Indian and Asian context.
- Summarize rainwater harvesting and water conservation measures.
- Describe methods of Irrigation management.
- Describe importance of Wetlands and its conservation

GEOG 513R Environmental Challenges and Disaster Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain approaches to study environmental development and crisis.
- Describe world energy crisis with its causes and suggested measures for improvement.
- Describe several environmental problems their causes, consequences and mitigation.
- Depict the major disasters and their management with the help of case studies.

GEOG 514R India: Socio-Political and Environmental Scenario

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Understand the current issues related with boundaries. water sharing, agricultural disparities, food security in India.
- Describe problems in Agricultural Development.
- Discuss Gender Issues and Women Safety.
- Find the role of non – conventional energy resources for solving energy crisis.

GEOG 515R Rajasthan: Challenges and Prospects

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the major environmental, socio economic problems of Rajasthan.
- Explain desertification, Aravalli development, agriculture and tourism of Rajasthan.
- Analyze existing state and national policies in terms of socio economic conditions.
- Aware society regarding existing policies related to child marriage, Female feticide and other Social problems.

GEOG 517R Transforming India

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Assess the ongoing governmental policies applicable to socio-economic and health sectors.
- Aware society about the injustice caused to Women in terms of Triple Talaq.
- Explain current livelihood struggle in the society and the role of skill development in enhancing quality of life.
- Suggest the measures of improvement in the policies.

GEOL 514R Geo Tourism

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Elucidate the criterion require for designating geotour sites.
- Explore the geological and geographical attributes of the geosites.
- Develop a geo-conservation plan for geotour sites.
- Evaluate the potential of geosites for revenue generation.

GEOL 517R Indian Mineral Deposits, Economics and Mining Ethics

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the distribution of mineral resources in India.
- Evaluate the mineral resources and reserves in Indian and global perspective.

- Familiarize with the concept of mineral legislation and policies.
- Delineate the different environmental issues associated with mining activities.

GEOL 518R Innovation and Entrepreneurship in Earth Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Understand necessary steps to open a new venture.
- Gain an understanding of creating products or services, launching innovative projects and making R&D investments in a start-up context.
- Develop marketing strategies for tools and technical products used in earth sciences.
- Familiarize with the legal concepts and financial planning for a successful new venture.

GEOL 521R Natural Hazards and Disasters

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the key concepts, definitions, perspectives of all hazards and management.
- Describe prevention and mitigation of natural hazards.
- Depict the preparedness response and recovery management of natural disasters.
- Elucidate the sustainable development methods in disaster mitigation.

BANASTHALI VIDYAPITH

M.A./M.Sc. (Mathematical Sciences - Pure Mathematics)
M.A./M.Sc. (Mathematical Sciences - Statistics)
M.A./M.Sc. (Mathematical Sciences - Operations Research)
M.A./M.Sc. (Mathematical Sciences-Theoretical Computer Science)
M.A./M.Sc. (Mathematics)
M.A./M.Sc. (Statistics)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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M.A./M.Sc. (Mathematical Sciences)

Programme Educational Objectives

Banasthali's education ideology is to nurture women leaders in all walks of life with strong value base. Mathematical Sciences is the most important discipline in today's world which open doors in engineering, business, finance, computing, data science, health sciences and environmental sciences. The educational objective of the M.Sc. Mathematical Sciences programme is to provide high quality education in mathematics, statistics, operations research and theoretical computer science in order to prepare students for professional careers in mathematical sciences and related fields.

The aim of the programme is to equip students with mathematical and statistical knowledge to define mathematical concepts, calculate quantities, estimate solutions, design data collection, analyze data appropriately and interpret to draw conclusions from these data. It emphasizes on both theory and applications of mathematics and statistics and is structured to provide knowledge and skills in depth necessary for the employability of students in industry, other organizations, as well as in academics.

The main objectives of the M.Sc. (Mathematical Sciences) programme are:

- To develop an understanding of the mathematics, statistics, operations research and theoretical computer science as a unifying language of science.
- To use mathematical and statistical techniques to solve well-defined real-world problems and understand the limitations.
- To provide exposure to various mathematical and statistical software packages, including analysis and programming.
- To develop communication and technical writing skills which enables them to present mathematical and statistical ideas clearly in oral and written forms using appropriate technical terms and deliver data analysis results.
- To nurture skills in effective multidisciplinary teamwork and adherence to principles of professional accountability and ethics.

Programme Outcomes

PO1: **Knowledge Domain:** Demonstrate an understanding of the basic concepts in mathematics, statistics, operations research and theoretical computer science and their importance in the solution of some real-world problems.

PO2: **Problem Analysis:** Analyze and solve the well-defined problems in mathematics statistics, operations research and theoretical computer science. Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO3: **Presentation and Interpretation of Data:** Demonstrate the ability to manipulate and visualize data and to compute standard statistical summaries.

PO4: **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and computing tools such as Excel, MATLAB, MATHEMATICA, SPSS, R etc. with an understanding of the limitations.

PO5: **Technical Skills:** Understand tools of modeling, simulation, and data analysis to bear on real-world problems, producing solutions with the power to predict and explain complex phenomena.

PO6: **Ethics:** Analyze relevant academic, professional and research ethical problems and commit to professional ethics and responsibilities with applicable norms of the data analysis and research practices.

PO7: **Communication:** Effectively communicate about their field of expertise on their activities, with their peer and society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations.

PO8: **Project Management:** Apply knowledge and understanding of principles of mathematics and statistics effectively as an individual, and as a member or leader in diverse teams to manage projects in multidisciplinary environment.

PO9: **Research Proposal:** Define, design and deliver a significant piece of research work that is clear and concise. Demonstrate the necessary skills and knowledge of deeper understanding of their chosen research area. Understand the philosophy of research in mathematical sciences and appreciate the value of its development.

PO10: **Life- long learning:** Demonstrate the ability to read and learn mathematical and statistical tools on their own that encourage independent exploration in the specific area of mathematics, statistics, operations research and theoretical computer science. Continue to acquire mathematical and statistical knowledge and skills appropriate to professional activities in the context of technological change.

M.A./M.Sc. (Mathematics)

Programme Educational Objectives

Banasthali's education ideology is to nurture women leaders in all walks of life with strong value base. Mathematics education opens doors in engineering, business, finance, computing, health sciences and environmental sciences. The educational objective of the M.Sc. Mathematics programme is to provide high quality education in pure and applied mathematics in order to prepare students for professional careers in mathematical sciences and related fields.

The aim of the programme is to equip students with analytic and problem-solving skills to define mathematical concepts, calculate quantities, estimate solutions, represent mathematical information, develop models, interpret data, explore systems and communicate mathematical thoughts.

The main objectives of the M.Sc. (Mathematics) programme are:

- To develop an understanding of the underlying structures of mathematics and the relationships among them.
- To develop and understand the value of proof, the single factor that distinguishes mathematics from all other disciplines.
- To develop an understanding of the historical and contemporary role of mathematics and be able to transmit mathematical ideas both orally and in writing.
- To provide exposure to a variety of areas of mathematics and related fields and to explore applications of mathematical ideas and models in the real-world problems.
- To develop the ability to read and learn mathematics on their own andutilize it to solve theoretical and applied problems.

Programme Outcomes

PO1: Mathematics Knowledge: Demonstrate an understanding of the basic concepts in algebra, analysis, geometry, graph theory, differential equations, number theory, numerical analysis, queueing theory and inventory theory and their importance in the solution of some real-world problems.

PO2: Problem Analysis and Solution: Analyze and solve the well-defined problems in mathematics. Demonstrate the ability to apply mathematical ideas and models to investigate and solve the problems in related fields such as computer science, biology, physics, business and economics. Gather and organize related problems, examples and counterexamples, identify suitable methods of analysis and to construct abstract models of the problem being considered.

PO3: Logic and Critical Thinking: Think critically with abstract reasoning and to develop a logically correct mathematical argument both in oral and written format. Demonstrate the ability to make ideas precise by formulating them mathematically, analyze and interpret technical arguments and form independent deductions.

PO4: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and computing tools such as MATLAB, MATHEMATICA etc. with an understanding of the limitations.

PO5: Ethics: Analyze relevant academic, professional and research ethical problems and commit to professional ethics and responsibilities with applicable norms of the mathematics research practices.

PO6: Communication: Communicate mathematical thoughts and ideas clearly and coherently to mathematics and non-mathematics community in both oral and written format. Describe mathematical information graphically, symbolically, numerically and visually using appropriate technology. Demonstrate the ability of mathematical writing, make effective presentations and documentation, and give and receive clear instructions.

PO7: Research Proposal: Define, design and deliver a significant piece of research work that is clear and concise. Demonstrate the necessary skills and knowledge of deeper understanding of their chosen research area. Understand the philosophy of research in mathematics and appreciate the value of its development.

PO8: Life- long learning: Demonstrate the ability to read and learn mathematics on their own that encourage independent exploration in mathematics. Continue to acquire mathematical knowledge and skills appropriate to professional activities in the context of technological change.

M.A./M.Sc. (Statistics)

Programme Educational Objectives

Banasthali's education ideology is to nurture women leaders in all walks of life with strong value base. Mathematics and statistics open doors in engineering, business, finance, computing, data sciences, health sciences, environmental sciences and public policy. The educational objective of the M.Sc. Statistics programme is to provide high quality education in pure and applied statistics in order to prepare students for professional careers.

Statisticians help to design data collection, analyze data appropriately and interpret to draw conclusions from these data. The essential competencies required for a Statistician have been well incorporated in the programme. It emphasizes both theory and modern applications of statistics and is structured to provide knowledge and skills in depth necessary for the employability of students in industry, other organizations, as well as in academics.

The main objectives of the M.Sc. (Statistics) programme are:

- To develop an ability to reason logically and capacity for statistical thinking.
- To provide a deep understanding of the most important statistical models and analytical tools for practical analysis of complex data, as well as the ability to analyze new types of problems.
- To provide exposure to various statistical software packages, including analysis and programming.
- To develop communication and technical writing skills which enables them to present statistical ideas clearly in oral and written forms using appropriate technical terms and deliver data analysis results to non-statistical audience.
- To nurture skills in effective multidisciplinary teamwork and adherence to principles of professional accountability and ethics.

Programme Outcomes

PO1: Knowledge Domain: Demonstrate an understanding of the theoretical and computational aspects of probability theory, inference, sample surveys, multivariate techniques, regression analysis and stochastic process and their importance in data analytics.

PO2: Problem Analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO3: Presentation and Interpretation of Data: Demonstrate the ability to manipulate and visualize data and to compute standard statistical summaries.

PO4: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and computing tools such as Excel, MATLAB, SPSS and R with an understanding of the limitations.

PO5: Technical Skills: Understand tools of modeling, simulation, and data analysis to bear on real-world problems, producing solutions with the power to predict and explain complex phenomena.

PO6: Ethics: Analyze relevant academic, professional and research ethical problems and commit to professional ethics and responsibilities with applicable norms for the data analysis and research practices.

PO6: Communication: Effectively communicate about their field of expertise on their activities, with their peer and society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations.

PO7: Project Management: Apply knowledge and understanding of principles of statistics effectively as an individual, and as a member or leader in diverse teams to manage projects in multidisciplinary environment.

PO8: Life- long learning: Demonstrate the ability to read and learn statistical tools on their own that encourage independent exploration in data analytics. Continue to acquire statistical knowledge and skills appropriate to professional activities in the context of technological change.

MATH 412 Algebra-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completing the course, students will be able to

1. Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces.
2. Understand the properties of linear transformations, matrices of linear transformations and change of basis, including kernel, range and isomorphism.
3. Compute inner products and determine orthogonality on vector spaces, including Gram-Schmidt orthogonalization.
4. Identify operators in inner product spaces.
5. Identify bilinear forms, canonical forms for symmetric and skew-symmetric forms.

MATH 415 Analysis-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

On completion of the course, the student will be able to,

- understand modern theory of set and real numbers.
- investigate different metric spaces and their properties.
- master the technique of calculating the Lebesgue integral and understand the applications measurable functions.
- explain construction and investigate properties of Lebesgue measure.
- derive the Fourier series of integrable functions.
- discuss the point-wise and uniform convergence of series.

MATH 420 Discrete Mathematics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completing the course, students will be able to

1. Understand logical arguments and logical constructs. Have a better understanding of sets, functions and relations.
2. Apply logical reasoning to solve a variety of mathematical problems.
3. Understand and apply the fundamental concepts in graph theory.
4. Acquire ability to apply graph theory-based tools in solving practical problems.
5. Improve the proof writing skills and able to develop mathematical maturity.

STAT 402 Probability and Statistics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the students will be able to:

- Understand the meaning of probability and probabilistic experiment
- Familiarize with the all approaches to probability theory and particularly, the axiomatic approach.
- Understanding the meaning of conditional probability, conditioning, and reduced sample space.
- Understand the concepts of random variables, sigma-fields generated by random variables, probability distributions and independence of random variables related to measurable functions.
- Distinguish between independent and uncorrelated random variables.
- Distinguish between discrete, continuous, and mixed random variables and be able to represent them using probability mass, probability density, and cumulative distribution function.
- Derive the distribution of functions of random variable.

- Understand the concepts of sampling distributions and use of sampling distribution in hypothesis testing.

CS 415 Computer Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understanding the concepts of computer basics and programming.
- Understanding of the organization and operations of a computer system.
- Understanding of Binary logic in design of electronic circuits.
- Students would have logical thinking for Analyzing problems, designing and implementing algorithmic solutions.
- Students would get the skills for the use of the C programming language to implement the real world applications.

CS 415L Computer Programming Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

MATH 417L Computational Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Perform basic mathematical operations in MATLAB.
- Create vectors, arrays, matrices and perform fundamental matrix operations.
- Visualize basic mathematical functions.
- Solve linear equations and system of linear equations.
- Import/export data, summarize and visualize the data.

- Fit some standard distributions and test hypothesis.

MATH 413 Algebra-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completing the course, students will be able

- To demonstrate the mathematical maturity of understanding the proof.
- To understand the algebraic structures groups, rings, modules.
- To grasp the significance of the concepts of homomorphism &isomorphism and be able to check a given function is one of these.
- To understand the class equation for a finite group and its applications in Sylows theorems.
- To classify groups up to isomorphism.
- To really understand the special types of rings and be able to construct new examples from the old ones.
- To check a subset of a ring is an ideal or not and be able to identify proper and maximal ideal.
- To understand the concept of unique factorization domain and able to write a polynomial as the product of irreducible factors
- To describe as a generalization of vector space and able to understand types of modules.
- To grasp the concept of Artinian modules, Northerian modules, Artinian rings and Northerian rings.

MATH 416 Analysis-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

On completion of the course, the student will be able to,

- demonstrate understanding of the basic and advanced concepts underlying complex analysis.
- demonstrate familiarity with a range of examples of these concepts.
- prove advanced results/theorems in complex analysis.

- apply the methods of complex function theory to evaluate integrals and infinite series of complex functions.
- demonstrate understanding and appreciation of a more deeper aspects of complex function theory.
- demonstrate skills in communicating mathematics orally and in writing.

MATH 422 Ordinary Differential Equations

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, students will be able to

- Understand the existence and uniqueness of IVPs and their solution
- Understand method of successive approximations, variation of constants, annihilator method, and reduction of order of a homogeneous equation.
- Solve linear differential equations of higher order with variable coefficients.
- Solve boundary value problems for second order equations.
- Solve Boundary Value problems for second order equations by Green's function, Strum-Liouville Boundary Value problem.
- Grasp the concept of the stability of system of differential equations
- Solve system of linear differential equations and study the qualitative behavior of these systems.

MATH 423 Topology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon successful completion of this course, student will be able to

- Define andillustrate the concept of topological spaces and continuous functions.
- Defineand illustrate the concept of product topology and quotient topology.

- Calculate simple topological invariants, such as the number of path components.
- Define and illustrate the concepts separation axioms.
- Use continuous functions and homeomorphisms to understand structure of topological spaces.

MATH 409 Numerical Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Demonstrate numerical methods to obtain approximate solutions to mathematical problems.
- Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of ordinary differential equations.
- Analyze the appropriate numerical method to find the Eigen values and corresponding eigenvectors of a system.
- Use rational approximation of a function like Padé approximant for power series.
- Solve the boundary value problems using shooting method and finite difference method.
- Define and use the concepts accuracy, consistence, stability and convergence.

MATH 409L Numerical Analysis Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Implement numerical methods in MATLAB to solve systems of linear equations, compute quadrature, solve ordinary differential equations and various computational problems.

- Write efficient, well-documented MATLAB code and present numerical results in an informative way.
- Show logical thinking in coding a mathematical problem in algorithmic form.
- Use their knowledge of a programming in MATLAB to learn more easily any other programming language like Mathematica, Python etc.

MATH 418L Computational Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On successful completion of the course, the students will be able to,

- Understand the fundaments of procedural and functional programming with Mathematica software;
- Efficiently use these technical computing systems in one's studies and research.
- Set up simple engineering problems such that they can be solved and visualized using basic codes.

STAT 407 Statistical Inference

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After successful completion of this course, student will be able to:

- Apply various parametric, non-parametric and sequential estimation techniques and testing procedures to deal with real life problems.
- Understand confidence interval, Neyman-Pearson fundamental lemma, UMP test, Interval estimation.
- Understand SPRT, OC and ASN function.
- Understand non-parametric methods, U-statistic.

STAT 406 Measure Theory and Advanced Probability

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of this unit, students will be able to:

- Understand the basic concepts of measure and integration theory.
- Understand of the theory on the basis of examples of application.
- Use abstract methods to solve problems and to use a wide range of references and critical thinking.
- Use weak and strong law of large numbers in statistical theory.

CS 417 Database Management Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Describe data models and schemas in DBMS
- Understand the features of database management system and Relational databases.
- Use SQL -the standard language of relational databases.
- Understand the functional dependencies and design of the database.
- Understand the concept of Transaction and Query processing.

CS 417L Database Management Systems Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

MATH 531 Advanced Calculus

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Analyzevector functions to find derivatives, tangent lines, integrals, and arc length.
- Evaluateintegrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.

- Use the Lagrange multiplier method to find extrema of functions with constraints.
- Solve problems involving tangent planes and normal lines.

MATH 542 Functional Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- explain the basic concepts of Functional Analysis, including the study of operator theory and the study of topological function spaces.
- describe how to illustrate the abstract notions in functional analysis via examples.
- apply Hilbert space-theory, including Riesz' representation theorem and weak convergence, and methods in problem solving.
- solve the problems appear in PDEs via the powerful tools from functional analysis,
- study in a range of other fields, e.g. Quantum Theory, Stochastic calculus and Harmonic analysis.

MATH 550 Operations Research

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Build a mathematical programming model of a real-life situation
- Write a report that describes the formulation of a linear programming problem, and able to presents and interprets the solutions.
- Understand the basic theory in linear programming.
- Apply a suitable method in research to develop the theories which will be applicable in the real-life problems.
- Understand the concepts of dynamic programming, job sequencing, network analysis.
- Understand the basic concepts and need of inventory theory and queueing theory.

STAT 532 Survey Sampling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes

- Understand the distinctive features of sampling schemes and its related estimation problems.
- Learn about various approaches (design based and model-based) to estimate admissible parameters; with and without replacement sampling scheme, sampling with varying probability of selection.
- Learn about the methods of post–stratification (stratified sampling) and controlled sampling and also double sampling procedure with unequal probability of selection.
- Learn about the applications of sampling methods; systematic, stratified and cluster sampling.
- Understand the cluster and two stages sampling with varying sizes of clusters/first stage units.
- Understand the super population approach to estimation.
- Understand non sampling error and estimation techniques in presence of non response.

STAT 529 Time Series and Stochastic Process

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes

On the successful completion of the course the students should be ableto

- Plot a time series and interpret the components.
- Identify and estimate cyclical fluctuations in the time series.
- Examine the relationship between the lagged values of the series.
- Test for the stationarity of the series.
- Estimate ARIMA(p,d,q) model for the series.
- Define stochastic process and identify its type .
- Understand the concept of Markov chain and its basic properties using some theorems.
- Define and understand the concept and application martingale.

- Define Poisson process and understand its properties with some applications.
- Apply gamblers ruin problem for some problems.
- Understand the basic concept and applications of Weiner process, Renewal theory and branching process.

STAT 507 Design of Experiments and Linear Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of this course, student will be able to:

- Identify what design was followed and its features, describe what assumptions are appropriate in modelling the data.
- Analyse the results of a designed experiment in order to conduct the appropriate statistical analysis of the data.
- Interpret statistical results from an experiment and report them in non-technical language.
- Compare efficiency of the experimental designs.

MATH 536L Computational Lab – III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning outcomes:

On completion of the course, the student will be able to,

- Analyze 2^n- factorial experiments.
- Apply ANCOVA with one and two concomitant variable
- Execute analysis and understanding of Split-plot designs and strip-plot design
- Appraise Narain, Horwitz-Thompson estimator, Des Raj's ordered estimator.
- Employ AR (p) process,MA (q) process, Mixed ARMA (p, q) process.

CS 209 Data tructures

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, stacks, queues, binary trees, heaps.
- Develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
- Learn to analyze and compare algorithms for efficiency using Big-O notation.
- Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
- Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

CS 209L Data Structures Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

MATH 555 Queueing Theory

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On completion of the course, the student will be able to

- Understand the principles and objectives of model building based on Markov chains.
- Analyze the queueing situations.
- Understand the mathematical tools that are needed to solve queueing problems.

- Identify and develop queueing models from the verbal description of the real system.

MATH 546 Inventory Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of this course, students will be able to:

- Comprehend the dynamics of inventory management's principles, concepts, and techniques as they relate to the entire supply chain (customer demand, distribution, and product transformation processes),
- Understand the methods used by organizations to obtain the right quantities of stock or inventory,
- Familiarize themselves with inventory management practices.
- Optimize different case studies requires efficient methods and practices to address inventory management problems.
- Understand the behavior of the inventory parameters after some time using simulation techniques.

MATH 539 Fields and Galois Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of this course, students will be able to

- Understand the concepts of field extension and appreciate its importance.
- Understand different types of extensions.
- Find the Galois group for some extension fields.
- Know the link between field theory and group theory.
- Demonstrate the solvability of quadratic, cubic and quartic equations by radicals.

STAT 508 Distribution Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, the students will be able to:

- Formulate the statistical models for real data sets arising in various fields in order to analyze in respect of various useful characteristics of the populations
- Develop problem-solving techniques needed to accurately calculate probabilities.
- Identify the distribution of random variable under various discrete and continuous distributions.
- Calculate probabilities, moments and other related quantities based on given distributions.
- Determine the probability distribution after transformation.
- Understand how to use non-central distributions in real life problems.

CS 308 Operating Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Learn the fundamentals of Operating Systems.
- Learn the mechanisms of OS to handle processes and threads and their communication
- Learn the mechanisms involved in memory management in contemporary OS
- Gain knowledge on Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- Know the components and management aspects of concurrency management
- Learn Case study of Unix OS.

CS 528 Modeling and Simulation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Define basic concepts in modeling and simulation (M&S).
- Classify various simulation models and give practical examples for each category.
- Construct a model for a given set of data and perform its validity.
- Generate and test random number and apply them to develop simulation models.
- Analyze output data produced by a model and test validity of the model.
- Explain parallel and distributed simulation methods.
- Know how to simulate any discrete system using queuing systems.

CS 315 Theory of Computation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory.
- Understand abstract models of computing, including deterministic (DFA), non-deterministic (NFA), Push Down Automata(PDA) andTuring (TM) machine models and their power to recognize the languages.
- Understand the application of machine models and descriptors to compiler theory and parsing.
- Relate practical problems to languages, automata, computability, and complexity.
- Apply mathematical and formal techniques for solving problems in computer science.
- Understand the relationship among language classes and grammars with the help of Chomsky Hierarchy.

MATH 537 Differential Geometry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to

- Compute Reparameterization, Curvature and Torsion of smooth curves of curves.
- Discuss about Osculating circle, Osculating sphere, Involutes and Evaluates, Bertrand curves, and Helices.
- Compute quantities of geometric interest such as curvature, as well as develop a facility to compute in various specialized systems, such as semi geodesic coordinates or ones representing asymptotic lines or principal curvatures.
- Develop arguments in the geometric description of curves and surfaces in order to establish basic properties of geodesics.

MATH 551 Partial Differential Equations

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to

- apply the techniques for solving partial differential equations.
- describe the most common partial differential equations that appear in problems concerning e.g. heat conduction, flow, elasticity and wave propagation
- solve simple first order equations using the method of characteristics and classify second order equations.
- describe, compute and analyse wave propagation and heat conduction in mathematical terms
- formulate maximum principles for various equations and derive consequences.
- evaluate and assess the results of various problems in other subjects based on these concepts.

STAT 519 Advanced Inference

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of this course, student will be able to

- Apply various estimation and testing procedures to deal with real life problems.
- Understand Fisher Information, Lower bounds to variance of estimators, MVUE.
- Understand consistency, CAN estimator, MLE.
- Understand Neyman-Pearson fundamental lemma, UMP test.
- Apply Likelihood Ratio test in real life testing problems.
- Understand invariant and similar test.

STAT 502 Bayesian and Multivariate Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On the successful completion of the course, student will be able to,

- Find posterior distribution of a parameter.
- Identify the nature of the prior.
- Understand various types of loss functions and their nature.
- Use Bayesian theory to draw inferences in simple problems.
- Define multivariate normal distribution and understand its properties.
- Estimate the mean vector and covariance matrix of the multivariate normal population.
- Test the significance of single mean vector and difference in the two mean vectors.
- Perform PCA and factor analysis on real data set.
- Classify and discriminate the observations in two populations.
- Perform correlation analysis between two multivariate populations.

STAT 502L Bayesian and Multivariate Analysis Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes

On completion of this course, the student will be able to

- Differentiate between the nature of prior and posterior densities by means of their plots
- Find Bayes estimator, Bayes Risk and perform Bayes testing
- Estimate mean vector and covariance matrix of given data set
- Perform testing of significance of single mean vector and difference of two mean vectors
- Reduce dimension of the data using principal component analysis and factor analysis
- Classify and discriminate observations in two or more populations
- Observe correlation between two sets of multivariate data sets.

STAT 524 Reliability and Renewal Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes

On successful completion of the course, the students will be able to:

- Understand the importance of validity and reliability assessment and the link between the two.
- Estimate the reliability function and mean time to failure for different types of systems
- Analyze statistical experiments leading to reliability modeling.
- Estimate life length distributions, using complete or censored data.
- Identify reliability testing components.
- Apply reliability theory to assessment of reliability in engineering design.
- Analyze non-repairable systems of independent components, with and without redundancy

- First look at what a random process is and then explain what renewal processes are.
- Describe, derive, and prove important theorems and formulas for renewal theory
- Use renewal theory to solve problems where Poisson is not a realistic process

MATH 516 Network Analysis and Goal Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of this course, students will be able to:

- Plan and structure a project.
- Understand basic techniques for quality improvement,
- Apply the PERT & CPM techniques to optimize the project goals.
- Solve network models like the shortest path, minimum spanning tree, and maximum flow problems.
- Understand how to model and solve problems using Goal Programming

MATH 516L Network Analysis and Goal Programming Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Implement optimization methods in software to solve shortest path problem, spanning tree problem, programming problems etc.
- The science learning goals of laboratory experiences include enhancing mastery of science subject matter, developing scientific reasoning abilities, increasing understanding of the complexity and ambiguity of empirical work, developing practical skills, increasing understanding of the nature of science, cultivating interest in science and science learning.

- Write efficient, well-documented code and present numerical results in an informative way.

CS 213 Design and Analysis of Algorithms

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Analyze the performance of various algorithms in terms of time and space.
- Solve recurrence relation using various methods.
- Compute complexity of various iterative and recursive algorithm.
- Understand the concept and design algorithm using data structures including threaded binary tree, B-Tree and hashing techniques.
- Understand numerous algorithm design techniques including divide& conquer, greedy, dynamic programming, backtracking and branch& bound.
- Choose appropriate algorithm design techniques for solving real world problems.
- Understand how the choice of the algorithm design methods impact the performance of programs

CS 213L Design and Analysis of Algorithms Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

CS 313 Software Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand the system development lifecycle.

- Understand the software-development process, including requirements analysis, design, programming, testing and maintenance.
- Model object-oriented software systems.
- Investigate and improve the specification of a software system.
- Specify, design and construct CASE tools and application software.
- Develop and apply testing strategies for software applications.
- Identify some of the main risks of software development and use.
- Effectively participate in team-based activities.

Discipline Elective

MATH 501 Advanced Analysis (Analysis on Abstract Spaces)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of this course, students will be able to

- Explain when Normed space become Banach space.
- Define the Hilbert spaces.
- Define multi linear mappings.
- Check whether the function is bounded or not?
- What is directional derivative?
- Explain the difference between partial derivative and directional derivative.
- Tell about the Lipschitz's constant and conditions
- Related the analysis and differential equation

MATH 503 Advanced Functional Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of this course, students will be able to

- Check whether a sequence of operators convergence or divergences?
- Explain how continuous function on a closed and bounded interval can be uniformly approximated on that interval by polynomials to any degree of accuracy.
- Explain how you will apply the Banach fixed point theorem.
- Relate the fixed point with solution of differential and Integral equation.
- Check the spectral properties of bounded linear operators
- Check whether the operator is compact or not?
- Explain and use of the properties of compact linear operators.

MATH 504 Analytic and Algebraic Number Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of this course, students will be able to

- Demonstrate the knowledge of arithmetic functions and their property.
- Know the prime number theorem and its analytic proof.
- Understand basic concepts of algebraic number theory such as conjugates, discriminants, algebraic integers, integral basis, norms and traces.
- Understand prime factorization of ideal and unique factorization.
- Know some important theorem in algebraic number theory.

MATH 510 Integral Equations and Calculus of Variations

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Acquire ability to recognize difference between Volterra and Fredholm Integral Equations, First kind and Second kind, homogeneous and inhomogeneous.
- Identify different types of integral equations and apply these methods to solve Integral Equations.
- Understand of the fundamental concepts of the space of admissible variations and concepts of a weak and a strong relative minimum of an integral.
- Solve isoperimetric problems of standard type.
- Solve simple initial and boundary value problems by using several variable calculus.

MATH 517 Number Theory and Cryptography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand the basic concepts of number theorem and their applications in cryptography.
- Know the need of security of digital data.
- Demonstrate the application of mathematics in computer science.
- Appreciate the historical cryptosystems and the development of modern cryptography.
- Demonstrate the knowledge of mathematics behind RSA cryptosystem, ElGamal Cryptosystem and secrete sharing schemes.

MATH 527 Tensor Analysis and Geometry of Manifolds

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Discuss different kinds of surfaces, connection and covariant derivatives.

- Understand the concepts of manifold and illustrate some examples of manifolds.
- Understand the Ricci identity and enable to use it in proving different theorems.
- Define and illustrate some examples of Lie group.

MATH 529 Theory of Games

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- understand all the basic concepts and results ofgame theory.
- understand terms like Nash equilibrium, the extensive form (which computer scientists call game trees), Bayesian games (modelling things like auctions), repeated and dynamic games.
- recognize and model strategic situations, to predict when and how your actions will influence the decisions of others and to exploit strategic situations for your own benefit.
- understant the game theoretic tools for modelling and solving problems in operations management.

MATH 530 Viscous Fluid Dynamics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand the fundamental concepts of fluid dynamics.
- Derive the fundamental equations governing the flow of a viscous fluid.
- Demonstrate the analytical solutions of navier-stokes equations by making certain assumptions for certain geometries.
- Identify, formulate and solve engineering problems.

MATH 507 Financial Mathematics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand financial analysis and planning.
- Know the cost of capital, capital structure and dividend policies.
- Apply technique of Goal Programming to profit planning and financial budgeting.
- Make financing decision onproblem of determining optimal capital structure
- Understand the concept of leasing, debt management, analysis of commitment of funds and risk of cash insolvency.

MATH 513 Marketing Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand the concept of marketing and its role in business and public organization.
- Understand the need for scientific marketing analysis.
- To uses Mathematical models in Marketing and understand their limitations.
- Understand the concept of promotional decisions in the presence of competition.
- Use game theory models for promotional effort.
- Make channels of distribution and transportation decision.

MATH 543 Fuzzy Logic and Belief Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of this course students will be able to:

- learn crips and fuzzy set theory.
- decide the difference between crips set and fuzzy set theory.
- make calculation on fuzy set theory.
- recognize fuzzy logic membership function and fuzzy inference systems.
- make applications on Fuzzy logic membership function and fuzzy inference systems.
- utilize fuzzy logic approach to problems arising in the field of Operations Research, Computer Science and Engineering.
- formulate logical expressions, fuzzy logic to solve a variety of problems related to real scenarios
- apply defuzzification methods.

MATH 534 Coding Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of this course students will be able to:

- Understand the need of coding theory.
- Appreciate the applications of abstract and linear algebra in coding theory.
- Find the generator and parity check matrix of linear codes.
- Understand the main coding theory problem.
- Derive classical bounds of codes and the distance of the code.
- Understand cyclic codes and their decoding.

MATH 540 Fixed Point Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of this course students will be able to:

- Understand various concepts in metric spaces such as completeness.

- Demonstrate standard examples of metric spaces and prove simple results related to them.
- Understand the proof of open mapping theorem and Closed graph theorem.
- Check the conditions for expansive and Nonexpansive Mappings, contractive and contraction mappings.
- Understand standard fixed-point theorems.
- To present the basic ideas of the theory, and illustrate them with a wealth of examples and applications in differential and integral equations.

MATH 545 Introduction to Dynamical Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of this course students will be able to:

- Describe the main features of dynamical systems and their realization as systems of ordinary differential equations.
- Identify fixed points of simple dynamical systems, and study the local dynamics around these fixed points, in particular to discuss their stability.
- Use a range of specialised analytical techniques which are required in the study of dynamical systems.
- Describe dynamical systems geometrically and represent them graphically via phase plane analysis.
- Find fixed points and period orbits of discrete dynamical systems, and find their stability.
- Do graphical analysis of 1D discrete dynamical systems.
- Understand the basic properties of a chaotic dynamical system.

MATH 533 Bio Mathematics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- model the single species and two species systems.
- study the stability of these systems.
- Apply harvesting of the species.
- to model epidemics and analyze the dynamics

MATH 532 Algebraic Topology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- Generate original solutions to a variety of mathematical problems related to the fundamental group and covering spaces.
- Recall all definitions and theorems in this course and use them to construct original proofs and/or counterexamples, even on demand (e.g. in exams or discussions).
- Use algebraic invariants of topological spaces to distinguish spaces which otherwise seem similar.
- Apply computational algorithms to compute algebraic invariants of simple topological spaces.

MATH 535 Combinatorial Optimization

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course, the student will be able to,

- define the concept of combinatorial (optimisation or satisfaction) problem
- recognize many types of combinatorial optimization problems;
- formulate linear and integer programs, and identify when a problem can be viewed in terms of various “standard” combinatorial

optimization problems; understand the mathematical concepts underlying these problems and their solutions;

- solve combinatorial optimization problems using suitable algorithms
- analyze the performance of simple algorithms, understand and interpret computational complexity, and reduce one problem to another.

MATH 559 Transportation System Analysis

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On completion of the course, the student will be able to,

1. Use optimal transportation decision-making schemes based on transportation data analysis by establishing, testing and solving transportation models.
2. Perform simple statistical analysis on transportation field data, sample estimation and hypothesis testing in transportation system.
3. Design suitable sampling and experimental methods for transportation system analysis and realize error sources.

MATH 544 Integral Transform and Special Functions

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On completion of the course, the student will be able to,

- understand transformations, and their conditions of existence.
- carry out integraltransformations and inverse transformation of different special functions, including some most useful special functions.
- demonstrate understanding of the concepts of recurrence relations, generating functions, series representations pertaining to different special functions and polynomials.
- determine some significant properties of special functions and integral transformations.
- discuss the nature of special functions in different domains.

STAT 505 Decision Theory

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes

On completion of the course, the student will be able to,

- Understand a decision theoretic approach to the problem, evaluate a utility function, propose a conjugate family of prior distributions, evaluate Bayes and posterior risks and find the optimal solution.
- Solve Multilevel Decision Problems, Decision Process with sampling information
- Understand Basic Concept of the sampling time Markov decision process, telecommunication and queuing theory.

STAT 522 Econometric Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After a successful completion of this course students will be able to

- Construct econometric models from economic models.
- Detect influential observations and perform robust regression.
- Estimate regression models when the dependent variable is nominal, ordinal or a quantile.
- Fit distributed lag model when the data is time series.
- Diagnose the identifiability of a simultaneous equation model.
- Estimate a simultaneous equation system.

STAT 504 Clinical Trials

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After reviewing this paper, students should be able to:

- Identify and classify different types of trial designs when reading a trial report.
- Understand the essential design issues of randomized clinical trials.
- Appreciate three possible sources of errors that could lead to erroneous trial results.

- Understand the basic statistical principles, concepts, and methods for clinical data analysis and reporting; and
- Understand some frequently used terms in clinical trials.
- Understand the relative contributions of clinical judgment and clinical trials in evaluating new medical therapies.

STAT 511 Non Parametric Inference and Sequential Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of this course, student will be able to,

- Solve hypothesis testing problems where the conditions for the traditional parametric inferential tools to be applied are not fulfilled.
- Build non-parametric density estimates.
- The application of sequential statistical techniques.
- Critically examining sequential procedures for appropriate statistical analyses.

STAT 513 Regression Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On the successful completion of the course the students should be ableto

- Understand the concept of regression and the underlying assumptions.
- Estimate least squares estimate of regression coefficients.
- Perform testing of complete regression model and subset of regression model.
- Measure the goodness of the model.
- Check the validity of the assumptions for a real data.
- Find a suitable remedy to reduce the effect of violation of any assumption.

- Include a qualitative variable as regressors in a regression model using dummy variables.
- Check the model for specification errors and its testing.
- Understand the concept of outlier, leverages and influential observations.
- Understand the concept of a simple logistic regression and make interpretations.

STAT 515 Statistical Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of this course, student will be able to:

- Simulate and generate statistical data by different techniques.
- Understand the basic concepts of statistical theories besides developing their ability to handle real world problems with large scale data.

STAT 527 Stochastic Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of this course, the students will be able to:

- Acquire skills in handling situations involving more than one random variables.
- Understand to analyze the performance of reliability models.
- Learn how to analyze a network of queues with Poisson arrivals and exponential service requirements.
- Learn how to analyze a network of queues with Poisson arrivals and general service requirements.
- Understand the concept of switching in reliability modeling.

STAT 521 Demography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Outcomes:

After successful completion of this course, the students will be able to

- Identify principle sources of demographic data and assess their strengths and weaknesses.
- Discuss the demographic significance of age and sex structures and the implications of variations in age & sex structure.
- Construct and interpret life tables.
- Calculation and interpretation of the principal demographic measures, and standardize these measures for comparison.
- Understand the components of population change, including the effects of changing birth, death and migration rates, and demonstrate their influences on age structure.
- Understand the concept of urbanization on the economic growth of the contrary.
- Estimate and project the population by different methods.
- Understand the concept of stable and stationary population.

STAT 518 Actuarial Statistics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Outcomes:

After successful completion of this course, the students will be able to:

- Understand the applications of Actuarial Statistics in insurance sector.
- Understand the concept of utility theory and premium principles.
- Construct life tables with various factors.
- Understand the concept of compound interest.
- Apply various life Insurance models in real life situations.

STAT 528 Survival Analysis

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On completion of the course, the student will be able to,

- Identify characteristics of survival data and problems in their correct analysis
- Define and understand the relationship between the survival function, distribution function, hazard function, relative hazard, and cumulative hazard
- Perform and interpret one-sample and two-sample analyses of survival data using common statistical procedures such as the log rank test and Kaplan-Meier estimator
- Formulate research questions involving survival data as regression problems
- Fit the proportional hazards regression and parametric regression models to survival data and assess the scientific significance, precision, and interpretation of regression coefficients
- Use graphical and other methods to assess the adequacy of fitted models and propose alternate solutions when common assumptions are violated
- Use time-dependent covariates in the proportional hazards model and interpret the coefficients
- Understand and use methods for analyzing correlated survival data
- Interpret and critically evaluate survival analyses in biomedical or epidemiologic manuscripts

CS 419 Distributed Computing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Study software components of distributed computing systems. Know about the communication and interconnection architecture of multiple computer systems.

- Recognize the inherent difficulties that arise due to distributed-ness of computing resources.
- Understand the hardware and software concepts of distributed operating systems, various design issues like transparency, flexibility etc., and communication and synchronization in distributed operating systems.
- Understand scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems.
- Understand the concept of design and implementation in the context of distributed operating systems.
- Develop various synchronous and asynchronous algorithms: Leader election, shortest path problem, minimal spanning tress, randomized co-ordinated attack problem, consensus problems and construction of the breath first tree, spanning tree, and maximal independent set.
- Have in-depth knowledge of asynchronous shared memory model including various classical algorithms of mutual exclusion and resource allocation.

CS 427 Parallel Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop computer program for different type of parallel computers.
- Measure the performance of algorithm used and parallel computers.
- Solve problem using parallel computers.
- Optimize sequential code to parallel code and determine if they are worthwhile to parallelize. Develop, analyze and implement algorithm for parallel computers with shared memory and with distributed memory.
- Analyze and perform development work related to use of parallel computers and are able to get placement in the govt. organization.

CS 431 Real Time Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Explain fundamental principles for programming of real time systems with time and resource limitations.
- Describe the foundation for programming languages developed for real time programming.
- Account for how real time operating systems are designed and functions.
- Describe what a real time network is.
- Use real time system programming languages and real time operating systems for real time applications.
- Analyze real time systems with regard to keeping time and resource restrictions.

CS 433 Soft Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop NN network based application.
- Differentiate between supervised, unsupervised and reinforcement learning.
- Apply fuzzy logic on real life problems.
- Design Hybrid Systems vizNeuro-Fuzzy, Neuro- Genetic, Fuzzy-Genetic systems.

CS 507 Artificial Intelligence

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

CS 527 Mobile Computing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Have knowledge of fundamentals of mobile communication systems.
- Choose system (TDMA/FDMA/CDMA) according to the complexity, installation cost, speed of transmission, channel properties etc.
- Identify the requirements of mobile communication as compared to static communication.
- Identify the limitations of 2G and 2.5G wireless mobile communication and use design of 3G and beyond mobile communication systems.

CS 523 Emerging Programming Paradigms

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

ELE 304 Digital Signal Processing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

CS 510 Client-Server Computing and Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand real life application using client-server architecture.
- Learn concepts of network and its usage in client-server model.
- Design distributed database for various application.

Reading Elective I & II

MATH 547R Network Biology

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand the use of graph theory in biology
- Build and analyse network of biological systems.

MATH 541R Fractional Calculus

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand fractional integrals of some important functions
- Understand the concepts of Fractional Derivatives
- Carry out research on the topic related to fractional calculus

MATH 554R Quantum Graphs

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Describe some basic tools in the spectral theory of Schrödinger operator on metric graphs
- Demonstrate results on the count of zeros of the eigen functions of quantum graphs.

MATH 552R Point Set Topology

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Express the notion of metric space, construct the topology by using the metric and using this topology identify the continuity of the functions which are defined between metric spaces.
- Define the notion of topology; construct various topologies on a general set which is not empty by using different kinds of techniques.
- Define the subspace topology, Construct the product topology on product spaces, and Construct the quotient topology.

MATH 549R Operational Research Applications

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- To have the knowledge of role of O.R. in solving industrial problems.
- To introduce the important ideas in operations research which are both fundamental and long lasting.
- To prepare and motivate future specialists to continue in their study by having an insightful overview of operations research.
- To demonstrate the cohesiveness of operations research methodology.
- To identify the resources required for a project and generate a plan and work schedule.

STAT 525R Selected Applications of Stochastic Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Elucidate the power of stochastic processes and their range of applications.

- Demonstrate essential stochastic modelling tools including Markov chains and queuing theory.
- Use probabilistic arguments including conditional distributions and expectations.
- Carry out basic modelling using Markov chains in discrete and continuous time.
- Review and apply Markov chains methods based on stationary and asymptotic distributions.

STAT 526R Step-Stress Modelling

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the student will be able to,

- Understand statistical models and methods for analyzing accelerated life-test data from step-stress tests.
- Understand how to use ALT methods in real life problems.

STAT 520R Categorical Data Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completing the course, the student will be able to:

- Identify and understand the structure of categorical data and be able to phrase the appropriate scientific questions in terms of parameters of interest.
- Understand the various assumptions needed for the various methodologies
- Test for independence, and equality of proportions
- Fit logistic models for binary data
- Check model assumptions and analyze residuals and goodness-of-fit
- Conduct inference for model parameters and interpret the output of the models

STAT 531R Robust estimation in Non Linear Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes:

On completion of this course, student will be able to

- Understand the basics of fitting and inference for nonlinear regression methods when the regression function acting on the predictors is not linear in the parameters.
- Check the robustness of the fitted model
- Carry out research in the area of robust estimation

STAT 530R Official Statistics

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course, the students will be able to:

- Know the key aspects of Official Statistics, as distinct from other branches of statistics.
- Know the legal and ethical constraints on organizations producing Official Statistics.
- Know the principal methods for data collection, analysis and interpretation of health, social and economic.
- Know the methods for presenting and preparing commentaries on Official Statistics.

BANASTHALI VIDYAPITH

Master of Arts (Textile Designing - Weaving)
Master of Arts (Textile Designing - Printing)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

The M.A. in Textile Design Programme offers courses that endeavor to develop student's Knowledge and skills in specialized fields of **FabricWeaving and Printing**.

The curriculum has identified essential competencies in the respective areas for which holistic education will be provided to the students.

The main objectives of the Master of Arts in Textile Design Programme are:

- Ø To impart knowledge and develop capacities of the students through industry oriented higher education with in-depth study of Weaving and Printing.
- Ø To develop the capability of critical and analytical thinking and encourage the students to pursue Research in the areas of Textiles.
- Ø The over-all emphasis is to build confidence in their professional field.

Programme Outcomes

PO1: Industry Orientation: To make students Industry-oriented in Textile Design (Weaving & Printing)

PO2: Indian Textiles and values: To impart knowledge about Indian Textile Industry and Indian Values

PO3: Modern Equipment usage: To inform students about the limitations of equipment and textile processes in India

PO4: Market Awareness: To make students aware of Markets and future Design Trends

PO5: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO6: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of Textile Design and technology.

First Semester

ENVS 408 Environmental Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Behave in day to day lifestyle according to eco system.
- Implement the knowledge to produce eco friendly design**.**
- Able to think about environmental issues and their solutions and implement in their domain work.

TXTD 404L Creative Thinking Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Develop the ability to understand design thinking process to give design solutions for society problems.
- Learn material handling and the difference between 2D to 3D
- Implement their creative ideas during material handling in Designer way.
- Enhance the skill of expressions and transfer their thoughts in practical with creative approach.

TXTD 405 Design Research and Methodology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:-

- To understand of research its type and process
- To understand different type of data and its use for to develop a new design.
- To use the data for new product with skill.

TXTD 408 Design Technique Printing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Able to know importance of finishing and dyeing techniques for various types of fabric according to requirement.
- Understand the concept of different types of quality testing of fabric and its importance for market and consumer.
- Know the importance of quality assurance for domestic and foreign market

TXTD 408L Design Technique Printing Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand and implement all required processes on fabric to enhance fabric quality.
- Apply practical knowledge of dyeing and printing styles and methods on desire fabric.

TXTD 409 Design Technique Weaving

Max. Marks : 100 **L T P C**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Produce fabric by weaving knowledge.
- Learn all weaving details and able to implement on fabric

TXTD 409L Design Technique Weaving Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	2	1

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Learn and reproduce any type of fabric according to requirement.

TXTD 412L Visual Research and Development Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes:-

Upon completion of the course, the students will be able to:

- Know how to see color, texture and attributes and enhance drawing skill. Develop a fabric with knowledge of the effect of color on yarn and weave/print and vice-versa.
- Manipulate and produce fabric by visual research

CS 420 Fundamentals of Computer

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	2	0	0	2

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Learn Theoretical basics of computer & its component, outgoing incoming functions and implement in their domain work.
- Understand the operations of computer for data tabulation, analysis and presentation in their projects research etc.
- Know editing Concept. It helps them in processing of Images to assist documentation and presentation.

CS 420L Fundamentals of Computer Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	2	1

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Learn & apply basics of computer in their domain work.
- make their presentations with application of data tabulation, analysis etc in their projects research etc.
- use MS-Word & MS-PowerPoint Functions which helps them in documentation and presentation of their domain work.
- Know Photo editing & capturing which helps them in processing of Images to assist documentation and presentation.

Second Semester

TSKL 402 Communication Skills and Presentation Techniques

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Develop their communicative competence and their critical thinking abilities.
- Appraise the importance of effective communication in their respective professions.
- Improve interpersonal skills which will enhance their presentation skills.
- Learn and apply the knowledge of report writing in formal situations.
- Communicate effectively and to make an effective social interaction utilizing the knowledge imparted in the class.
- Prepare their CV/Resume so as to highlight their accomplishments while applying for jobs.
- Develop effective writing process to compose different types of letters, Circulars, Agenda, Minutes, Notices

TSKL 402L Computer Aided Textile Designing (Weaving) - I Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand the use of CATD software for constructive design.
- Understand the scope of software for professional work in industries.
- Understand how to design yarn with their technical particulars.

TXTD 401L Computer Aided Textile Designing (Printing) -I Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning outcomes:

Upon completion of the course, the students will be able to:

- Understand the use of adobe Photoshop software for surface design.
- Understand the scope of software for professional work in industries.
- Learn and implement for printed design with various functions and limitation .

TXTD 403 Conceptual Design

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	2	0	0	2

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand the relation between client's need & demand and Design;
- Difference between Client Brief, Redefined Brief;
- Develop Theoretical knowledge of doing primary and secondary research according to consumer's choice.
- Enhance the knowledge of Design process and method; for product development

TXTD 403L Conceptual Design Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Develop an ability to search topic and research to final concept doing primary and secondary research according to consumer's choice.
- Experimenting, analyzing of own work.
- Transfer a 2 D design concept to 3 D product according to innovative concepts for Textile Design.

TXTD 407L Design Studio (Weaving) - I Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Develop different fabrics through advance construction.
- Implement different type of yarns, dyes and the technique in weaving.

TXTD 406L Design Studio (Printing) - I Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Practical

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Develop different fabrics through different printing styles and methods.
- Implement different type dyes on different type of fabrics.

TXTD 410 Fundamentals of Marketing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand how products & services are marketed
- Get basic knowledge about working of Textile Mills/Design houses in India and subsequent employment opportunities
- Aware about the process of pricing a product/service

TXTD 411 Indian Textiles

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand Textile and craft heritage of India.
- Get theoretical knowledge of Traditional Indian woven, printed and embroidered fabrics.

TXTD 411L Indian Textiles Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	2	1

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Produce fabric and enhance the skill in at least two Indian textiles.
- Understand importance of Indian Textiles and promote them for their sustainability.

Third Semester

TXTD 502L Computer Aided Textile Designing (Weaving) - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Examine, and modify ideas very quickly on the color monitor before producing any real fabrics.
- Understand the CATD as useful tool.
- Make modern designs and unique colour combinations which can easily satisfy the consumer's need.
- Illustrate the product with details of weave, color and pattern.
- Take decision of elimination of some irrelevant parameters and make it little affordable and time consuming process of prototyping and colour matching in printed/woven fabric design.

TXTD 503L Design Studio (Weaving) - II Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

Upon completion of the course, the students will be able to:

- develop fabrics through knowledge of advance constructions ,
- Implement different type of yarns, dyes and the weaving technique.

TXTD 505 Fundamentals of Fashion Merchandising

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes:

Upon completion of the course, the students will be able to:

- Understand the fashion and trends and its importance for fashion industry.
- Work as merchandiser in textile and fashion industry.

- Understand the importance of quality assurance for all type of textiles for domestic and export market.

TXTD 510L Textile Testing and Assurance Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Handle of different type of testing equipments with different textiles testing.
- Handle the testing equipments as a professional in industry.
- Make testing report according to testing results.

TXTD 509 Trends and Forecasting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand about importance of trends forecasting for coming season.
- understand the types of forecasting and its process, Identification of types of market, agencies and services understand the types of forecasting and its process, Identification of types of market, agencies and services

TXTD 509L Trends and Forecasting Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

Learning outcomes:

Upon completion of the course, the students will be able to:

- Develop concept on basis of given brief.
- Make research process according to client profile and need.
- Study the market demand, present trend and develop new product accordingly.
- Understand the costumer need and explore the ideas accordingly.

. TXTD 501L Computer Aided Textile Designing (Printing) - II Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Do surface design. with CATD software for various aspects.
- Develop new concept and design for professional work in industries.
- Make draping for Apparel & home textile material before sampling process.

TXTD 504L Design Studio (Printing) - II Lab

Max. Marks : 100	L	T	P	C
	0	0	12	6

Learning outcomes:

Upon completion of the course, the students will be able to:

- understand the different types of prints / surface embellishments.
- learn pre- printing and after printing process.

Discipline Elective (Printing/Weaving)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning outcome:

Upon completion of the course, the students will be able to:

- Develop concept on basis of given brief.
- Make research process according to client profile and need.
- Study the market demand, present trend and develop new product accordingly.
- Understand the costumer need and explore the ideas accordingly.

Fourth Semester

TXTD 517P / TXTD 512D UIL Project / Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**48**	**24**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Understand industry and its day to day working process.
- Learn working process through selected organization.
- Understand role of designer in industry and enhance the skill and previous knowledge to develop new products.

Reading Electives

DES 432R Introduction to Behavioral Science

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Grasp basic knowledge about behavioral science
- Appreciate the value of behavioral sciences in modern life
- Acquire “how to” discussions that address everyday problems.
- Develop critical thinking with logical reasoning and approach fundamental issues of health by multi-perspectives
- Show empathy to others and concern the health and well-being of others.

DES 433R Introduction to Intellectual property Rights (IPR)

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

Upon completion of the course, the students will be able to

- Define intellectual property.
- Identify and State reasons and ways to protect intellectual property
- Define the types such as: patents, copyrights, trademarks, designs, etc., found in everyday experiences
- Define piracy and counterfeit
- Understand the harm caused by piracy and counterfeit
- Identify the timelines and Duration of patents, copyrights, trademarks and designs
- Use the knowledge for getting IPR as per the requirement.

DES 523R Fundamentals of Retail Management

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Describe retailing, the entities involved, and the impact of decisions on a retail business
- Analyze the evolution of the retail industry
- Recognize career opportunities available in the retail businesses

DES 434R Management of Information System

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Describe the role of information technology and information systems in business
- Understand the current issues of information technology and relate those issues to the firm
- Reproduce a working knowledge of concepts and terminology related to information technology
- Analyze and apply information technology.

BANASTHALI VIDYAPITH

Master of Business Administration

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

As the Management Education has undergone various changes due to changes in Indian economy with the advent of many events like liberalization and other economic reforms, there is need to develop good quality managers and leaders to meet the challenges of Indian Corporate Sector. The educational philosophy of M.B.A. is rooted in Indian culture and the value education provided by Banasthali Vidyapith. The curriculum of M.B.A. offered at Banasthali Vidyapith is designed keeping in view the existing and emerging requirements of different forms of organizations. On one hand the students are taught various core subjects like Accounting, Indian Ethos, Managerial Economics, Corporate Governance, Business Environment and Research and on other they have been offered various specialization courses like HR, Marketing, Finance and Banking, Public Policy and CSR, Retail Management, Aviation Management and Sports Management. With a focus to develop practical aspect the students have to undergo intensive internship to enhance their skills and have to choose among large number of open reading electives.

The main objectives of M.B.A. programme are:

1. To produce industry ready graduates having highest regard for Personal and Institutional integrity, Social Responsibility, Continuous Learning and Team Work.
2. Develop an understanding of the diverse and rapidly changing business environment.
3. To enhance the critical thinking, nurture innovation and evaluating ability by imbibing the knowledge of research and statistics amongst the students.
4. To provide knowledge of industry and practical outlook, by implementing various industry accepted courses, by calling various industry experts and industrial training for the better development of the students and making them job ready.
5. To make students ethical, socially responsible when they take their personal as well as professional decisions.
6. To make the students aware that giving back to society is very important by teaching them CSR and ISR (Individual Social Responsibility).
7. To develop sound knowledge of the entrepreneurial process and inculcate creativity and innovation among students.

Programme Outcomes

PO1:Leadership And Team Management Skills: As Management education is getting redefined in terms of analytical inputs, dynamic environment, the focus of programmes is on developing leadership traits among women in consonance with value education imparted at Banasthali Vidyapith.

PO2:Ethics: The learners will be imbibed with utmost professional ethics that are required for a practical and impartial behaviour of the M.B.A. graduates. Demonstrate behaviour in consonance with the values and ethics nurtured at the Vidyapith, which are significant as the learner will function in the management sector, and an ethical behaviour of the highest level is expected from them.

PO3: Soft Skills, Personality Development and Communication: As the M.B.A. graduate needs to have effective communication and interpersonal skills because they need to interact with various stakeholders so this programme focuses on this important aspect too.

PO4: Entrepreneurial Thinking: There is need to develop entrepreneurial mind set so that within the organization, managers can come out with new thoughts and initiatives. So this programme aims at developing various women entrepreneurs.

PO5: Industry Collaboration: There is need for active collaboration with industry for live projects so as to acquire adequate industry exposure, corporate exposure and to understand field level problems so in this programme there is provision for industry collaborations and owing to all these efforts student's placement in various prominent organizations becomes possible.

PO6: Recent Specializations: This programme also offers some recent specializations like Public Policy and CSR, Aviation Management, Sports Management and Retail Management along with traditional specializations like Finance, Marketing and HR.

PO7: Encourage "Out of Box thinking": the business environment is very dynamic nowadays so this programme focuses on approach of "Out of Box Thinking" by adopting various new techniques in pedagogy and inculcating recent trends in curriculum.

First Semester

MGMT 411 Financial and Cost Accounting

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives

1. To understand the fundamental concepts and processes of Accounting.
2. To analyze the Cost Accounting methods and to identify profitable products and services.
3. To be able to interpret cost accounting statements for cost ascertainment, planning, control.
4. To analyze accounting reports to make sound managerial decisions.

Learning Outcomes

Upon completion of the course the student will be able to:

- Understand terminology, fundamental principles, classifications, generalizations and methods of accounting.
- Solve cost related problems and make decisions based on the effective cost system.
- Apply management decision on business situations with the help of real life examples and cases studies.

MGMT 418 Indian Ethos and Human Quality Development

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To generate interest of students in main characteristics of Indian Society and Culture
2. To overcome cognitive dominance and think creatively to address social and business problems

3. To assimilate Indian ethos and values relevant for management entrepreneurship and development
4. To develop managerial approaches in conformity with Indian ethos and realities.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Appreciate role of Indian culture ideas in developing effective management skills
- Overcome cognitive dominance and take a step towards new ideas of management
- Develop a sense of respect for wisdom from grassroots and its innovative ideas
- Develop managerial skills which are contextually and culturally relevant

MGMT 419 Information Technology and MIS

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To develop understanding of the various aspects of IT and MIS and their practical applications.
2. To develop understanding of Database Management, Data Administration, Entity Relationship Modeling etc.
3. To study the concepts of System Analysis, Role of system analyst, System development life cycle.
4. To develop understanding of the social dynamics of internet, e-commerce, mobile commerce, IPR, legal & ethical issues of IT.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Develop an understanding of application of MIS & IT in various areas of corporate and individual life.

- Become aware of the working of various IT- based, E-commerce based, data based organizations and the utility of data/Information.
- Understand and pursue their careers in of the concepts of cloud computing, system analysis, data analysis

MGMT 422 Managerial Economics

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To familiarize students with concepts and analytical tools from micro economic theory that are useful to managers in making decisions at the enterprise level, large, medium, small, tiny and other types.
2. To aware the students about various concept of demand, production, cost and implication of these concepts in managerial decision making.
3. To make clarity about the different market structures and price and output determination under different market structures.
4. To develop the knowledge about the macro economics concepts, national income, circular flow trade cycles
5. To aware the students about recent trends and policies of Indian Economy.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand managerial decision making at the enterprise level and facilitate an appraisal of the macroeconomic environment with a view to understanding its implications on decision making.
- Understand the implications of economic theory in managerial decision making.
- Understand the concept of demand, production and cost and will be able to take business decisions in more accurate way.
- Understand the macro economics concepts and understand its impact on business.

- Understanding the recent trends of Indian economy and the overall business scenario.

MGMT 423 Marketing Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To provide an understanding of the underlying concepts, strategies and issues involved in exchange of products and services between the firm and markets.
2. To understand the distribution processes its types and factors affecting the choice of distribution channels.
3. To understand the promotion mix and various components of promotion mix.
4. To understand the product mix and related pricing strategies

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand various issues and activities involved in marketing management and related activities
- Understand different concepts, strategies and issues of marketing management for effective decision making.

MGMT 425 People Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To help students to develop their managerial competencies by understanding the issues related to human behavior.
2. To understand why people behave as they do and gain insight into management of human behavior for organizational effectiveness.

3. To acquaint the students with the theory and practice of Human Resource Management systems of contemporary organizations.
4. To help students become better leaders by enhancing their effectiveness in managing human resources.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Develop the skills to analyze the organizational behavioral issues in the context of organizational theories, models, and concepts.
- Analyze the behavior of individuals and groups within organizations in terms of key factors that influence organizational behavior.
- Prepare for leadership roles in modern organizations.
- Demonstrate the skills and knowledge needed to effectively manage human resource.
- Administer and contribute to the design and evaluation of the performance management programs.

MGMT 434 Quantitative Research Techniques

Max Marks: 100	**L**	**T**	**P**	**C**
(CA: 40+ESA:60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To gain overview of the research for business management
2. To learn research tools and their application in business management
3. To learn the process of optimization
4. To understand the basics of transportation and linear programming with its application in business

Learning Outcomess:

Upon completion of the course, the student will be able to:

- Undertake research for business
- Apply research tools for drawing insights for business

- Understand the role of allocation / assignment problems in business

CS 407L Computer Lab-I

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **0 0 6 3**

Course Objectives:

1. To develop the understanding of basics of Computers amongst the students and make them proeficient in using computers for their official use.
2. To provide strong foundation of Word, Excel, Power Point and their relevance; and to acquaint students with role of IT in marketing management and making financial statements.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Effectively use computer skills in developing business plans.
- Be job-ready with hands-on computer skills.

Second Semester

MGMT 430 Business Environment and Operations

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To acquaint the students with the critical elements of the business environment, with special focus on globalization and business operations.
2. To become aware of various acts of Indian legal system with special reference to business scenario.
3. To become aware about concept of production in a manufacturing unit.
4. To learn about best practices through case studies

Learning Outcomes:

Upon completion of the course the student will be able to:

- Awareness of the business environment, especially globalization and business operations.
- Knowledge of various business laws
- Learn about the role of production in a manufacturing unit.
- Gain insights into best practices of industry for application into upcoming business challenges.

MGMT 412 Financial Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives :

1. To develop critical thinking and problem solving competencies, at both the individual and group levels, of financial statement analysis,
2. To familiarize the students with decision on financial planning, capital budgeting, capital structure, and issues in financial policy.
3. To apply financial theory to analyze real life situations in an uncertain environment with an incomplete data set.

Learning Outcomes :

Upon completion of the course the student will be able to:

- Conduct financial analysis to form long-term financial policies for business.
- Judge the financial environment within which organizations must operate.
- Critically evaluate the financial objectives of various types of organizations
- Analyze the alternative sources of finance and investment opportunities
- Apply techniques in managing working capital .

CS 408L Computer Lab - II

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **0 0 6 3**

Course Objectives:

1. To help students to develop their managerial competencies by visiting and analyzing various relevant websites in area of general business scenario as well as their area of specialization.
2. The course will help in developing the understanding to work with Excel and SPSS to solve business problems.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Use computer skills in developing the business plans in more effective manner.
- Job readiness with the complete hands-on job skills.

Third Semester

List of Reading Electives (Choose any 1)

MGMT 503R Corporate Banking - I

Max. Marks : 100 **L T P C**
(ESA: 100) **0 0 0 2**

Course Objectives:

1. To understand about corporate banking products and services offer by various Banks.
2. To understand the concept and significance of branch profitability.
3. To understand about all the BASEL norms which are designed to improve the regulation, supervision and risk management within the banking sector.
4. To understand the concept of credit bureau.

5. **Note:** The question paper will contain five questions and candidate will be required to attempt any three.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand corporate banking products and services
- Understand the concept and significance of branch profitability.
- Gain knowledge about all BASEL norms
- Gain knowledge that will make them job ready.

MGMT 506R Digital Marketing

Max. Marks : 100 **L T P C**

(ESA: 100) **0 0 0 2**

Course Objectives:

1. To understand the components of digital marketing and its role in promotion mix
2. To learn various activities performed under digital marketing
3. To understand the application of digital marketing tools in marketing management

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand and implement digital marketing tools
- Get a practical outlook of the digital marketing and its implementation in marketing promotion
- Gain knowledge that will make them job ready for the marketing job

MGMT 521R Advance in Mutual Funds

Max. Marks : 100 **L T P C**

(ESA: 100) **0 0 0 2**

Course Objectives:

1. To Develop Understanding of Mutual Funds so that they should compare the risks and expected yields after adjustment of tax on various instruments while taking investment decisions.

2. To develops students understanding and skills in investment area and various options available in mutual funds.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Advise on various aspects of Mutual Funds.
- Be Equipped with the knowledge to clear NISM V Module.
- Job-readiness in Mutual Fund industry.

MGMT 529R Supply Chain Management

Max Marks: 100 **L T P C**
(ESA: 100) **0 0 0 2**

Course Objectives:

1. To develop understanding of basics of SCM.
2. To develop basic understanding of role of mathematics in SCM.
3. To develop understanding of inventory management in SCM.
4. To develop understanding of role of internet and customer centric orientation in SCM.
5. To stimulate thought process of students with help of suitable case studies.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Have a basic understanding of SCM.
- Understand and apply mathematics behind SCM.
- Understand inventory management in real world scenarios.
- Understand the role of internet and customer centric orientation in SCM.
- Secure jobs in the SCM industry.

MGMT 502R Advanced Readings in HRM

Max. Marks : 100 **L T P C**
(ESA: 100) **0 0 0 2**

Course Objectives:

1. This course aims at exposing students to latest thinking in Human Resource Management
2. This course enables the participants to understand and appreciate the role of Institution Building and their impact on society development.
3. Learning about leadership and related HRD issues in the corporate and social context and development of qualities to face the challenges of the outer world.
4. It also aims at developing excellence, motivation and human concerns while managing in a competitive scenario and to understand various concepts related with HRA, HRIS, IHRM and HRD audit

Learning Outcomes:

Upon completion of the course the student will be able to:

- Gain in-depth knowledge about various HR concepts, role and Role Analysis and their significance for individual and organizations
- Cope with stress arising due to role ambiguity
- Learn about organization, organization culture, environmental interface and its implication for managers
- Understand the HR polices , cultural differences &IHRM
- Learn about Audit of Human Resource, HRA & HRIS

MGMT 504R Corporate Banking - II

Max. Marks : 100 **L T P C**
(ESA: 100) **0 0 0 2**

Course Objectives:

1. To understand about corporate banking products and services offer by various Banks.

2. To understand the products offer for MSME financing by Banks.
3. To understand about international banking products and services offer by Banks like treasury products, trade services, Forex etc.
4. To understand the concept of rural business credit and the products offer by the Banks for same.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand term loans, working capital loans, project financing etc.
- Understand about the products and services offer for MSME financing.
- Job- readiness specifically in Corporate Banking and international banking division of Banks.

MGMT 508R Entrepreneurship

Max. Marks : 100 **L T P C**
(ESA: 100) **0 0 0 2**

Course Objectives:

1. To facilitate students to recognize, create and shape opportunities, so that they can provide the leadership and build team generating economic and social value
2. To understand the basic concepts of venture creation

Learning Outcomes:

Upon completion of the course the student will be able to:

- Get insights related to dynamics of entrepreneurship ecosystem and generate economic and social value.
- Gain knowledge of customer development, customer validation, and competitive analysis while utilizing design thinking.
- Able to create a business plan that articulate and apply financial, operational, organizational, market, and sales knowledge.

MGMT 528R Strategic Planning in IT

Max Marks: 100 **L T P C**
(ESA: 100) **0 0 0 2**

Course Objectives:

1. To develop advanced learning in level of collaboration, communication, and engagement in Information Technology.
2. To update the student in current environment as well as the dynamic changes in Information technology.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand and apply strategic Management in their jobs.
- Provide a competitive edge to the students while in job

Fourth Semester

MGMT 505 Corporate Governance and Strategy

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To build the understanding of Corporate Governance structure in India and its legality.
2. To enhance the knowledge about the Corporate Governance Practices and it effect on the working of the organization.
3. To develop an understanding about strategic management of the corporate and various strategies adopted.
4. To understand the practicality of the strategic management avenue and develop its knowledge in Indian Context

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the ethical aspects of corporate governance implied in the business arena.

- Understand and apply the aspects of strategic management in the working of the corporate.
- Understand the practical use of corporate governance and strategic man agement

MGMT 510 Indigenous Management System

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To justify the rationale for studying Indigenous Management Systems (IMS)
2. To stimulate interest of students in creative ideas from Bharatiya culture
3. To draw managerial and leadership insights from various Bharatiya management systems like Gita and Arthshastra
4. To examine approaches of Bharatiya business houses and relevance for contemporary management and sustainable development
5. To explore the idea of Integrating Simplification for new business systems

Learning Outcomes:

Upon completion of the course the student will be able to:

- Appreciate the role of inherent indigenous ideas in management
- Creatively approach management problems
- Develop sense of respect for wisdom from grassroots and its innovative ideas
- Synthesize global and indigenous perspectives of management

Major/Minor Specialization Electives
Aviation Management (AM)
MGMT 403 Airline and Airport Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. The objective of the course is to introduce the students with the basic functionalities of Airports and Airlines.
2. To make students understand various security and legal aspects aligned with the airline management.
3. To introduce the functioning of airports in handling customers and goods and how the same is planned at all levels.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand Indian Aviation structure.
- Get a practical outlook of the Aviation Management.
- Job readiness for the Aviation sector.

MGMT 408 Crew Resource Management and Aviation Safety

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To introduce students to the concepts of Crew Resource Management
2. To introduce students to safe human –machine interaction.
3. To identify and categorize risk and how they relate to commercial and general aviation.
4. To provide a foundation and framework in safety and the important role of humans in safety administration.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the basic concepts of Crew Resource Management, its history and safety cultures of various organizations.
- Understand safety management systems and human- machine interaction in this context.
- Identify and categorize risk in commercial and general aviation.
- Learn cross- cultural perspectives, the framework of safety and the role of humans in safety administration.

MGMT 414 Fundamentals and Principles of Aviation

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. The mission of the course is to provide students with a well-rounded liberal arts education, a solid foundation in business, and a focus on unique aspects of aviation as a business.
2. To understand the concept of Aviation management and fundamental delivery to the Aviation professionals**..**

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the Indian Aviation structure.
- Get a practical outlook of the Aviation Management.
- Be job-ready for the Aviation sector.

MGMT 520 Strategic Airlines Marketing and CRM

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the concepts of marketing management in Aviation Industry
2. Deliver the knowledge of product delivery with reference to the aviation industry.

3. Devise the concept of air transport industry
4. To understand the airline business environment

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand Indian Aviation structure.
- Get a practical outlook of the Aviation Management.
- Job readiness for the Aviation sector.

Finance and Banking (FB)

MGMT 523 Banking and Financial Services

Max Marks: 100	**L**	**T**	**P**	**C**
(CA: 40+ESA:60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the banking system and banking structure of India in light of the legal structure
2. To understand the banking operations in association with the retail banking in India.
3. To understand various products and services offered by the banks along with the various account operations and retail credit products offered by the banks
4. To understand the aspect of financial planning along with understanding of various third party products offered by banks and in line understands the retirement and estate planning.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand and analyze the banking structure of India in light of the legal structure.
- Gets a practical outlook of the retail banking and the legal formalities associated with it.

- Understand the aspects of financial planning and retirement planning which will help in better future planning of finances.
- Job readiness for financial advising and banking jobs.

MGMT 530 Taxation

Max Marks: 100	L	T	P	C
(CA: 40+ESA:60)	4	0	0	4

Course Objectives:

1. To enables the students to know the basics of Income Tax Act and its implications.
2. To demonstrate knowledge of the concepts, principles, and rules of taxation of various assesses.
3. To prepare students for tax forms, recognize tax planning opportunities and recommend appropriate tax-saving strategies for decision making;
4. To address tax situations for a variety of taxpayers, such as wage earners, salespersons, owners of small business, professionals, investors, home and rental property owners, farmers, etc.
5. This course also aims at imparting basic knowledge about major indirect taxes as GST and Customs.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the basic principles underlying the Income Tax Act.
- Analyze the assessment procedure and representation before appropriate authorities under the law.
- Understand the intricacies and calculations associated with tax.
- To do better tax management and advisory.

MGMT 429 Security Analysis and Portfolio Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. This course seeks to introduce the students to the field of inquiry that focuses on the security markets and its development globally.
2. To highlight the functioning of the financial markets and its role in resource allocation.
3. To introduce the students to the various asset classes traded in financial markets and its importance.
4. Introducing and acquainting students with different theories, valuation and pricing models.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the dynamics of the markets and the role of the market participants bringing efficiency to the markets.
- Understand the concepts of valuation of financial securities.
- Understand portfolio allocation and how assets are priced in financial markets.

MGMT 527 Strategic Financial Management

Max. Marks : 100	**L T P C**
(CA: 40 + ESA: 60)	**4 0 0 4**

Course Objectives:

1. To develop advance knowledge of the principle theories and techniques of Corporate Finance.
2. To develop the understanding of corporate restructuring and analyze with real life examples.
3. To develop the understanding of Derivatives and International Financial Market.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Apply the technical language and practices of financial management.

- Undertake sophisticated financial analysis with regard to corporate valuation, interest rate and currency risk management and present the information in an appropriate format.
- Evaluate, synthesize and apply the contemporary theories and empirical evidence concerning Financial Management to a range of problems and situations
- Critically evaluate the impact of macro economics and recognize the role of international financial institutions in the financial management of multinationals.

Human Resource Development (HD)

MGMT 401 Advance Reading in HRD and HQD

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. Based on the journals articles and recent books, this course aims at exposing students to latest thinking in HRD and HQD
2. This course is also an attempt to enable the participants to understand and appreciate the role of Institution Building and their impact on society development.
3. Learning about leadership and related HRD issues in the corporate and social context and development of qualities to face the challenges of the outer world.
4. It also aims at developing excellence, motivation and human concerns while managing in a competitive scenario and to understand various concepts related with HRA, HRIS, IHRM and HRD audit.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the concept of Institution building, the role of management in institution Building and the impact of institutions on society
- Learn about the various Indian Models of Leadership and their implications for managers

- Gain in-depth knowledge about Role and Role Analysis and their significance for the individual and organizations
- Learn about organization culture and its implication for managers
- Understand HR polices, cultural differences, IHRM, Audit of Human Resource, HRA & HRIS

MGMT 417 Human Resource Development Systems

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the meaning of Human Resource Development and Human Resource Systems and differentiate between the concepts
2. Develop the knowledge about the various Human Resource Development Systems in the organization
3. To understand the changing trends in designing and managing Human Resource Development Systems.
4. To understand the issues involved in the implementation of HRDS.
5. Understand the need to reposition HR function to create value addition to the organization.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand the fundamental differences among Human Resources, Human Resource System and Human Resource Development.
- Understand the changing trends in HRDS.
- Identify and work in each of the Human Resource Development Systems.

MGMT 424 Organization Development and Change Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To prepare students as organizational change facilitators using the knowledge and techniques of behavioral science.
2. To explore important issues pertaining to the era of organization change and development.
3. To gain insight into various interventions as tools to help organizations and their members to enhance effectiveness and bring desired change.
4. To understand the importance of counseling for desired change.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Gain an insight into how to lead, adapt, and manage change.
- Develop skills to collaboratively manage the culture of an organization to attain the goals and purposes of the organization.
- Develop the skills to design interventions as needed.
- Learn the technicalities of counseling and will gain skills for counseling as intervention.

MGMT 512 Industrial Relations Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the conceptual and practical aspects of industrial relations at the macro and micro levels with respect to changing economic, political and social scenario.
2. To understand management strategies to design the tools for Employee Empowerment and Employee Participation.
3. To introduce the various Labor Laws and the recent changes made in it to have a deep knowledge of laws to ensure adequate safety measures in the workplace.
4. To understand the human resource and industrial relation perspectives on the conflict in the employment relationship.

5. To have a deep knowledge of strategies regarding workforce acquisition, workforce management, and workforce optimization.

Learning Outcomes:

Upon completion of the course the student will be able to:

- Understand various issues related to compensation, performance management, organization development, safety, wellness, benefits, employee motivation, training and others.
- Design various strategies related to Human Resource of the Organization.
- Understand various laws that protect worker's rights, improve worker safety, prevent child labor and increase workers' bargaining power relative to their employers.

Marketing Management (MM)

MGMT 522 Advertising and Brand Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. The objective of this course is to enable students to appreciate the various issues and activities involved in advertising and brand management
2. Correlate the role of Advertising and Brand in Marketing Management
3. To apprehend the importance of marketing communication channel in Marketing Mix
4. To design effective communication messages for promotion mix

Learning Outcomes:

Upon completion of the course the student will be able to:

- Select appropriate promotion mix to meet marketing objectives
- Analyze and implement branding strategies to solve business problems

- Understand various issues and limitations involved in promotion mix

MGMT 407 Consumer Behavior

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objective:

1. To develop an understanding of concepts and application of consumer behavior.
2. To develop an understanding of consumer as an individual and its marketing implications.
3. To develop an understanding of consumer's group dynamics including family, culture, groups, etc. and their marketing implications.
4. To develop an understanding of consumer's decision making process, its influencing factors and their marketing implications.
5. To develop an understanding of consumer behavior modelling and their marketing implications.
6. To develop an understanding of organizational buying and its process.
7. To develop an understanding of how better CRM can be conducted by studying consumer behavior.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Understand consumer behavior in different settings.
- Apply consumer behavior knowledge in marketing and its applications.
- Apply the knowledge of CRM in its marketing applications.

MGMT 428 Sales and Distribution Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the meaning of the concepts of sales & distribution management

2. To develop knowledge about Salesmanship and various issues related to it
3. To understand the meaning of the concepts of Sales Quotas, Sales Territory, Sales Control recruitment, selection training and evaluation in sales
4. To study the distribution management, channel intermediaries in Indian context

Learning Outcomes:

- Understand the concepts of sales management
- Become well versed with the concept of distribution management and the related operations of various companies
- Develop understanding and choose one of the sales and distribution management areas like sales, logistics, channel management as their career option

MGMT 509 Global Marketing Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the scope and challenges of International Marketing
2. Correlate the role and implementation of marketing mix in Global Marketing
3. To analyse the emerging trends in globalization
4. To comprehend the significance of procedure, documentation and promotional measures in international marketing
5. To assess the role of electronic marketing in Global marketing

Learning Outcomes

Upon completion of the course the student will be able to:

- Understand emerging trends in global markets and learn how to use those trends in business management

- Understand procedure and promotional measures used in global marketing
- Understand documentation procedure required for export and import in the Indian context.

Public Policy and CSR (PC)

MGMT 409 CSR and Social Entrepreneurship

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To stimulate the interest of students towards Public Policy, CSR, and Social Entrepreneurship and inherent Bharatiya ideas
2. To examine the scope and complexity of corporate social responsibility (CSR)
3. To establish the importance of traditional Bharatiya sustainable practices and enable participants to critically analyze CSR practices of Indian companies
4. To apply the framework for analyzing business-society-government dynamics and examine interplay of stakeholder theory and social entrepreneurship.
5. To develop a strategic decision matrix by analyzing case studies of social enterprises in India.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Identify linkages of management and public policy
- Creatively approach social problems
- Develop a sense of respect for wisdom and sustainable development approaches from grassroots and its innovative ideas
- Analyze dynamics of social sector development

MGMT 415 Fundamentals of Public Policy and Public Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the basics of the process of public policy.

2. To be able to take informed business decision based on policy scenario.

3. To understand the role of institutional theory in public policy.

4. To understand the concepts of Public Managing and Public Governance.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Obtain a thorough knowledge on the various aspects of Public Policy.
- Use the public scenario understanding to develop an unbiased decision.

MGMT 416 Fundamentals of Public Policy Implementation

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand the process of public policy implementation.

2. To understand role of bureaucracy, civil society, multi-lateral institutions, and corporate in achieving objectives of public policy.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Draft and propose a policy in the corporate that will be of a larger benefit to people.
- Job- readiness to work in the corporate domain of CSR.

MGMT 507D Dissertation

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **0 0 8 4**

Course Objectives:

1. To encourage the students to undertake research work in area of their interest.
2. To develop basic understanding of Research and analytical statistical techniques amongst students.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Understand the mechanism of identifying a problem and evolving the solution using standardized Quantitative and Qualitative tools.
- Comprehend the process of writing a dissertation document.

Retail Management (RM)

MGMT 420 Mall and Store Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. The objective of the course is to make the students appreciate & understand the various aspects related to Mall & Store Management
2. To develop decision making skills with respect to Mall & Store Management.
3. To develop managerial skills with respect to Mall & Store Management.
4. To understand retail pricing.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Understand various issues and activities involved in mall and store management.
- Develop decision making skills respect to mall and store management.
- Develop managerial skills with respect to mall and store management.

- Understand concepts of retail pricing evaluate merchandise performance, elements of retail pricing.

MGMT 426 Retail Environment and Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. The course strives to make the students understand the emerging retail environment in the Indian and global context and general aspects related to Retail Management.
2. To understand the retail trends in Asia and the World.
3. To understand retail strategies.
4. To understand the legal issues in retailing

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Understand various issues and activities involved in retail environment and management prevailing in Asia and the World markets.
- Understand different strategies in retail, international expansion and retail value chain.
- Understand different legal issues prevailing in the retailing, various laws related to retailing and their implications.

MGMT 427 Retail Operations and Supply Chain Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. The course strives to make the students understand the emerging operation and supply chain environment in the Indian and global context.

2. It seeks to provide the conceptual framework and develop managerial skills to understand the relevant issues.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Understand logistics management and how it applies in practice.
- Job-readiness to handle managerial position in retail stores.
- Understand the working of the retail stores and intricacies associated with the same.

MGMT 518 Retail Marketing and Crew Resources Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To understand role of retail in marketing management
2. To evaluate, assess and apply various retail strategies
3. To understand issues, problems and solutions related to customer relationship management
4. To develop decision making skills with respect to relationship management

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Develop managerial skills with respect to retail management
- Understand different strategies in retail, able to take effective decision based on situation analysis and marketing environment
- Develop decision making skills respect to Customer Relationship Management

Sports Management (SM)

MGMT 413 Foundation of Sports Management

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To provide overview of sports scenario in the country and prepare students to manage the sports events.
2. To familiarize the students with the booming sports industry of India.

3. To develop and understanding of the business aspect of sports Industry.
4. To enhance knowledge about the sports world.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills.
- Development of leadership and teamwork, transfer of knowledge to other learning areas, work cooperatively in other subjects; work with groups in a leadership role.
- Become leaders and managers of sports industry.

MGMT 501 Advance Reading in Sports

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Course Objectives:

1. To delve deeper into emerging trends in sports management by understanding interdisciplinary dimensions of sport.
2. The course aims to shape managers and leaders of future in the sports industry.

Learning Outcomes:

Upon completion of the course, the student will be able to:

- Understand emerging trends in sports management and interdisciplinary dimensions of sports.
- Become the leaders and managers of sports industry.
- Promote sports as tourism and an instrument for social development.

BANASTHALI VIDYAPITH

Master of Computer Applications
Master of Computer Applications - Lateral Entry
PGDCA
Master of Science (Computer Science)

Curriculum Structure

Master of Computer Applications (MCA)
First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021
Fifth Semester Examination, December-2021
Sixth Semester Examination, April/May-2022

Master of Computer Applications – Lateral Entry (MCA-LE)
Third Semester Examination, December-2019
Fourth Semester Examination, April/May-2020
Fifth Semester Examination, December-2020
Sixth Semester Examination, April/May-2021

PGDCA
First Semester Examination, December-2019
Second Semester Examination, April/May-2020

M.Sc. (Computer Science)
First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019 **110**

Master of Computer Applications

Programme Educational Objectives

The main objectives of the programme are:

- Department of Computer Science offers the most effective teaching learning methodologies through class room and practical exercises to cultivate an inquisitive mind-set among students.
- The skills and education imparted enables students to utilize new technologies and prepare them for key technology applications and decision-making.
- The MCA program is dedicated to application development and thus, has more emphasis on latest programming languages and tools to develop real world applications.
- Prepare post graduates for productive careers in software industry, corporate sector, Govt. organizations and academia by providing skill based environment for teaching and research in the core and emerging areas of the discipline.
- The programme's thrust is on giving the students a thorough and sound background in theoretical and skill-oriented courses relevant to the latest computer software development.
- Students are trained in the fields of Computational Theory, Programming Languages, Algorithm Design, Application Software Development, Enterprise Resource Planning, Computer Networks, System Administration, Web Designing and Development, Database Administration, Data Mining and Warehousing, and various emerging fields in computer science.
- The programme emphasizes the application of software technology to solve mathematical, computing, communications/networking and commercial problems.
- To apply current tools, technologies and research to create systems for solving industry oriented problems.
- To develop the abilities to face the changing trends and career opportunities in computer applications.
- To embed strong human values and professional ethics for becoming social responsibilities.

Programme Outcomes

After completion of the course, the student will achieve the following:

- **PO1. Domain Knowledge:** Apply the knowledge of mathematics, strong fundamental concepts on data structure, database technologies, Operating systems, algorithmic principles, compiler designs, advanced programming, Software engineering, networking, theoretical computer science in the modeling and design of computer based systems. Also apply the knowledge gained on laboratory experiments.
- **PO2. Problem analysis:** Identify, formulate, and analyze existing algorithms for different real life problems using different domain knowledge
- **PO3. Design/development of solutions:** Design, develop, test and maintain desktop, web, mobile and cross platform software applications using modern tools and technologies that are technically sound, economically feasible, socially and industrially acceptable.
- **PO4. Analyzing Complex problems:** Use domain based knowledge to function effectively on various problems to achieve a common goal to provide effective solutions for complex real life problems using limited resources.
- **PO5. Usage of Modern IT tools:** Use emerging technologies such as Machine learning, cognitive computing, analysis and interpretation of data and simulation tools for problem solving in different computer application domain.
- **PO6. The Professional and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- **PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10. Communication:** Communicate effectively on complex activities with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11. Project Management:** Demonstrate knowledge of the computer application and management principles to apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change

Master of Science (Computer Science)

Programme Educational Objectives

The main objectives of the programme are:

- The department of computer science follows a unique up-to-date curriculum with the aim of equipping students with strong analytical and technical skills as well as thorough knowledge and expertise in the latest state-of-the art techniques in IT, so that they can work competently in diverse areas including teaching and research and development.
- M.Sc. computer science deals with the theoretical details of hardware and software along with logic & algorithm. Those having a strong computational and scientific background opt for M.Sc. computer science field.
- Prepare skilled and capable professionals with a strong conceptual and practical background in Computer Science.
- Provides an excellent grounding for further research, either through Ph.D. study or in a commercial setting.
- Prepare the students with strong fundamental concepts, analytical capability, programming and problem solving skills.
- Create an ambience of education through faculty training, self learning, sound academic practices and research endeavors.
- Provide opportunities to promote organizational and leadership skills in students through various extra- curricular and co-curricular events.
- Make the students as for as possible industry ready to enhance their employability in the industries.
- Improve department industry collaboration through internship program and interaction with professional society through seminar/workshops.
- Imbibe social awareness and responsibility in students to serve the society and protect environment

Program Outcomes

After completion of the course, the student will achieve the following:

- **PO1. Domain Knowledge:** Apply the knowledge of strong fundamental concepts on data structure, database technologies, Operating systems, algorithmic principles, compiler designs, advanced programming, Software engineering, networking, theoretical computer science in the modeling and design of computer based systems. Also apply the knowledge gained on laboratory experiments.

- **PO2. Problem analysis:** Identify, formulate, and apply standard software engineering practices and strategies in real-time software project development to deliver quality product. Analyze complex real-world problems and devise efficient computer-based solutions

- **PO3. Design/development of solutions:** Design and develop computer programs/computer-based systems using open-source programming environment or commercial environment in the areas related to algorithms, networking, web design, cloud computing, Internet of Things and data analytics of varying complexity.

- **PO4. Analyzing Complex problems:** Use domain based knowledge to function effectively on various problems to achieve a common goal to provide effective solutions for complex real life problems using limited resources. Apply research methods, techniques, and problem solving approaches from the field of research in which they are specializing.

- **PO5. Usage of Modern IT tools:** Use emerging technologies such as Machine learning, cognitive computing, analysis and interpretation of data and simulation tools for problem solving in different computer application domain.

- **PO6. The Professional and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- **PO7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10. Communication:** Communicate effectively on complex activities with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO11. Project Management:** Demonstrate knowledge of the computer application and management principles to apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change

First Semester

CS 207 Computer Organization and Architecture

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Perform computer arithmetic operations.
- Use the concepts and design of all type of sequential and combinational circuits.
- Design and conduct experiments, as well as to analyze of the hardware of a computer system and its components such as control unit, arithmetic and logical (ALU) unit, input/output, and memory unit.
- Design techniques such as pipelining and microprogramming in the design of the central processing unit of a computer system.
- Understand the concept of I/O organization.

CS 413 Computer Oriented Numerical and Statistical Methods

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Apply numerical methods to obtain approximate solutions to mathematical problems.
- Using appropriate numerical methods, determine the solutions to given non-linear equations, systems of linear equations, interpolation, numerical differentiation and integration and numerical solution of ordinary differential equations.
- Analyze the errors obtained in the numerical solution of problems.
- Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.
- Compare different algorithms with respect to accuracy and efficiency of solution.

- Implement numerical methods algorithm using programming language.

CS 440L Computer Oriented Numerical and Statistical Methods Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

CS 415 Computer Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understanding the concepts of computer basics and programming.
- Understanding of the organization and operations of a computer system.
- Understanding of Binary logic in design of electronic circuits.
- Students would have logical thinking for Analyzing problems, designing and implementing algorithmic solutions.
- Students would get the skills for the use of the C programming language to implement the real world applications.

CS 415L Computer Programming Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

CS 434 System Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.

- Describe the various concepts of assemblers and macro-processors.
- Understand the various phases of compiler and compare its working with assembler.
- Understand how linker and loader create an executable program from an object module created by assembler and compiler.
- Know various editors and debugging techniques.

CS 437 Web Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand working of Internet & World Wide Web.
- Develop a dynamic webpage by the use of java script, HTML & CSS.
- Develop an application using Javascript.
- Develop web application using PHP with database connectivity.
- Get the knowledge of publishing and hosting web application.

CS 437L Web Technology Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Second Semester

CS 209 Data Structures

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, stacks, queues, binary trees, heaps.
- Develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
- Learn to analyze and compare algorithms for efficiency using Big-O notation.
- Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
- Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

CS 209L Data Structures Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

CS 417 Database Management Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Describe data models and schemas in DBMS
- Understand the features of database management system and Relational databases.

- Use SQL -the standard language of relational databases.
- Understand the functional dependencies and design of the database.
- Understand the concept of Transaction and Query processing.

CS 417L Database Management Systems Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

CS 425 Object Oriented Methodology and Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand the features of C++ supporting object oriented programming
- Understand the relative merits of C++ as an object oriented programming language
- Understand how to produce object-oriented software using C++
- Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
- Understand advanced features of C++ specifically stream I/O, templates and operator overloading
- Understand other features of the C++ language including templates, forms of casting, conversions, and file handling.

CS 425L Object Oriented Methodology and Programming Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

MATH 302 Introduction to Discrete Mathematics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Solve counting problems involving the multiplication rule, permutations, and combinations (with and without replacement)
- Have a better understanding of sets, apply the operations of sets and use Venn diagrams to solve applied problems
- Apply the inclusion-exclusion principle to problems with more than two sets and use the principle to solve counting problems
- Understand the basics of discrete probability and be able to apply the methods from these subjects in problem solving
- Demonstrate an understanding of relations and functions and be able to determine their properties
- Understand the basic principles of lattices and Boolean algebra
- Demonstrate an understanding of various types of graph and its properties
- Apply the Pigeonhole Principle to solve various problems
- Understand the numeric function and generating function
- Solve linear homogeneous and linear non-homogeneous recurrence relations with constant coefficients using various methods

MGMT 421 Management Information System

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Course Outcomes

On successful completion of the course students will be able to

- Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making.
- Analyze and synthesize business information and systems to facilitate evaluation of strategic alternatives.
- Effectively communicate strategic alternatives to facilitate decision making.
- Describe the role of information technology and information systems in business
- Record the current issues of information technology and relate those issues to the firm
- Reproduce a working knowledge of concepts and terminology related to information technology
- Interpret how to use information technology to solve business problems
- Illustrate the impact of information systems in society

Third Semester

CS 213 Design and Analysis of Algorithms

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course students will be able to

- Analyze the performance of various algorithms in terms of time and space.
- Solve recurrence relation using various methods

- Describe the concept and design algorithm using data structures including threaded binary tree, B-Tree and hashing techniques.
- Design numerous algorithm techniques including divide & conquer, greedy, dynamic programming, backtracking and branch & bound.

CS 213L Design and Analysis of Algorithms Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

After successful completion of the course students will be able to

- Implement problems based on sorting techniques and max heap.
- Perform various operations on threaded binary tree and B-Tree practically.
- Implement graph based problems.
- Implement problems based on deterministic algorithms.

CS 308 Operating Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Learn the fundamentals of Operating Systems.
- Learn the mechanisms of OS to handle processes and threads and their communication
- Learn the mechanisms involved in memory management in contemporary OS
- Gain knowledge on Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- Know the components and management aspects of concurrency management
- Learn Case study of Unix OS.

CS 308L Operating Systems Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	2	1

CS 313 Software Engineering

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand the system development lifecycle.
- Understand the software-development process, including requirements analysis, design, programming, testing and maintenance.
- Model object-oriented software systems.
- Investigate and improve the specification of a software system.
- Specify, design and construct CASE tools and application software.
- Develop and apply testing strategies for software applications.
- Identify some of the main risks of software development and use.
- Effectively participate in team-based activities.

CS 315 Theory of Computation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory.
- Understand abstract models of computing, including deterministic (DFA), non-deterministic (NFA), Push Down Automata(PDA) andTuring (TM) machine models and their power to recognize the languages.

- Understand the application of machine models and descriptors to compiler theory and parsing.
- Relate practical problems to languages, automata, computability, and complexity.
- Apply mathematical and formal techniques for solving problems in computer science.
- Understand the relationship among language classes and grammars with the help of Chomsky Hierarchy.

CS 423 Java Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On completion of the course students will able to

- Understand concept of Object Oriented Programming & Java Programming Constructs.
- Understand the basic concepts of Java such as Operators, Classes, Objects, Interface, Inheritance, Packages, Enumeration and various keywords.
- Understand the concept of Exception Handling, Collections, Input/output operations, Socket Programming, Database Connectivity.
- Design the applications of Java, Swing, Applet and JSP.
- Analyze & Design the concept of Event Handling and Abstract Window Toolkit (AWT).

CS 423L Java Programming Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

TSKL 401 Communication Skills

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcomes:

On completion of the course students will able to

- Understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication, etc. from multiple perspectives.
- Understand and evaluate key theoretical approaches used in the interdisciplinary field of communication.
- Explain major theoretical frameworks, constructs, and concepts for the study of communication and language, summarize the work of central thinkers associated with particular approaches, and begin to evaluate the strengths and weaknesses of their approaches.
- Understand the research methods associated with the study of human communication, and apply at least one of those approaches to the analysis and evaluation of human communication.
- Find, use, and evaluate primary academic writing associated with the communication discipline.
- Develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication Competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, etc.
- Communicate effectively orally and in writing.

Fourth Semester

CS 302 Data Communications and Networks

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand basic computer network technology and the Data Communications System and its components.
- Identify the different types of network topologies, protocols and network devices and their functions within a network.
- Understand the layers of the OSI model and TCP/IP and the function(s) of each layer.
- Understand the importance of data communications and the Internet in supporting business communications and daily activity.
- Design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
- Analyze the features and working of IPV4, IPV6 and their transition with Connection less and Connection oriented Transport layer protocols (TCP/UDP).
- Analyze the features and operations of various protocols such as HTTP, DNS, SMTP and many more application layer protocols.
- Understand and can apply the features of Data Compression, Network and Data security.

CS 406 Compiler Design

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Specify and analyze the lexical, syntactic and semantic structures of advanced language features.
- Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation.

- Write a scanner, parser, and semantic analyzer without the aid of automatic generators.
- Turn fully processed source code for a novel language into machine code for a novel computer.
- Describe techniques for intermediate code and machine code optimization.
- Design the structures and support required for compiling advanced language features.

CS 419 Distributed Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Study software components of distributed computing systems. Know about the communication and interconnection architecture of multiple computer systems.
- Recognize the inherent difficulties that arise due to distributed-ness of computing resources.
- Understand the hardware and software concepts of distributed operating systems, various design issues like transparency, flexibility etc., and communication and synchronization in distributed operating systems.
- Understand scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems.
- Understand the concept of design and implementation in the context of distributed operating systems.
- Develop various synchronous and asynchronous algorithms: Leader election, shortest path problem, minimal spanning tress, randomized co-ordinated attack problem, consensus problems and construction of the breath first tree, spanning tree, and maximal independent set.

- Have in-depth knowledge of asynchronous shared memory model including various classical algorithms of mutual exclusion and resource allocation.

CS 436 Web Development and .NET Framework

Max. Marks : 60	**L**	**T**	**P**	**C**
	4	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop working knowledge of C# programming constructs and the .NET Framework architecture.
- Develop, implement and create Applications with C#.
- Build and debug well-formed Web Forms with ASP. NET Controls
- Perform form validation with validation controls.
- Create custom controls with user controls.
- Use of XML in ADO.NET and SQL server.
- Use ADO.NET in a web application to read, insert, and update data in a database.

CS 436L Web Development and .NET Framework Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Fifth Semester

CS 411 Computer Graphics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Gain comprehensive knowledge about the principles and applications of computer graphics.
- Implement various algorithms for scan converting the basic geometrical output primitives, area filling and clipping.
- Design graphics applications such as animations and games etc.
- The student will be able to realistically display 3-Dimensional images on 2-Dimensional plane using projections, shading and illumination models.
- Get the skills to develop the real world graphics applications according to the industry requirements.

CS 537L Computer Graphics Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

CS 507 Artificial Intelligence

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

CS 508 Big Data Analytics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand big data systems and identify the main sources of Big Data in the real world.
- Learn various frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.
- Implement several Data Intensive tasks using the Map Reduce Paradigm in Hadoop.
- Program applications using tools like Hive, pig, NO SQL for Big data Applications.
- Construct scalable algorithms for large Datasets using Map Reduce techniques.
- Apply the knowledge of Big Data gained to fully develop BDA applications for real life applications.

CS 536L Big Data Analytics Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	6	3

Discipline Elective - I & II

CS 427 Parallel Computing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

CS 427 Parallel Computing

Learning Outcomes:

On successful completion of the course students will be able to

- Develop computer program for different type of parallel computers.

- Measure the performance of algorithm used and parallel computers.
- Solve problem using parallel computers.
- Optimize sequential code to parallel code and determine if they are worthwhile to parallelize. Develop, analyze and implement algorithm for parallel computers with shared memory and with distributed memory.
- Analyze and perform development work related to use of parallel computers and are able to get placement in the govt. organization.

CS 431 Real Time Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Explain fundamental principles for programming of real time systems with time and resource limitations.
- Describe the foundation for programming languages developed for real time programming.
- Account for how real time operating systems are designed and functions.
- Describe what a real time network is.
- Use real time system programming languages and real time operating systems for real time applications.
- Analyze real time systems with regard to keeping time and resource restrictions.

CS 433 Soft Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop NN network based application.

- Differentiate between supervised, unsupervised and reinforcement learning.
- Apply fuzzy logic on real life problems.
- Design Hybrid Systems vizNeuro-Fuzzy, Neuro- Genetic, Fuzzy-Genetic systems.

CS 511 Cloud Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Apply cloud computing model in real application.
- Use programming paradigms like MapReduce to create applications.
- Operate cloud by installing virtual machines and apply migration.
- Understand the challenges of cloud
- Aware about the Access Control mechanisms of cloud.

CS 519 Data Warehouse and Data Mining

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Identify the scope and necessity of Data Mining & Warehousing for the society.
- Describe the designing of Data Warehousing so that it can be able to solve the root problems.
- Understand various tools of Data Mining and their techniques to solve the real time problems.
- Develop ability to design various algorithms based on data mining tools.

- Develop further interest in research and design of new Data Mining techniques.

CS 527 Mobile Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Have knowledge of fundamentals of mobile communication systems.
- Choose system (TDMA/FDMA/CDMA) according to the complexity, installation cost, speed of transmission, channel properties etc.
- Identify the requirements of mobile communication as compared to static communication.
- Identify the limitations of 2G and 2.5G wireless mobile communication and use design of 3G and beyond mobile communication systems.

CS 528 Modeling and Simulation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Define basic concepts in modeling and simulation (M&S).
- Classify various simulation models and give practical examples for each category.
- Construct a model for a given set of data and perform its validity.
- Generate and test random number and apply them to develop simulation models.
- Analyze output data produced by a model and test validity of the model.
- Explain parallel and distributed simulation methods.
- Know how to simulate any discrete system using queuing systems.

CS 529 Natural Language Processing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Develop algorithms based on NLP Concepts.
- Develop applications based on Statistical Approaches of NLP.
- Create applications for Indian Language Processing.

CS 601 Cyber Security

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Evaluate the computer network and information security needs of an organization.
- Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
- Measure the performance of security systems within an enterprise-level information system.
- Troubleshoot, maintain and update an enterprise-level information security system.
- Implement continuous network monitoring and provide real-time security solutions.
- Formulate, update and communicate short- and long-term organizational cyber security strategies and policies.

CS 602 Digital Image Processing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Explain how digital images are represented and manipulated in a computer, including reading and writing from storage, and displaying. Write a program which implements fundamental image processing algorithms.

- Conversant with the mathematical description of image processing techniques
- Know how to go from the equations to code.

ELE 304 Digital Signal Processing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Describe the characteristics and transformations of discrete time signals mathematically.
- Apply techniques in time and transform domains to the analysis and design of discrete-time systems
- Estimate the spectra of deterministic and stochastic signals, and appropriately interpret the information contained therein
- Demonstrate the ability to manipulate signals using analytical techniques and write algorithms to implement discrete-time systems
- Describe the techniques for signal modulation and discriminate between the different modulation schemes used in communication systems

IT 506 Human Computer Interaction

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop effective UI.
- Design menus using STM.
- Develop applications based on cognitive architecture

Reading Elective

CS 509R Client-Server Computing and Applications

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand real life application using client-server architecture.
- Learn concepts of network and its usage in client-server model.
- Design distributed database for various application.

CS 522R Electronic Commerce

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Recognize the business impact and potential of e-Commerce.
- Explain the technologies required to make e-Commerce viable.
- Discuss the current drivers and inhibitors facing the business world in adopting and using e-Commerce.
- Explain the economic consequences of e-Commerce.
- Discuss the trends in e-Commerce and the use of the Internet.
- Create and refine ecommerce website and application designs based on industry's usability standards.
- Assess the suitability of various design principles for ecommerce websites and applications apply the technologies required to design and prototype Web-based information systems.

- Discuss e-commerce from an enterprise point of view evaluate key aspects of B2B e-commerce.
- Discuss emerging e-commerce topics.

IT 403R Enterprise Resource Planning

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Make students able to learn fundamental concepts of ERP system and ERP related technologies.
- Provide students knowledge of different ERP modules and manufacturing perspectives of ERP.
- Use ERP system in different business organizations by having knowledge of latest scenario of ERP market in e-business.

MCA VI Semester

Online Course Reading Electives

Agile Software Development

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand basic of agile model for software development
- Understand roles of agile values
- Understand testing management

Organizational Behaviour

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand and apply principles of organizational dynamics relating to systems, culture, structure• and change processes
- Develop critical analytical skills that will help them diagnose situations pertaining to human behaviour and generate effective solutions for the same.
- Understand performance behaviour at individual and group levels.
- Develop the ability to lead and motivate others to succeed.

Software as a Service

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Create more sophisticated apps by adding relationships between models in apps and by enhancing their apps with JavaScript.
- Learn about what happens after the apps are deployed to real users, including how to monitor performance, identify and fix common performance problems, and avoid compromising customer data.
- Learn how to apply Agile techniques to enhance and refactor legacy code, a critical skill for professional programmers.

Blockchain

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand concept of Block Chain Technology
- Understand Bitcoin protocol
- Understand hashing and cryptography foundations

BANASTHALI VIDYAPITH

Master of Commerce

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

In our country, teaching and research in commerce is being carried out by many of the universities. Banasthali Vidyapith, which has been successfully nurturing women for variety of roles in society for the last eight decades, is trying to develop teaching and research talent to create academic expertise suiting to contemporary needs of the society. FMS-WISDOM offers M.Com Program with emphasis on application oriented approach to fulfill the requirements of academia and corporate both. The program is of two years duration divided in four semesters to deal with practical aspects of financial and non financial sectors. The program has aim to nurture research culture and also promote industry internship. The third semester provides elective opportunity in emerging areas such as accounting and finance, banking, and public policy and law. Whereas the fourth semester provides dissertation and internship opportunity so that students can shape their career as a professional with right skills, capability and attitude.

The specific objectives of the M.Com program are:

1. To prepare the students to evaluate environmental factors that influence business operation by providing higher level knowledge and understanding of contemporary trends in commerce and business finance.
2. To prepare students for analytical approach in regard of the structure and operations of financial markets, role of government and central banks and related laws and regulations.
3. To facilitate the students to understand and analyze the risk in financial decisions and its effect on various business situations.
4. To prepare students to start their own venture by inculcating the skills of entrepreneurship and networking.
5. Guest sessions by various industry experts for students to observe and analyze the behavior of different firms which helpful to develop their understanding towards industrial research.
6. To provide guidance to students to undertake independent research either through dissertation or internship mode in their own chosen discipline.

7. To train the students for teamwork, learning and continuous professional development by inculcating strong ethical and moral values.

Programme Outcomes

PO1: Educational Improvement: The commerce education would enable students to understand the dynamic environment and developments in national and global financial sectors through effective delivery of the curricular aspects.

PO2: Personal Development: The program adopts a reflective approach for personal development of the student by providing vast treasure of knowledge and developing communication and interpersonal skills.

PO3: Practical Knowledge: The students will be able toevaluate the various financial investment avenues with the use of software tools to carry out a specified financial analysis of a business application.

PO4: Teaching Methodology: M.Com program uses the case study approach and presentation sessions which is helpful for students to further understanding of the concepts and bring students abreast with the corporate culture.

PO5: Professional Exposure: The students would feel motivated for the positions of leadership in business organizations or in their own venture by providing analytical inputs and industry exposures.

PO6: Holistic Development: The student would benefit from the focus on the overall development in relevant branches of knowledge, competence and creativity to face challenges.

PO7: Value Based Development: The program inculcates a sense of responsibility, social commitment, and moral accountability among the students through providing in-depth knowledge of Indian ethos and culture.

First Semester

COM 402 Advanced Corporate Accounting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the concepts of corporate accounting.
2. To understand the maintaining of accounts in holding, subsidiaries and internal reconstruction.
3. To understand the effect of inflation on accounts of business.
4. To understand the recent developments in accounting.

Learning Outcomes:

Upon completion of the course the students will be able to :

- Understand accounts of corporate with latest amendments.
- Price level changes and its maintenance
- Procure job in accounting field.

COM 403 Advanced Financial Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the methods and source of raising finance.
2. To understand the concept of project planning, financing and appraisal.
3. To understand the concept of valuation of share and evaluation of portfolio.
4. To enable students to get a deep insight into emerging trends of derivatives and option strategy formation.

Learning Outcomes:

Upon completion of the course student will be able to:

- Understand implementation of project evaluation techniques.

- Advice and guide in valuation of stock/Shares.
- Will be job ready as fundamental and technical analyst.

COM 406 Business Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To familiarize students with concepts and analytical tools from micro economic theory that are useful to managers in making decisions at the enterprise level, large, medium, small, tiny and other types.
2. To aware the students about various concept of demand, production, cost and implication of these concepts in managerial decision making.
3. To make clarity about the different market structures and price and output determination under different market structures.
4. To develop the knowledge about the macro economics concepts, national income, circular flow trade cycles
5. To aware the students about recent trends and policies of Indian Economy.

Learning Outcomes:

Upon completion of the course student will be able to :

- Understand macroeconomic environment and its implications on decision making.
- Understand role of economic theory in managerial decision making.
- Learn about concept of demand, production and cost.
- Accurate business decisions.
- Understand the macro economics concepts and its impact on business

COM 407 Entrepreneurship

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To contribute towards developing an entrepreneurial attitude amongst students.

2. To develop the ability of analyzing and understanding business situations in which entrepreneurs act and to master the knowledge necessary to plan entrepreneurial activities
3. To understand the basic concepts of venture creation.

Learning Outcomes:

Upon completion of the course student will be able to :

- Familiarize with the basics of entrepreneurship.
- Learn about systematic process to select and screen a business idea.
- Developing a business plan using financial, operational, organizational, market, and sales knowledge.

COM 409 Indian Ethos and Culture

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To assimilate Indian ethos and values relevant for management development.
2. To understand the main characteristics of Indian Society and Culture: unity, diversity, change, dissent, continuity, learning society and resilience.
3. To generate management wisdom through Indian folk lores, proverbs and local idioms
4. To understand the Indian models of holistic person - OSHA, Corporate Rishi, VEDA Model society and their implications for modern managers.
5. To empower women students to managerial approaches in conformity with Indian ethos/realities.

Learning Outcomes:

Upon completion of the course student will be able to :

- Understand ancient Indian spiritual teachings.
- Develop value oriented approach in life.
- Develop capacity to deal with women issues.

COM 411 Organizational Communication

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To acquaint students with the importance of efficient and effective communication.
2. To make students understand the flow of communication and the various channels adopted herewith.
3. To familiarize the students with various forms of verbal and non-verbal communication.

Learning Outcomes:

Upon completion of the course student will be able to :

- Understand the specifications of formal communication process.
- Draft different forms of written communication.
- Learn to prepare and deliver presentations.
- Understand assimilation of verbal and non-verbal communication.

Second Semester

COM 401 Advanced Business Laws-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop knowledge about the sources of Indian law and the basic legal concepts
2. To differentiate among offer, agreement and contract
3. To study the different concepts of bailment and pledge
4. To deliver knowledge about partnership firms, registration and partnership deeds
5. To discuss the contract of sales of goods act and its performance
6. To sensitize students of useful terminologies like price, warranty, guarantee etc.

Learning Outcomes:

Upon completion of the course student will be able to :

- Understand business law and related terminologies.
- Gain knowledge about partnership firms, registration and partnership deed.
- Understand key terms like price, warranty, guarantee.

COM 405 Auditing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the basic of auditing.
2. To understand audit planning and implementation of audit programme.
3. To comprehend various practical aspects like audit note book, audit papers, audit file, audit memorandum.
4. To understand preparation of audit report and its contents.

Learning Outcomes:

Upon completion of the course student will be able to:

- Understand importance of auditing.
- Comprehend the practical dimensions of audit.
- Practically implement an audit programme.

COM 408 Financial Institutions and Markets

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop the knowledge about financial market and financial system and its relation with economic development
2. To understand the theoretical concepts underlying money market, capital markets, financial instruments etc.
3. To understand the role of development banks, NBFIs and their role in financial system.

4. To gain the insight about financial services, fund based and non fund based services.

Learning Outcomes:

Upon completion of the course student will be able to :

- Develop capacity to work within financial institutions.
- Develop practical knowledge about Money market and capital market.
- Understand the concept of development banks and non banking financial institutions.

COM 410 International Business and Finance

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the concept of business environment, globalization and International trade.
2. To study the roles of International economic Institution and International financial management
3. To understand the concept of Balance of payment and FOREX market.
4. To understand the trading concept of direct and indirect quotation of currency.

Learning Outcomes:

Upon completion of the course student will be able to :

- Understand business environment and globalization affect.
- Understand the working of International economic Institution.
- Develop capacity to advice and guide in FOREX market.
- Procure jobs as currency strategist and analyst.

COM 412 Personal Financial Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the meaning of financial planning Along with the details about the various areas of financial planning like Tax planning, Retirement planning, Estate planning, and Budgeting, Savings, Debt management and Investment planning.
2. To study in detail about tax refund, residency rules, procedure of assessment, taxation of interest income, taxation of capital gain, advance tax planning and instruments of tax planning.
3. To understand the meaning of financial planning, its different components, process, personal financial statements, budgeting, time value of money and along with this To understand about various investment avenues like mutual funds, insurance, basics of equity and debt markets.
4. To understand about the Regulatory bodies and ethical aspects of Personal finance.

Learning Outcomes:

Upon completion of the course student will be able to :

- Learn about components of financial planning.
- Understand Personal Tax Planning.
- Familiarize with regulatory bodies like SEBI, IRDA.

COM 404 Application Software for Accounting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the application of computers in the field of accounting.
2. To understand the application of Tally ERP 9 as accounting software package
3. To understand the preparation of books of accounts in MS Excel.

4. To understand calculation of TDS and file e-TDS return.

Learning Outcomes:

Upon completion of the course student will be able to

- Learn usage of Tally ERP 9 for accounting purposes.
- Learn usage of MS Excel in maintaining books of accounting.
- Procure a job in the field of accounting.

COM 413L Application Software for Accounting Lab

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Objective : To provide practical insight about using Tally, Excel and PowerPoint for accounting and finance.

Third Semester

Disciplinary Courses

COM 502 Advanced Business Laws – II

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To enable students to delve deeply into legal aspects of Companies and to understand the big picture of a corporate world.
2. To familiarize the students with the nature of regulatory environment of corporate enterprises in India.
3. To provide insight into other related laws like Insolvency Code, Competition Act, FEMA, IT Act and Consumer Protection Act etc. so as to enable students to learn the legalities associated to the corporate houses.

Learning Outcomes:

Upon completion of the course student will be able to :

- Demonstrate comprehensive and accurate knowledge of company law.
- Critically analyze complex problems of regulation of companies.
- Apply the legal principles studied for solving problems.

COM 504 Advertising Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop an understanding of the dynamics of advertisement.
2. To examine the scope and complexity of media in our society.
3. To stimulate interest in ethical and unethical advertising.

Learning Outcomes:

Upon completion of the course student will be able to

- Understand the advertising industry and its working.
- Gain knowledge to device an Ad Campaign.
- Secure an entry level job.

COM 510 Insurance Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. This course seeks to introduce the students about insurance sector and its developments.
2. To highlight the functioning and the laws governing insurance business.
3. To introduce the students to the various types of insurance products.
4. Introduce and acquainting students with different risk management techniques and actuarial mathematics.

Learning Outcomes:

Upon completion of the course student will be able to:

- Understand dynamics of the insurance markets.
- Understand need based requirements of life and non-life insurance products.
- Understand insurance sector and actuarial mathematics.

COM 507 Corporate Social Responsibility

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop an understanding of the dynamics of CSR and its role in development
2. To examine the scope and complexity of corporate social responsibility (CSR)
3. To stimulate interest of students in emerging dimensions of CSR
4. To enable participants appreciate the Bharatiya concept of social responsibility

Learning Outcomes:

Upon the outcomes of the course student will be able to:

- Realize importance of CSR in social development.
- Gain insights in emerging trends of CSR
- Better understand Bharatiya culture and its role in sustainable development.

Discipline Electives

COM 512 Management Accounting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives :

1. To understand the fundamental concepts and processes of Management Accounting.
2. To analyze the Management Accounting methods and to identify profitable products and services.

3. To be able to interpret management accounting statements for ascertainment of price and profit, planning & control of expenses.
4. To analyze accounting reports to make sound managerial decisions

Learning Outcomes:

Upon comptition of the course student will be able to

- Understand management accounting practices.
- Make effective decisions following accurate process.
- Apply management decisions in various situations.

COM 501 Advance Investment Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives :

1. This course seeks to introduce the students to the field of inquiry that focuses on the security markets and its development globally.
2. To highlight the functioning of the financial markets and its role in resource allocation.
3. To introduce the students to the various asset classes traded in financial markets and its importance.
4. Introducing and acquainting students with different theories, valuation and pricing models.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Explore dynamics between markets.
- Understand role of the market participants.
- Learn about concepts of valuation of financial securities.
- Develop understanding of portfolio allocation.

COM 513 Public Policy

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop an understanding of the fundamentals of the public policy, policy implementation processes and models
2. To enable participants make informed business decisions with respect to policy environment
3. To gain insights of the emerging governance scenario and its impact on businesses
4. To explore role of ancient Bharatiya wisdom in public policy

Learning Outcomes:

Upon comptition of the course student will be able to :

- Analyze impact of policy decision on business.
- Take informed business decisions.
- Learn innovative policies from Bharatiya ancient wisdom.

COM 503 Advanced Business Laws III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the connection of public policy with law and the role of the judiciary.
2. To expose the intricacies of administrative and constitutional law to the students.
3. To make students learn about the functioning of parliamentary procedures and the exercise of administrative discretion in execution of policies.
4. To give students a perspective on comparative law, international law and arbitration mechanisms between nations, natural justice and regulatory institutions.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Connect public policy with law.
- Understand the intricacies of administrative and constitutional law.
- Familiarize with parliamentary procedures and execution of policies.

- Understand various perspectives of law and legal mechanism.

COM 514 Qualitative Research

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop the qualitative research skills for business management
2. To enable participants appreciate the role of qualitative research in business decision making.
3. To gain insights into business processes by analyzingcase studies and organizational ethnographies
4. To become aware of recent trends in qualitative research for effective business management

Learning Outcomes:

Upon comptition of the course student will be able to :

- Gather and interpret qualitative data for understanding business scenario in effective manner.
- Simulate in-depth observations and subsequent analysis help in improving organizational environment.
- Obtain awareness of recent trends and developments in the area of business research
- Be equipped with relevant skills of qualitative research for application in business environment

COM 509 Indian Banking Sector

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To understand the banking system and banking structure of India.
2. To understand the banking operations in association with the retail, corporate and rural banking in India.
3. To understand various products and services offered by the banks along with micro finance offered by the banks.
4. To understand the various other financial services provided by Indian banks.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Understand banking structure of India.
- Understand banking operations and associated services.
- Accustomed to the aspects of micro finance.
- Know various financial services offered a bank.

COM 505 Banking Theory and Practice

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To facilitate the study of theory and practice of banking for Indian financial system.
2. To establish the understanding about banking customers relations and instruments used for banking operations.
3. To provide knowledge of various banking services related to transfers and withdrawals
4. To provide understanding of role of international banking and financial operations and import and exports facilities by banks.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Learn theory and practice of banking for Indian financial system.
- Understand various banking services related to transfers and withdrawals.
- Understand role of international banking and financial operations
- Learn about import and exports facilities by banks.

COM 506 Business Analytics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Course Objectives:

1. To develop the quantitative research abilities for business intelligence.
2. To enable participants appreciate the role of data analytics (quantitative) in business decision making.

3. To appreciate the changing dynamics of business scenario through data sciences
4. To apply concepts of business analytics for effective management skill.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Interpret data for understanding business scenario in effective manner.
- Get a simulation of how data sciences help in predicting and forecasting sales.
- Aware of recent trends and developments in the area of business analytics

Reading Electives

MGMT 503R Corporate Banking - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Course Objectives:

1. To understand about corporate banking products and services offer by various Banks.
2. To understand the concept and significance of branch profitability.
3. To understand about all the BASEL norms which are designed to improve the regulation, supervision and risk management within the banking sector.
4. To understand the concept of credit bureau.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Understand corporate banking products and services
- Understand the concept and significance of branch profitability.
- Gain knowledge about all BASEL norms
- Gain knowledge that will make them job ready .

MGMT 506R Digital Marketing

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Course Objectives:

1. To understand the components of digital marketing and its role in promotion mix
2. To learn various activities performed under digital marketing
3. To understand the application of digital marketing tools in marketing management

Learning Outcomes:

Upon comptition of the course student will be able to :

- Understand and implement digital marketing tools
- Get a practical outlook of the digital marketing and its implementation in marketing promotion
- Gain knowledge that will make them job ready for the marketing job

MGMT 521R Advance in Mutual Funds

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Course Objectives:

1. To Develop Understanding of Mutual Funds so that they should compare the risks and expected yields after adjustment of tax on various instruments while taking investment decisions.
2. To develops students understanding and skills in investment area and various options available in mutual funds.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Advise on various aspects of Mutual Funds.
- Be Equipped with the knowledge to clear NISM V Module.
- Job-readiness in Mutual Fund industry.

MGMT 529R Supply Chain Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Course Objectives:

1. To develop understanding of basics of SCM.
2. To develop basic understanding of role of mathematics in SCM.
3. To develop understanding of inventory management in SCM.
4. To develop understanding of role of internet and customer centric orientation in SCM.
5. To stimulate thought process of students with help of suitable case studies.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Have a basic understanding of SCM.
- Understand and apply mathematics behind SCM.
- Understand inventory management in real world scenarios.
- Understand the role of internet and customer centric orientation in SCM.
- Secure jobs in the SCM industry.

MGMT 502R Advanced Readings in HRM

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Course Objectives:

1. This course aims at exposing students to latest thinking in Human Resource Management
2. This course enables the participants to understand and appreciate the role of Institution Building and their impact on society development.
3. Learning about leadership and related HRD issues in the corporate and social context and development of qualities to face the challenges of the outer world.

4. It also aims at developing excellence, motivation and human concerns while managing in a competitive scenario and to understand various concepts related with HRA, HRIS, IHRM and HRD audit

Learning Outcomes:

Upon comptition of the course student will be able to :

- Gain in-depth knowledge about various HR concepts, role and Role Analysis and their significance for individual and organizations
- Cope with stress arising due to role ambiguity
- Learn about organization, organization culture, environmental interface and its implication for managers
- Understand the HR polices , cultural differences &IHRM
- Learn about Audit of Human Resource , HRA & HRIS

MGMT 504R Corporate Banking - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Course Objectives:

1. To understand about corporate banking products and services offer by various Banks.
2. To understand the products offer for MSME financing by Banks.
3. To understand about international banking products and services offer by Banks like treasury products, trade services, Forex etc.
4. To understand the concept of rural business credit and the products offer by the Banks for same.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Understand term loans, working capital loans, project financing etc.
- Understand about the products and services offer for MSME financing.
- Job- readiness specifically in Corporate Banking and international banking division of Banks.

COM 508R International Financial Reporting Standards (IFRS)

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Course Objectives:

1. To have an understanding of the IASB's due process and the objectives of the IASB.
2. To have an understanding of the development of the IFRS in the past.
3. To know which entities are required or permitted to use IFRS and a general overview about IFRS.
4. To have an in-depth understanding in applying and interpreting IFRS to real world accounting problems.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Familiarize with International Financial Reporting Standards.
- Understand accounting harmonization and convergence.
- Explore International Financial Reporting Standards (IFRS).
- Understand alternative accounting and reporting methods.

MGMT 528R Strategic Planning in IT

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Course Objectives:

1. To develop advanced learning in level of collaboration, communication, and engagement in Information Technology.
2. To update the student in current environment as well as the dynamic changes in Information technology.

Learning Outcomes:

Upon comptition of the course student will be able to :

- Understand and apply strategic Management in their jobs.
- Provide a competitive edge to the students while in job

BANASTHALI VIDYAPITH

Master of Design

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

The M.Des programme is supported by UGC under Innovative Programme from 2013. It offers courses that endeavor to develop student's Knowledge and skills in a wide range of interdisciplinary studies such as **Communication Design, Fashion and Lifestyle Design and Interior Design**.

The curriculum has identified essential competencies in the respective areas for which holistic education will be provided to the students.

The main objectives of the Master of Design Programme are:

- To create Designers so that they can work in a wide range of Multi-disciplinary areas and with diverse team members to achieve holistic and sustainable goals.
- This Programme is Project-oriented (10-month Industry Training), Human-centered and Interactive in approach. It culminates in Industry based projects with a view to connect students with Industry and develop their skills and confidence to work towards real-time objectives.
- An Interdisciplinary Programme which aims to impart knowledge and develop capacities of the students from different streams/departments through employment oriented higher education.

Programme Outcomes

PO1: Interdisciplinary approach: Possess interdisciplinary approach in their thinking and find creative solutions

PO2: Advanced Level: Achieve/Go to next levels in their own design field for the purpose of either education, research or branching into specialized field.

PO3: Multi-discipline: To be able to contribute in a multi-discipline or cross-discipline projects.

PO4: Research Orientation: To be able to do Research, analyse problems, find suitable solutions by Research/Design Process & be able to articulate them.

PO5: Awareness of global issues: To be aware of the global issues related to Sustainability, socially relevant & human centric factors.

PO6: Design Ethics: Apply ethical principles in professional, personal and social contexts.

PO7 Professional Identity: Understand, analyze and communicate the value of their professional roles in society

PO8: Communication: Communicate effectively with the Design Community and with society at large, such as, being able to comprehend and write effective, make effective presentations and documentation, and give and receive clear instructions.

PO9: Environment and sustainability: Understand the impact of the professional Design solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for human-centric sustainable development.

PO10: Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.

PO11: Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

First Semester

DES 502 Contemporary Global Issues

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

Upon completion of the course, students will be able to:

- Appreciate Environmental issues and its impact on the world.
- Understand the role of International agencies like United Nations, IMF, World bank in addressing the Global issues and finding the solution.
- Understand the role of contemporary design in addressing the contemporary global issue

DES 504 Materials and Techniques

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	2	0	0	2

Learning Outcomes:

Upon completion of the course, students will be able to:

- Think on new concepts its perception and transformed it in to the product.

DES 504L Materials and Techniques Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcomes:

Upon completion of the course, students will be able to:

- Developed ability to select different types of materials according to their types, categories and properties.
- Developed ability to hands on handling of different types of materials.

DES 512 Study of Innovation, Visualization and Conceptualization

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	2	0	0	2

Learning Outcomes:

Upon completion of the course, students will be able to:

- Understand how visualization can facilitate concept design.
- Understand designers' use of a specific cognitive process, visualization, can influence the development of design concepts.
- Develop conceptual framework that links the type of visualization (memory v/s imagination) and the content of visualization (incorporation of the end user) to the nature of the design process and to the nature of the design outcome, i.e. its originality, usefulness, and customer appeal.

DES 512L Study of Innovation, Visualization and Conceptualization Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcome

Upon completion of the course, students will be able to:

- Create products based on Customer Demand.
- Conceptualize structure and implement creative ideas into design centric products.

Discipline Elective - I

Learning Outcomes:

Upon completion of the course, students will be able to:

- Select market and product knowledge to the student related to the interest area
- Finalize the next 4 tentative minor projects

Discipline Elective - II

Learning Outcomes:

Upon completion of the course, students will be able to:

- Conceptualize the ideas in form of at-least 40 sketches (both hand & on soft-wares)

Discipline Elective - III

Learning Outcomes:

Upon completion of the course, students will be able to:

- Develop the final concept (soft-copy) based on the chosen design brief.
- Develop a product range/prototype based on the finalized concept.

Second Semester

DES 503 Marketing and Entrepreneurship

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

Upon completion of the course, students will be able to:

- Identify opportunities and complete all the necessary formalities for starting a new business

DES 511 Research and Documentation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

DES 501L Advanced Representation Techniques Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

Upon completion of the course, students will be able to:

- Use 2D and 3D representation in their creative execution process.

- Examine how representation is used throughout the design process from problem to solution, from informing and inspiring their designs to clearly communication our processes and intentions to colleagues, client, and contractors.
- Develop their abilities to ‘see’, ‘create’, and ‘read’ representation from precise detailed drawings and models.

Discipline Elective - IV

Learning Outcomes:

Upon completion of the course, students will be able to:

- Aware of the market and services expected from them as Designers
- Business aspect of the Design

Discipline Elective - V

Learning Outcomes:

Upon completion of the course, students will be able to:

- Make Business plan for a start-up in India considering all the aspects related to business/Research proposal feasible for National level.

Discipline Elective - VI

Learning Outcomes:

Upon completion of the course, students will be able to:

- Get Internship in an organization related to the projects undertaken

Third Semester

DES 605P/DES 603D UIL Project-I / Dissertation-I

Max. Marks : 100 **L T P C**

Learning Outcomes:

Upon completion of the course, students will be able to:

- Make students aware of the possible problems faced while undertaking a project and ways to find solutions to them.
- Make students understand the application of all the skills gained (both hard & soft skills) to make the project a success.

Fourth Semester

DES 606P/DES 604D UIL Project-II / Dissertation-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**48**	**24**

Learning Outcomes:

Upon completion of this course students should be able to:

- Make students aware of the possible problems faced while undertaking a project and ways to find solutions to them.
- Make students understand the application of all the skills gained (both hard & soft skills) to make the project a success.

Reading Elective

DES 432R Introduction to Behavioral Science

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

Upon completion of this course students should be able to:

- Grasp basic knowledge about behavioral science
- Appreciate the value of behavioral sciences in modern life
- Acquire “how to” discussions that address everyday problems.

- Develop critical thinking with logical reasoning and approach fundamental issues of health by multi-perspectives
- Show empathy to others and concern the health and well-being of others.

DES 433R Introduction to Intellectual property Rights (IPR)

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

Upon completion of this course students should be able to:

- Define intellectual property
- Identify and State reasons and ways to protect intellectual property
- Define the types such as: patents, copyrights, trademarks, designs, etc., found in everyday experiences
- Define piracy and counterfeit
- Understand the harm caused by piracy and counterfeit
- Identify the timelines and Duration of patents, copyrights, trademarks and designs
- Use the knowledge for getting IPR as per the requirement.

DES 523R Fundamentals of Retail Management

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Describe retailing, the entities involved, and the impact of decisions on a retail business
- Analyze the evolution of the retail industry
- Recognize career opportunities available in the retail businesses

DES 434R Management Information System

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

Upon completion of the course, the students will be able to:

- Describe the role of information technology and information systems in business
- Understand the current issues of information technology and relate those issues to the firm
- Reproduce a working knowledge of concepts and terminology related to information technology
- Analyze and apply information technology.

BANASTHALI VIDYAPITH

Master of Education

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Department of Education aims to develop human resource in terms of effective School Teachers, Educational Researchers, Teacher Educators and Educational Leaders so as to achieve the excellence in teaching, research and innovation with Indian ethos.

Teacher Education program at Banasthali Vidyapith intends to develop knowledge of Teaching Learning Process, competencies to transfer the knowledge, development of skills, organization and management of school system as well as to develop subject content and curriculum and maintain professional ethics and attitude towards Teaching as a 'noble profession'.

Department of Education purports to provide comprehensive inputs which are aimed;

* To study the education as a discipline.
* To prepare competent and enlightened teachers for different levels of education in India.
* To develop responsive, reflective and responsible teachers, educational administrators, researchers and academicians who will be able to work in collaboration with parents and community.
* To develop an understanding of focal concerns of education such as language diversity, inclusive education, gender-neutral attitude and education for sustainable development and global citizenship.
* To prepare teachers having an understanding of interact and instruct in class in the context of school organization and school education system at local and global level.
* Develop a sensitivity and appreciation amongst professionals about the larger societal context in which school education operates, the linkages, mutual pressure and influences of other sub systems.
* To provide a deep understanding of educational research and be competent to carry out independent need based quality field researches.
* To create digital competency amongst professionals in order to enhance their teaching, research, innovation and administration.
* To prepare effective teachers by integrating the academic studies with professional understanding, competencies and reflective visions.
* To nurture a temperament in the professionals to work toward self-driven performance goals, entrepreneurship and academic leadership for a noble mission 'Teaching'.
* To increase the sensitivity of professional ethics, code of conduct, social cultural values, human dignity and humanness.

Programme Outcomes

On completion of Masters in Teacher Education the student will be able;

PSO1. To use enduring content and pedagogical knowledge to update their teaching

PSO2. To develop relevant, rigorous, stage appropriate curricula.

PSO3. To modify curriculum and instruction based on the individual needs of their students.

PSO4. To use assessment of their students' learning and their own teaching to design future planning and teaching.

PSO5. To relate and deliver oral and written communication based on sound educational theory and research in guiding the instruction of diverse students and/or for public education leadership.

PSO6. To evaluate and formulate education plans based on research and knowledge of legal requirements outlined in federal legislation, current issues, and/or public education stakeholders.

PSO7. To synthesize, evaluate, and refine information from an information base of scholarly resources.

PSO8. To evaluate and articulate responses to moral, ethical, legal, and professional challenges from the perspective of an educational leader, and/or advocate for learners who are exceptional.

PSO9. To employ statistically valid processes to analyze assessment data to evaluate student learning with respect to district, state, and federal goals.

PSO10. To work individually and collaboratively for research-based change and innovation in Education.

PSO11. To facilitate the social and civic development of their students.

PSO12. To work collaboratively with colleagues and community to ensure quality of instructional programs of schools.

FIRST SEMESTER

EDU 621 Conceptual Perspectives of Teacher Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Students will be able to:

- explain the concept and objectives of teacher education.
- discuss the development of teacher education.
- analyze the diversification in teacher education.
- explain the concept, inputs, evaluation in pre-service teacher education.
- describe in-service teacher education and various agencies involved in in-service teacher education.
- analyze the distance mode in teacher education.

EDU 623 Educational Research - I: Theoretical Perspective

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- describe the concepts of research and educational research.
- discuss the nature and scope of educational research.
- describe and differentiate various kinds of research as well their aspects.
- reflect on methodological issues involved in educational research.
- explain the process of research proposal writing.

- show the skills of design a research proposal.

EDU 627 Philosophical Foundations of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- reflect on concept and nature of education
- appreciate philosophical base of education
- analyze Indian and Western philosophical base for education
- critically analyze epistemological and Axiological issues on education
- apply philosophical Inquiry for analyzing the education issues

EDU 629 Sociological Foundations of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- analyze sociological basis of education.
- explain the role of Education in Social Structure and Social Stratification.
- analyze the role of education in Social Control and Social Mobility.
- observe and analyze Social Changes in the Society.
- discuss issues related to society and education.

SECOND SEMESTER

EDU 624 Educational Research - II: Data Analysis and Interpretation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- Develop skill in presentation of data through different forms of graphs
- Analyze applications of NPC
- Interpret a given set of data after analysis
- Apply inferential statistics in data analysis
- Differentiate quantitative and qualitative methods of analysis
- Reflect on different qualitative methods of research
- Write a research report in a proper way

EDU 628 Psychological Foundations of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- describe and analyze the psychological foundation of Education.
- explain the meaning, nature and kinds of learning.
- discuss the basic ideas, components of major schools of learning and their contribution to Education.
- explain the concept of motivation and discuss its implication in Educational process.

- recognize and appreciate unique traits in the learner as an individual.
- describe the learner as a group member.
- analyze the psychological process of group and apply various ways to make it effective.

EDU 622 Curriculum Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- define curriculum.
- identify the components of curriculum.
- describe the various principles of curriculum.
- explain various determinants of curriculum.
- describe and analyze various approaches to curriculum.
- describe various models of curriculum development.

EDU 625 Emerging Trends and Issues in Teacher Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- elucidate the objectives and functions of NCTE.
- critically analyze NCFTE 2009.
- elucidate the quality assurance in TEP.
- reflect the teaching practices in TEP.

- analyze major research areas and present scenario of research in TEP.
- interpret the role of media in TEP.
- appreciate the functions of Media Resource Centers.

EDU 626 Historical, Political & Economic Foundations of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- analyze socio-historical context of Indian.
- critically analyze various education commissions and policies in post -independence period.
- familiarize with political and economic scenario of Indian Education.
- analyze and explain relationship between education and Development.
- discuss political and economic issues of Education.

THIRD SEMESTER

EDU 720L Communication Skills, Self Development and Yoga

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

Student will be able to-

- express their ideas in small and large group.
- reflect through reading of some inspirational books.
- communicate through Creative Writings.
- discuss the importance to Yoga for their well-being.
- perform Asnaas and Pranayam.

EDU 719L Communication Skill with ICT Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

Student will be able to:

- explain the concept and potential of ICT for Communication.
- critically analyze and utilize the ICT for teacher-educator related work.
- design appropriate ICT for Communication.
- apply appropriate ICT for Communication.

EDU 732 Secondary Education in Contemporary India

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The student will be able to:

- reflect diversity in Indian Society.
- express the constitutional values as reflected in Education.
- analyze the roles of commissions and policies in Secondary Education.

- deal with inequality and marginalization related issues in India.
- analyze and appraise the policy and programmes for Public Education in India.

FOURTH SEMESTER

EDU 735 Teaching and Learning at Secondary Stage

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- differentiate between types of learner while teaching.
- analyze the different factors influencing teaching learning process during class interaction.
- apply different type of methods and media.
- plan according to Phases, level and maxims of teaching.
- manage the classroom as a professional.

Discipline Elective

EDU 724 Educational Administration and Planning

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- analyze fundamental of Educational Management.
- describe the development of Educational Administration.
- visualize Educational Administration as a process.
- Critically evaluate status of Educational Administration in India.
- critically analyze Educational planning in India.

EDU 726 Educational Technology and Instructional Process

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- clarify the concept and nature of Educational Technology.
- apply systems approach in Education.
- develop Programmed instruction material.
- clarify the phases and levels of Teaching.
- appraise and use various Models of Teaching.

EDU 728 Fundamentals of Educational Assessment and Evaluation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Students will be enable to:

- explain the Concept and Need of Educational Measurement and Evaluation.
- discuss the relationship of Instructional Process and Educational Evaluation.
- discuss selection and use the various items used in Educational Evaluation.
- selection and use of the Characteristics of Evaluation Tools.
- analyze the Trends in Educational Evaluation.
- reflect the skills necessary for determining the degree of reliability and validity of a test.

EDU 730 Principles and Procedures of Guidance and Counselling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- explain the concepts of guidance and counselling, their need and application to the process of education.
- discuss the basic principles of guidance and counseling.
- analyze the theoretical background of vocational development and guidance activities.
- describe the organizational frame work of various guidance services in schools.

EDU 718 Assessment and Counseling Process

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Students will be able to:

- describe and analyze the theoretical understanding of nature and needs of various assessment techniques used in counseling.
- explain and analyze the basic assumptions and process of different approaches of counseling.
- discuss and appreciate unique features of individual and group counseling.
- apply individual and group counseling procedures and organize counseling service for educational context

EDU 725 Educational Management

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- explain the fundamentals of Educational Management.
- explore resource Management in Education.
- clarify roles and responsibilities of Academic Leaders in Educational Management.
- act as an Educational Supervisor.
- identify specific issues in Educational Management.

EDU 727 Educational Technology in Practice

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- Reflect on communication process and role of media in Education Technology.
- Write a script & recording.
- differentiate between variius forms of Information Technology.
- appreciate the trends and thrust areas in Education Technology.

EDU 731 Procedures of Educational Assessment and Evaluation

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Students will be enable to:

- discuss the knowledge of various Educational Evaluation Techniques.

- reflect the necessary skill of constructing an Educational Achievement Test.
- analyze and use the process of Test Standardization.
- selection and use of the competencies for measuring psychological traits of students.
- criticize the role of ICT in Educational Evaluation.
- reflect the skills of administration and interpretation of educational and psychological Test.

List of Reading Elective

EDU 466R Peace Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA:100)	**0**	**0**	**0**	**2**

Learning Outcomes:

The Students will be able to:

- Clarify the concept of Peace education
- Assess need for peace education
- Appraise the peace initiatives and movements for peace
- Organize curricular and co-curricular activities for promotion of peace in school

EDU 737R Value Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

The students will be able to:

- Assess the need and importance of values and its classification in contemporary society.
- Prioritize the values needed for peaceful society.

- Demonstrate awareness for role of education in building value as dynamic social reality.
- Describe the importance of value education towards personal, national and global development.

EDU 729R Human Right Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA:100)	**0**	**0**	**0**	**2**

Learning Outcomes:

Student will be able to:

- The student teachers directly engaged in the promotion of human rights and duties.
- Discuss the changing dimensions of human rights and duties.
- Explain Societal Problems of Human Rights in India.

EDU 721R Conceptual Basis of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

Students will be able to:

- Express the nature of education as a discipline/an area of study.
- Reflect upon aims of Indian Education in the context of a democratic, secular, socialist, egalitarian and a humane society.
- Clarify the concept of knowledge and knowledge construction.

EDU 723R Education as Interdisciplinary Knowledge

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

Students will be able to:

- Examine issues related to education as interdisciplinary knowledge.
- Appreciate interdisciplinary nature of education and it's relationships with disciplines/ subjects such as philosophy, psychology, sociology, management, economics and anthropology.
- Clarify axiological issues in education.

EDU 733R Socio-Cultural Context of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

Students will be able to:

- Clarify Social purposiveness of education.
- Examine issues related to Equality in educational opportunity-critical analysis of the ways in which schooling, teaching-learning and curriculum contribute to social inequality.
- Reflect upon Multilingual and multicultural Indian Society and other diversity, appropriate approaches for teaching in the context of diversity.

EDU 734R Supportive Mechanism of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

Students will be able to:

- Identify various issues related to Teacher Education as reflects in NCF (2005).
- Analyze functions of various academic and administrative Governmental/autonomous agencies for School Education.
- Examine critically the concerns arises from vision of school education and teacher education.

- Organize various learning resources–textbooks, supplementary books, workbooks, multimedia and ICT and School library in the institution.

EDU 736R Understanding School Contexts

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

Students will be able to:

- Contribute in creating Learner friendly school environment..
- Analyze role of personals in school management: teachers, headmasters, and administrators..
- Critically reflect Teacher's autonomy and accountability.

BANASTHALI VIDYAPITH

Master of Pharmacy (Pharmaceutical Chemistry)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Pharmacy programme deals with various aspects of modern drug design, drug development, production and quality assurance that are the basis for expertise in all domains of medicine. Pharmacy professionals being a member of healthcare team are unique in their detailed and comprehensive understanding of physical, chemical and biological interactions on the outcomes of drug therapy. They require an understanding of drug entities chemistry, delivery characteristics of dosage formulations, physiological and pharmacological outcomes of drug interactions. Pharmacy curriculum incorporate components of problem solving, case study and project work in the areas of specialization. The main objectives of the Pharmacy programme are:

- To provide exemplary education in a stimulating environment where delivery of pharmaceutical knowledge is integrated with nationally and internationally recognized research to conduct and publish cutting-edge multidisciplinary research in the discovery, utilization and evaluation of therapeutic agents.
- To prepare competent pharmacists at various levels for India.
- To raise sensitivity to professional ethical codes of conduct and social values.
- To prepare globally recognized pharmacy professionals.
- To demonstrate standards of digital literacy that would support professional needs in manufacture, patient care, hospital administration etc.
- To create awareness in society for rationale usage of medicines.
- To create awareness about environmental hazards in relation to GMP & GLP.
- To develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions.
- To nurture a temperament that would enable individuals to set and work towards self-driven performance-goals, entrepreneurial ventures and overall leadership.

Programme Outcomes

PO1: Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical science and technology; behavioral, social, and administrative pharmaceutical sciences; and manufacturing practices.

PO2: Planning abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO3: Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO4: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO5: Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizen or leadership roles when appropriate to facilitate improvement in health and well-being.

PO6: Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO7: Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO8: Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective, make effective presentations and documentation, and give and receive clear instructions.

PO9: The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

PO10: Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO11: Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

First Semester

PHAR 503 Advanced Medicinal Chemistry

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- Various aspects of drug designing and methods for their analysis.
- Factor to design new drug against particular biochemical.
- Characterization and interpretation of data

PHAR 504 Advanced Organic Chemistry-I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- Basic reaction mechanisms involved in an organic synthesis.
- Design organic synthesis by using different techniques in the field of drug discovery and process chemistry.

PHAR 509 Chemistry of Natural Products

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- The role and applicability of lead molecules of natural origin in the field of drug research
- Isolation, purification and characterization of medicinal compounds from natural origin.

- Application of rDNA technology in the field of drug discovery.
- Types and uses of various reagents and reactions involved in the structural elucidation of natural compounds.

PHAR 516 Modern Pharmaceutical Analytical Techniques

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Significance of Pharmaceutical Analysis in the profession.
- Various tools and techniques available for the analysis of drugs.
- Principles of various conventional analytical techniques.
- Application of Pharmacopoeial purity and identity tests for samples.
- Interpretation of spectra and correlation with sample.

PHAR 519L Pharmaceutical Chemistry Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning outcomes

Upon completion of this course student will have an understanding of:

- handing various equipments
- performing the synthesis of drugs
- extraction techniques used in various natural resources

Second Semester

PHAR 501 Advance Organic Chemistry-II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- Nomenclature, reaction mechanism, kinetics, order of reaction, factors affecting reaction, name reactions of alkanes, alkenes, conjugated dienes, alkyl halides, alchohols, carbonyl compounds, carboxylic acids and aliphatic amines.

PHAR 507 Advanced Spectral Analysis

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- various hyphenated analytical instrumental techniques
- Different analytical data from different principle instrument.
- Interpretation skills of different analytical data like LC-MS, GC-MS, ATR-IR, DSC etc. theoretically and practically.
- Handling of different analytical data to predict the unknown structures.

PHAR 511 Computer Aided Drug Design

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- Different CADD techniques and their applications in drug discovery.

- Use of software in identifying drug receptor interactions and pharmacophore mapping.
- Applicability of *in silico* virtual screening protocols in drug research.

PHAR 521 Pharmaceutical Process Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Synthetic strategy used in process chemistry for scaling up of API from a small scale to a larger scale.
- The role of a process chemist in developing synthetic routes that is safe, cost-effective, environmentally friendly and efficient.

PHAR 520L Pharmaceutical Chemistry Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning outcomes

Upon completion of this course student will have an understanding of:

- various organic reactions
- spectral analysis
- handling of various analytical instruments
- calibration of instruments
- computational software

(Discipline Elective)

PHAR 532 Pharmacological and Toxicological Screening Methods

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development.
- Maintenance of laboratory animals as per the guidelines, basic knowledge of various *in-vitro* and *in-vivo* preclinical evaluation processes
- Regulations and ethical requirement for the usage of experimental animals.
- the various screening methods involved in the drug discovery process

PHAR 531 Herbal Cosmetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

After completion of the course, student shall be able to

- Understand the basic principles of various herbal/natural cosmetic preparations
- Current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities

PHAR 530 Advanced Pharmaceutical Biotechnology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- Enzyme technology, genetic Engineering, Peptides and its applications.
- Transgenic animal, human genome and signal transduction.
- Microbial transformation, biodegradation and biosensors.

PHAR 515 Intellectual Property Rights

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of this course student will have an understanding of:

- Patent and copyright for innovative works.
- Selected IP issues that might arise in practice.
- Federal and state IP protection.
- Tools and activities of IP practitioners such as the Copyright, Patent, and Trademark websites, searching, reading patents, and more.

PHAR 536 Regulatory Aspects of Food and Nutraceuticals

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of the course, the student shall be able to

- Know the regulatory Requirements for nutraceuticals

- Understand the regulation for registration and labeling of nutraceuticals
- Know food supplements in India, USA and Europe.

PHAR 537 Regulatory Aspects of Medical Devices

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of the course, the student shall be able to know

- Basics of medical devices and IVDs, process of development, ethical and quality considerations
- Harmonization initiatives for approval and marketing of medical devices and IVDs
- Regulatory approval process for medical devices and IVDs in India, US, Canada, EU, Japan and ASEAN
- Clinical evaluation and investigation of medical devices and IVDs

(Reading Elective)

PHAR 607R Pharmacovigilance

Max. Marks : 100	**L**	**T**	**P**	**C**
ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Types of clinical trial designs.
- Responsibilities of key players involved in clinical trials
- Safety monitoring, reporting and close-out activities.
- Principles of pharmacovigilance

PHAR 604R Nutraceuticals

Max. Marks : 100	**L**	**T**	**P**	**C**
ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of the course, the student will be able to understand

- Concept of nutraceuticals and their use in various aspect of health.
- Chemical aspects of Nutraceuticals and their anti-nutritional factors.
- Nutraceuticals regulations.

PHAR 609R Toxicology

Max. Marks : 100	**L**	**T**	**P**	**C**
ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of course student will have understanding of:

- Principles of toxicology & clinical toxicology
- Management of poison individual
- Role of antidotes in various poisoning
- Clinical management of various types of drug poisoning

PHAR 605R Pharmaceutical Industrial Management

Max. Marks : 100	**L**	**T**	**P**	**C**
ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Principles of management
- techniques used in marketing
- application of the marketing in the pharmaceutical industry sales promotion

PHAR 608R Product Development

Max. Marks : 100	L	T	P	C
ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of this course student will be able:

- To understand the concept of pre-formulation and their influence on formulation and stability of products.
- To develop understanding of BCS Classification, rheology and solubilization in context to dosage form development.
- To develop understanding of students about in vitro dissolution study of solids and interpretation of dissolution data.

PHAR 603R Molecular Basis of Drug Discovery

Max. Marks : 100	L	T	P	C
ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of the course, the student will be able to:-

- Understand receptors and enzymes, the body's molecules most often targeted by drugs.
- Learn pharmacokinetics (drug adsorption, elimination, and half-life) and metabolism

PHAR 606R Pharmaceutical Quality Assurance

Max. Marks : 100	L	T	P	C
ESA: 100)	0	0	0	2

Learning outcomes

On the completion of this course student shall be able to know

- The cGMP aspects in a pharmaceutical industry
- The importance of documentation
- Scope of quality certifications applicable to Pharmaceutical industries
- Responsibilities of QA & QC departments

BANASTHALI VIDYAPITH

Master of Pharmacy (Pharmaceutics)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019 **118**

Programme Educational Objectives

Pharmacy programme deals with various aspects of modern drug design, drug development, production and quality assurance that are the basis for expertise in all domains of medicine. Pharmacy professionals being a member of healthcare team are unique in their detailed and comprehensive understanding of physical, chemical and biological interactions on the outcomes of drug therapy. They require an understanding of drug entities chemistry, delivery characteristics of dosage formulations, physiological and pharmacological outcomes of drug interactions.Pharmacy curriculum incorporate components of problem solving, case study and project work in the areas of specialization.The main objectives of the Pharmacy programme are:

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- To demonstrate standards of digital literacy that would support professional needs in manufacture, patient care, hospital administration etc.
- To create awareness in society for rationale usage of medicines.
- To create awareness about environmental hazards in relation to GMP & GLP.
- To develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions.
- To nurture a temperament that would enable individuals to set and work towards self-driven performance-goals, entrepreneurial ventures and overall leadership.

Programme Outcomes

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ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

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PO11: Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

First Semester

PHAR 514 Drug Delivery Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The criteria for selection of drugs and polymers for the development of novel dosage forms
- Need of different approaches for preparation of novel drug delivery systems.
- Formulation and evaluation of novel drug delivery systems.

PHAR 516 Modern Pharmaceutical Analytical Techniques

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Significance of Pharmaceutical Analysis in the profession.
- Various tools and techniques available for the analysis of drugs.
- Principles of various conventional analytical techniques.
- Application of Pharmacopoeial purity and identity tests for samples.
- Interpretation of spectra and correlation with sample.

PHAR 517 Modern Pharmaceutics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The concept of pre-formulation and its effect on formulation, efficacy and stability of pharmaceutical products at industry.
- Formulation, evaluation and stability aspect of emulsion, suspension, SMEDDS, and parenteral at large scale production.

- Aspects related to compression and compaction of tablets.
- Better way of application of pharmaceutical and statistical tools.

PHAR 529 Regulatory affairs

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- concepts of innovator and generic drugs, drug development process
- The Regulatory guidance's for filing and approval process
- preparation of dossiers and their submission to regulatory agencies in different countries
- post approval regulatory requirements for actives and drug product
- clinical trials requirements for approvals for conducting clinical trials

PHAR 522L Pharmaceutics Lab – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning outcomes

Upon completion of this course the student will develop skills of:

- Developing new analytical method
- Designing pre-formulation study for new drug
- Formulation and characterization of dosage forms

Second Semester

PHAR 502 Advanced Biopharmaceutics and Pharmacokinetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The basic concepts in biopharmaceutics and pharmacokinetics.
- The critical evaluation of biopharmaceutical studies involving drug product performance.
- compartment modelling and nonlinear
- Bioavailability – bioequivalence (BA-BE) study.
- PK-PD.

PHAR 512 Computer Aided Drug Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Computational modeling of drug for its pharmacokinetic evaluation.
- Usage of software in designing and optimizing pharmaceutical formulations.
- Application of artificial intelligence and robotics in pharmaceutical automation.
- implementation of computational fluid dynamics (cfd) to overcome challenges in pharmaceutical product development.

PHAR 513 Cosmetics and Cosmeceuticals

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Various key ingredients and basic science involve to develop cosmetics and Cosmeceuticals
- Scientific knowledge to develop cosmetics and cosmeceuticals with desired safety, stability and efficacy with compliance to Indian Regulatory Authority.

PHAR 518 Molecular Pharmaceutics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The criteria for selection of drugs and polymers for the development of Targeted drug delivery.
- The various approaches for development of novel drug delivery systems.
- The formulation and evaluation of novel drug delivery systems.

PHAR 523L Pharmaceutics Lab – II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Formulation and characterization of NDDS.
- Various pharmacokinetic and statistical softwares.

- Clinical and nonclinical data collection.

(Discipline Elective)

PHAR 532 Pharmacological and Toxicological Screening Methods

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development.
- Maintenance of laboratory animals as per the guidelines, basic knowledge of various *in-vitro* and *in-vivo* preclinical evaluation processes
- Regulations and ethical requirement for the usage of experimental animals.
- the various screening methods involved in the drug discovery process

PHAR 531 Herbal Cosmetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

After completion of the course, student shall be able to

- Understand the basic principles of various herbal/natural cosmetic preparations
- Current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities

PHAR 530 Advanced Pharmaceutical Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Enzyme technology, genetic Engineering, Peptides and its applications.

- Transgenic animal, human genome and signal transduction.
- Microbial transformation, biodegradation and biosensors.

PHAR 515 Intellectual Property Rights

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Patent and copyright for innovative works.
- Selected IP issues that might arise in practice.
- Federal and state IP protection.
- Tools and activities of IP practitioners such as the Copyright, Patent, and Trademark websites, searching, reading patents, and more.

PHAR 536 Regulatory Aspects of Food and Nutraceuticals

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of the course, the student shall be able to

- Know the regulatory Requirements for nutraceuticals
- Understand the regulation for registration and labeling of nutraceuticals
- Know food supplements in India, USA and Europe.

PHAR 537 Regulatory Aspects of Medical Devices

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of the course, the student shall be able to know

- Basics of medical devices and IVDs, process of development, ethical and quality considerations
- Harmonization initiatives for approval and marketing of medical devices and IVDs
- Regulatory approval process for medical devices and IVDs in India, US, Canada, EU, Japan and ASEAN
- Clinical evaluation and investigation of medical devices and IVDs

(Reading Elective)

PHAR 607R Pharmacovigilance

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Types of clinical trial designs.
- Responsibilities of key players involved in clinical trials
- Safety monitoring, reporting and close-out activities.
- Principles of pharmacovigilance

PHAR 604R Nutraceuticals

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of the course, the student will be able to understand

- Concept of nutraceuticals and their use in various aspect of health.
- Chemical aspects of Nutraceuticals and their anti-nutritional factors.

- Nutraceuticals regulations.

PHAR 609R Toxicology

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of course student will have understanding of:

- Principles of toxicology &clinical toxicology
- Management of poison individual
- Role of antidotes in various poisoning
- Clinical management of various types of drug poisoning

PHAR 605R Pharmaceutical Industrial Management

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of this course student will have an understanding of:

- Principles of management
- techniques used in marketing
- application of the marketing in the pharmaceutical industrysales promotion

PHAR 608R Product Development

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of this course student will be able:

- To understand the concept of pre-formulation and their influence on formulation and stability of products.
- To develop understanding of BCS Classification, rheology and solubilization in context to dosage form development.

- To develop understanding of students about in vitro dissolution study of solids and interpretation of dissolution data.

PHAR 603R Molecular Basis of Drug Discovery

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of the course, the student will be able to:-

- Understand receptors and enzymes, the body's molecules most often targeted by drugs.
- Learn pharmacokinetics (drug adsorption, elimination, and half-life) and metabolism

PHAR 606R Pharmaceutical Quality Assurance

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

On the completion of this course student shall be able to know

- The cGMP aspects in a pharmaceutical industry
- The importance of documentation
- Scope of quality certifications applicable to Pharmaceutical industries

BANASTHALI VIDYAPITH

Master of Pharmacy (Pharmacology)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Pharmacy programme deals with various aspects of modern drug design, drug development, production and quality assurance that are the basis for expertise in all domains of medicine. Pharmacy professionals being a member of healthcare team are unique in their detailed and comprehensive understanding of physical, chemical and biological interactions on the outcomes of drug therapy. They require an understanding of drug entities chemistry, delivery characteristics of dosage formulations, physiological and pharmacological outcomes of drug interactions.Pharmacy curriculum incorporate components of problem solving, case study and project work in the areas of specialization.The main objectives of the Pharmacy programme are:

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- To prepare globally recognized pharmacy professionals.
- To demonstrate standards of digital literacy that would support professional needs in manufacture, patient care, hospital administration etc.
- To create awareness in society for rationale usage of medicines.
- To create awareness about environmental hazards in relation to GMP & GLP.
- To develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions.
- To nurture a temperament that would enable individuals to set and work towards self-driven performance-goals, entrepreneurial ventures and overall leadership.

Programme Outcomes

PO1: **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical science and technology; behavioral, social, and administrative pharmaceutical sciences; and manufacturing practices.

PO2: **Planning abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO3: **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO4: **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO5: **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizen or leadership roles when appropriate to facilitate improvement in health and well-being.

PO6: **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO7: **Pharmaceutical Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO8: Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective, make effective presentations and documentation, and give and receive clear instructions.

PO9: The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

PO10: Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO11: Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

First Semester

PHAR 505 Advanced Pharmacology - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The basic knowledge in the field of pharmacology pertaining to the drugs and its therapeutic applications
- Recent advances in the drugs used for the treatment of various diseases.
- Concepts of drug action and mechanisms involved.
- Pathophysiology and pharmacotherapy of certain diseases
- Underlying mechanism of drug actions at cellular and molecular level.
- Adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

PHAR 508 Cellular and Molecular Pharmacology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Fundamental knowledge on the structure and functions of cellular components
- Interaction of these components with drugs.
- Drug discovery and receptor signal transduction processes.
- Molecular pathways affected by drugs.

- Applicability of molecular pharmacology and biomarkers in drug discovery process.
- Molecular biology techniques as applicable for pharmacology.

PHAR 516 Modern Pharmaceutical Analytical Techniques

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Significance of Pharmaceutical Analysis in the profession.
- Various tools and techniques available for the analysis of drugs.
- Principles of various conventional analytical techniques.
- Application of Pharmacopoeial purity and identity tests for samples.
- Interpretation of spectra and correlation with sample.

PHAR 533 Pharmacological and Toxicological Screening Methods – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development.
- Maintenance of laboratory animals as per the guidelines, basic knowledge of various *in-vitro* and *in-vivo* preclinical evaluation processes

- Regulations and ethical requirement for the usage of experimental animals.
- various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals
- Various screening methods involved in the drug discovery process.

PHAR 526L Pharmacology Lab - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Second Semester

PHAR 506 Advanced Pharmacology - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The basic knowledge in the field of pharmacology pertaining to the drugs and its therapeutic applications
- Recent advances in the drugs used for the treatment of various diseases.
- Concepts of drug action and mechanisms involved.
- The pathophysiology and pharmacotherapy of certain diseases
- Underlying mechanism of drug actions at cellular and molecular level.
- Adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

PHAR 510 Clinical Research and Pharmacovigilance

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- The clinical research.
- Regulatory requirements for conducting clinical trial.
- Responsibilities of key players involved in clinical trials
- Safety monitoring, reporting and close-out activities.
- Principles of pharmacovigilance

PHAR 534 Principles of Drug Discovery

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Different CADD techniques and their applications in drug discovery.
- The use of software in identifying drug receptor interactions and pharmacophore mapping.
- The applicability of *in silico* virtual screening protocols in drug research.

PHAR 525 Pharmacological and Toxicological Screening Methods-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Preclinical safety and toxicological evaluation of drug & new chemical entity.
- Regulatory aspects for the toxicological evaluation of drugs and chemicals.

- Types of toxicity studies and their procedure.
- Importance of ethical and regulatory requirements for toxicity studies.
- Practical skills required to conduct the preclinical toxicity studies.
- Use of experimental animals for the different toxicological studies.

PHAR 527L Pharmacology Lab – II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

(Discipline Elective)

PHAR 535 Principles of Medicinal Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Various aspects of drug designing and methods for their analysis.
- Factor to design new drug against particular biochemical.
- Medicinal and stereochemistry of various class of drugs

PHAR 531 Herbal Cosmetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

After completion of the course, student shall be able to

- Understand the basic principles of various herbal/natural cosmetic preparations
- Current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities

PHAR 530 Advanced Pharmaceutical Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Enzyme technology, genetic Engineering, Peptides and its applications.
- Transgenic animal, human genome and signal transduction.
- Microbial transformation, biodegradation and biosensors.

PHAR 515 Intellectual Property Rights

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Patent and copyright for innovative works.
- Selected IP issues that might arise in practice.
- Federal and state IP protection.
- Tools and activities of IP practitioners such as the Copyright, Patent, and Trademark websites, searching, reading patents, and more.

PHAR 536 Regulatory Aspects of Food And Nutraceuticals

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

Upon completion of the course, the student shall be able to

- Know the regulatory Requirements for nutraceuticals
- Understand the regulation for registration and labeling of nutraceuticals
- Know food supplements in India, USA and Europe.

PHAR 537 Regulatory Aspects of Medical Devices

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning outcomes

Upon completion of the course, the student shall be able to know

- Basics of medical devices and IVDs, process of development, ethical and quality considerations
- Harmonization initiatives for approval and marketing of medical devices and IVDs
- Regulatory approval process for medical devices and IVDs in India, US, Canada, EU, Japan and ASEAN
- Clinical evaluation and investigation of medical devices and IVDs

(Reading Elective)

PHAR 607R Pharmacovigilance

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of this course student will have an understanding of:

- Types of clinical trial designs.
- Responsibilities of key players involved in clinical trials
- Safety monitoring, reporting and close-out activities.
- Principles of pharmacovigilance

PHAR 604R Nutraceuticals

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of the course, the student will be able to understand

- Concept of nutraceuticals and their use in various aspect of health.

- Chemical aspects of Nutraceuticals and their anti-nutritional factors.
- Nutraceuticals regulations.

PHAR 609R Toxicology

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of course student will have understanding of:

- Principles of toxicology &clinical toxicology
- Management of poison individual
- Role of antidotes in various poisoning
- Clinical management of various types of drug poisoning

PHAR 605R Pharmaceutical Industrial Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of this course student will have an understanding of:

- Principles of management
- techniques used in marketing
- application of the marketing in the pharmaceutical industrysales promotion

PHAR 608R Product Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning outcomes

Upon completion of this course student will be able:

- To understand the concept of pre-formulation and their influence on formulation and stability of products.
- To develop understanding of BCS Classification, rheology and solubilization in context to dosage form development.
- To develop understanding of students about in vitro dissolution study of solids and interpretation of dissolution data.

PHAR 603R Molecular Basis of Drug Discovery

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

Upon completion of the course, the student will be able to:-

- Understand receptors and enzymes, the body's molecules most often targeted by drugs.
- Learn pharmacokinetics (drug adsorption, elimination, and half-life) and metabolism

PHAR 606R Pharmaceutical Quality Assurance

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning outcomes

On the completion of this course student shall be able to know

- The cGMP aspects in a pharmaceutical industry
- The importance of documentation
- Scope of quality certifications applicable to Pharmaceutical industries
- Responsibilities of QA & QC departments

BANASTHALI VIDYAPITH

Master of Science
(Applied Microbiology and Biotechnology)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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PROGRAMME EDUCATIONAL OBJECTIVES

The M.Sc. Applied Microbiology and Biotechnology programme aims for the holistic development of students through the unique and innovative five fold educational ideology of Banasthali Vidyapith and targets an extremely broad and yet specialized sector of microbial biotechnology having application in environmental, medical, agricultural, food and beverage industries. Due to the immense potential of research and entrepreneurial ventures present within these sectors, the curriculum has been devised specifically for students who wish to enter any of these sectors to develop their career as academicians, researchers, entrepreneurs or professionals. Through a balanced and well distributed curriculum, the student will gain knowledge about diverse courses of biotechnology, microbiology, biochemistry, bioinformatics etc. This knowledge should find an amalgamative outcome in the practicals and eventually in the project work to be performed by the students. On completion of the Programme, students will be able to:

- use the fundamentals and concepts taught for practical applications.
- explore, interpret and analyse research literature for utilization in scientific writing and designing experimental methodologies
- design and execute research problems relating to microbes and their various roles (pathogenesis, epidemiology studies, diagnostics, industrial applications, environmental remediation and molecular biology)
- identify potential domains to develop scope for entrepreneurial ventures
- inculcate self-appraisal skills for fostering value added learning
- foster skills for public interaction to develop more awareness about microbes and their role in facilitating biotechnological advances
- engage in lifelong learning to keep pace with technological change.

PROGRAMME OUTCOMES

PO1: Knowledge: Generate knowledge and skills to interpret, experiment, formulate and evaluate various theories and hypotheses associated with microbiology, biochemistry, molecular biology, immunology, environmental sciences, statistics, bioinformatics, industrial biotechnology, microbial physiology and genetics.

PO2: Planning abilities: Practice setting up of time and resource efficient working while managing delegation and organizational skill to improve output.

PO3: Problem analysis: Developing scientific methodology for formulating hypothesis, testing and experimentation to select and propose logical outcomes.

PO4: Modern tool usage: Identify, employ and inventorize the procedures and resources available to use the best combination for achieving the goal.

PO5: Leadership skills: By acknowledging the limitations of individualistic efforts, learn to work in team and simultaneously develop organizational skills, recognize and accept contributions to decisively and effectively compete while fulfilling professional responsibilities.

PO6: Professional Identity: Recognize and appraise various roles (researchers, entrepreneurs, diagnostician, quality control, academia, industry professional, publication houses, patent agents etc) to identify one's role as a productive and informed citizen.

PO7: Bioethics and Biosafety: Implementation of safe practices for containment following good lab practices and associated protocols are necessary to ensure protection and manage any risk for people and environment. Debate, argue and determine upon the most ethical route of Pursuit in research and subsequent commercialization for overcoming for negative criticism and improve public perception.

PO8: Communication: Develop oral, written and presentation skill to achieve effective documentation procedures, standard operating protocols, along with research publications. Clarity in communication also helps in building transparency and generating good public support.

PO9: Role in society: Appraise the role played in society for solving various problems (technical, moral & ethical) to ensure social sustainability leading to generation of value added services and social recognition.

PO10: Environment and sustainability: Utilize the knowhow generated to create environmentally sustainable technology and work towards development of methodologies and practices for remediation and environment conservation.

PO11: Life- long learning: Formulate strategies for self appraisal, analysis and evolution to constantly innovate oneself and be a positive contributor to technology advancement.

First Semester

BIN 405 Bioinformatics

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe and identify various databases and tools used for phylogenetic analysis.
- Apply protein structure prediction.
- Demonstrate and apply different tools for data-mining.

BIO 401 Analytical Techniques-I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Comprehend the principles of various instrumentation techniques.
- Identify suitable and relevant tools for use in research problems.
- Utilize the scope of the content for designing and performing future experiments.

BIO 418 Biochemistry

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the structure and role of various biomolecules.
- Identify, assess and explain various biochemical pathways.
- Develop understanding of enzymes and their mechanism of action.

BIO 407 Cell And Molecular Biology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand membrane transport and cell signalling mechanisms.
- Develop comprehensive understanding of endo-membrane system.
- Understand molecular mechanisms of prokaryotes and eukaryotes.

BIO 423 General Microbiology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe bacterial structure, nutrition, growth and tools used for microbial classification.
- Explain classification of protists and fungi.
- Develop comprehensive concepts of virology including viral structure, replication, classification, cultivation and assay.

BIO 419L Bioscience Lab-I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate use of various tools and techniques for detection and quantification of biomolecules.

- Perform various biochemical assays for fats, carbohydrate, protein and enzymes.
- Demonstrate microbiological techniques.
- Access, retrieve, and analyze nucleotide and protein sequences using bioinformatics tools.

Second Semester

BIO 406 Biostatistics and Research Methodology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Apply statistical analysis to biological data.
- Identify ethics in scientific research and associated methodologies.
- Develop skills in scientific writing.

BT 422 Environmental Biology and Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify key factors responsible for ecosystem balance and explain different efforts which can be undertaken for restoration and environmental remediation.
- Comprehend the toxicity of various environmental pollutants and their influence on ecosystem.
- Understand different waste management processes and generation of energy from waste.
- Describe various roles played by microbes in biodegradation, bioremediation and plant growth promotion.

BIO 411 Immunology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Evaluate and compare the role of various components and mechanisms of the immune system.
- Describe various immune response mechanisms.
- Develop concept of antibody generation and various immunological techniques.

BIO 414 Microbial Physiology and Genetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate differences between bacteria on basis of metabolism and physiology.
- Compare and interpret various regulatory mechanisms in a bacterial cell.
- Conceptualize microbial genetics and utilize it for mapping.

BT 408 Genetic Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Develop comprehensive understanding of gene manipulation techniques.
- Describe various cloning and expression vectors.

- Develop skills for primer designing, gene amplification and expression.

BIO 424L Microbial Technology Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate techniques used in immunology and genetic engineering.
- Perform key experiments for water quality analysis and microbial physiology.
- Solve problems based on bacterial gene mapping.

Third Semester

BIO 507S Critical Analysis of Classical Papers/ Landmark Discoveries (Seminar)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Analyze and give a critical description of the papers studied.
- Discuss the significance of the research work.

BIO 504 Microbial Ecology and Diversity

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe microbial diversity with special reference to microbial ecosystem.
- Identify various habitats of extremophiles and their mechanism of survival.
- Explain microbial interactions of relevance in environmental remediation.

BT 504 Bioprocess Engineering and Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify bioreactor design and differentiate between types.
- Explain kinetics of scale up and sterilization along with processes of downstreaming.
- Demonstrate large scale production of biomolecules.

BIO 506L Microbial Technology Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Perform production and scale up of some industrially relevant bioactive molecules from microbes.
- Demonstrate gene transfer and tissue culture techniques.
- Identify microbes in specific habitats and their role in environmental processes.

Fourth Semester

BT 528D Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After successful completion of the course, students should be able to:

- Gain an exposure of working in the academic institutions, research laboratories and industries.
- Apply the understanding developed from the earlier courses in carrying out solutions to research problems.
- Identify, formulate and execute a research hypothesis.
- Write a scientific document highlighting introduction of research problem, objectives, review of literature, methodology, results, discussions, conclusions, significant outcomes and references.
- Develop the skills of presenting research findings in the scientific journals.

List of Discipline Elective

BIO 503 Fundamentals of Bioentrepreneurship

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand role of entrepreneurship in promoting innovation and wealth generation.
- Develop skills for writing business models for new ideas and market segments.
- Explain various financial, marketing, sales and legal issues associated with entrepreneurship.

BIO 505 Microbial Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Utilize various strategies for strain improvement, overexpression, maintenance and containment of microbes.
- Describe strategies used for large scale production of various industrially relevant bioactive molecules from microorganisms.

BT 511 Enzyme Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Develop understanding of enzymes and their mechanism of action and regulation.
- Explain the production of enzymes.
- Learn wide applications of enzymes and their future potential.

BT 513 Food Process and Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Explain strategies of food preservation, spoilage and quality assessment.
- Understand various policies related to GM food and its safety assessment.

- Demonstrate the principles for production of various processed food.

BT 423 Genomics and Proteomics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe principles of functional genomics.
- Develop an understanding of proteomics and associated techniques.
- Understand comprehensive concept of nucleotide and protein sequencing.

BT 521 Plant Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate principles for development of various stress resistant plants.
- Understand various techniques used in plant biotechnology.

BT 522 Recombinant DNA Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Explain techniques used for DNA synthesis, amplification and sequencing.

- Describe strategies of cloning in both prokaryotes and eukaryotes.
- Identify novel diagnostic tools of rDNA and gene therapy.

BT 532 Immunotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe various theories describing antibody formation.
- Explain the mechanism of immune response to various stimuli.
- Elucidate on vaccines and their development

BT 525 Animal Biotechnology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

At successful completion of this course students will be able to:

- Comprehend tools of molecular biology and biotechnology for the improved production and protection of animals.
- Evaluate and discuss public and ethical concerns over the use of animal biotechnology.
- Demonstrate an understanding of the key topics in tissue engineering.

PHY 532 Biophysics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course, the students will be able to-

- Understand the concepts of physical principles in the biomolecular systems.
- Know properties and conformations of biomolecules.
- Understand the interaction between physics and biology.

Reading Elective

BT 529R Drug Discovery

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of this course, students should be able to:

- Understand basics of R&D in drug discovery and should be able to apply knowledge gained in respective fields of pharmaceutical industry.
- Understand the role of synthetic chemistry in the development of pharmaceutical agents; and the modification of chemical structures to develop new drug molecules.
- Have an advanced understanding of the chemical structure of a pharmaceutical agent and determine the chemical group/s responsible for a given biological effect.
- Demonstrate a basic understanding of pharmacogenomics and bioinformatics as it relates to drug design and discovery.

BT 531R Human Genetics and Diseases

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course students will be able to:

- Understand hereditary and molecular genetics with a strong human disease perspective.
- Describe genetic abnormalities underlying human disease and disorders
- Develop interest in biomedical research, genetic counseling, medicine, and clinical genetics.

BT 534R Intellectual Property Rights

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After completing this course, students will be able to:

- Understand the concept of IPR and its types.
- Describe the steps for patenting.
- Discuss the role of WTO and WIPO on IPR

BT 535R Medical Microbiology

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify various bacterial, fungal, viral and protozoan diseases and their epidemiology
- Understand the relevance of emerg ing and reemerging diseases

BT 538R Molecular Plant Breeding

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After completing this course, students will be able to:

- Understand strategies and applications of plant breeding technologies.
- Comprehend the knowledge of different plat molecular markers.
- Plan a research career in the area of plant biotechnology.

BT 539R Protein Engineering

Max. Marks : 100	L	T	P	C

(ESA: 100) **0 0 0 2**

Learning Outcomes:

On completion of this course, students should be able to:

- Analyse structure and construction of proteins by computer-based methods.
- Describe structure and classification of proteins.
- Analyse and compare the amino acid sequence and structure of proteins, and relate this information to the function of proteins.
- Explain how proteins can be used for different industrial and academic purposes such as structure determination, organic synthesis and drug design.
- Plan and carry out activity measurements of isolated proteins and characterize their purity and stability.

BANASTHALI VIDYAPITH

Master of Science (Bioinformatics)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May,2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
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July, 2019

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PROGRAMME EDUCATIONAL OBJECTIVES

The M.Sc. Bioinformatics programme aims for the holistic development of the students through the unique and innovative fivefold education ideology of Banasthali Vidyapith.

Bioinformatics is aninterdisciplinary approach to study of biological processes including gene expression, protein modifications or interactions as well as the molecular evolution. The programme focuses on specific knowledge of computational biology and the associated academic disciplines including molecular cell biology, structural biology, mathematics and statistics, computer programming, drug designing,database management systems and genetic engineering. The program fulfills the requirements of the students to become familiar with basic and advanced concepts of the subject thus providing them the scientific background they need to find career opportunities in any related field of bioinformatics.

Main objectives of M.Sc. Bioinformatics programme are to:

- develop interdisciplinary approach for learning about the biological processes and their significance ranging fromsingle cell to multicellular system.
- enable students to solve complex biological questions by developing the the mathematical and computational skills.
- decipher the process of molecular evolution and phylogenetic reconstruction.
- develop understanding of organisms functioning at the molecular level of the gene, genome, cell.

- apply bioinformatics for biological database management, exploring behavior of the biomacromolecules and drug discovery programs.
- gain the ability to work as computational biophysicist, computational chemist in chemical biology projects, medical bioinformatician and evolutionary biologist.
- access the primary literature, recognize relevant works for a particular topic, and evaluate the scientific content of these works.
- demonstrate ability in the experimental and computational techniques and methods of analysis appropriate for their area of specialization within bioinformatics.

PROGRAMME OUTCOMES

PO1: Knowledge: Equipped with an in-depth knowledge in the area of basic and applied bioinformatics including molecular evolution, computational structural molecular biology, cell biology, computer programming and database management system. Enable them to specialize in one of the many branches of bioinformatics through dissertation work.

PO2: Planning abilities: Develop efficient planning abilities with time management, analytical and decisive skills to reach achievable goals.

PO3: Problem analysis: Devise and sustain logical thinking to tackle detailed problem-solving and analytical tasks associated with questions in core and applied bioinformatics.

PO4: Bioinformatics tool usage: Learn, select, and apply statistical, mathematical and computational tools of bioinformatics. Develop competence in the handling of research facilities and work in a laboratory environment, both individually and as a teammember.

PO5: Leadership skill: Develop leadership skills to work in a team and take initiative for fulfillment of professional and societal responsibilities.

PO6: Professional Identity: Understand, analyze and communicate the value of their professional roles in different research and development laboratories, information technology, pharmaceutical industries etc.

PO7: Communication: Develop skills used in reasoning and communication with scientific community and society.To synthesize information from literature and its communication in form of scientific papers, reports, poster and oral presentations.

PO8: The Bioinformatics and society: Contribute to society, in the realms of the agriculture, biological resource management, human and animal health well being.

PO9: Environment and sustainability: Development of efficient predictive bioinformatics methods for sustainable development conservation and preservation of biodiversity.

PO10: Life-long learning: Develop independent, critical and creative thinker who has a self-motivated passion for life-long learning.

First Semester

BIN 406 Biological Databases

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- understand the architecture of different sequence and structure database.
- mine and analyze the biological information from different database.

BIO 407 Cell and Molecular Biology

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- Understand membrane transport and cell signalling mechanisms.
- Develop comprehensive understanding of endo-membrane system.
- Understand molecular mechanisms of prokaryotes and eukaryotes

BIO 426 Structural Biology

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- understand the biophysical processes working at molecular level.
- develop analytical understanding of macromolecular folding and interactions.

MATH 421 Introductory Mathematics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- understand the principles of algebra.
- Solve the complex biological problems using calculus methods.
- Understand the geometrical properties.
- Develop a basic understanding of statistics and statistical distributions.

BIO 419L Bioscience Lab -1

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcome:

After successful completion of the course, students should be able to:

- Demonstrate use of various tools and techniques for detection and quantification of biomolecules.
- Perform various biochemical assays for fats, carbohydrate, protein and enzymes
- Demonstrate microbiological techniques
- Access, retrieve, and analyze nucleotide and protein sequences using bioinformatics tools

CS 443 Fundamentals of Computer and Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcome

After successful completion of the course, students should be able to:

- understand working of computation.
- write simple programs to carry out bioinformatics analyses.

CS 443L Fundamentals of Computer and Programming Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcome:

After successful completion of the course, students should be able to:

- Write programs to analyze biological and statistical data.
- Understand different statistical distributions

Second Semester

BIN 404 Algorithms in Computational Biology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcome:

After successful completion of the course, students should be able to:

- Develop understanding on the efficiency and speed of computer algorithm.
- Understand the stochastic process and sampling methods.
- Understand the system optimization using computational tools.

BIN 407 Sequence Analysis and Phylogenetics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcome:

After successful completion of the course, students should be able to:

- Understand the biological sequence analysis.
- Identify similar sequences in the database.
- Understand the phylogenetic analyses

BT 408 Genetic Engineering

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcome:

After successful completion of the course, students should be able to:

- Handle gene manipulation techniques in biotechnology-based industries and research institutions.
- Helpful for competitive examinations

CS 418 Database Management Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcome:

After successful completion of the course, students should be able to:

- Understand relational database systems
- Calling, processing and optimizing the databases.
- Mining data from open access biological databases.

CS 418L Database Management Systems Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcome:

After successful completion of the course, students should be able to:

- Create relational databases.
- Manage databases for biological purposes.

CS 446 Programming with Perl and R

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- Understand the perl scripting for string manipulations.
- Understand using the perl modules.
- Understand the environment of R and Bioconductors.

CS 446L Programming with Perl and R Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- Write the perl programs for string manipulations.
- Develop and use simple perl modules.
- Install and use the Bioconductor packages from R for statistical analyses of biological data.

Third Semester

BIN 511 Biomolecular Modeling and Computational Drug Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome

After successful completion of the course the candidates should be able to:

- Understand the principles of statistical thermodynamics.
- Develop understanding of principles of biomolecular modelling and simulations.

- Understand the computational methods for drug designing and development.

BIN 511L Biomolecular Modeling and Computational Drug Design Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcome:

After successful completion of the course the candidates should be able to:

- Model the 3D structure of the biomolecules.
- Carry out biomolecular interaction studies.
- Perform MD simulations to study the biomolecular dynamics.

BT 423 Genomics and Proteomics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course the candidates should be able to:

- Understand the experimental methods available to study the genome and proteomes.
- Develop understanding of computational tools of genomics and proteomics.
- Understand the next generation sequencing methods.

CS 538 Python Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After the successful completion of course the candidates should be able to:

- Understand the python programming environment.
- Understand using the python libraries.
- Learn file and directory handling in python.

CS 538L Python Programming Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcome:

After the successful completion of course the candidates should be able to:

- Write python programs for studying biological samples.

Discipline Electives

BIN 507 Mining and Warehousing of Biological Data

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course the candidates should be able to:

- Understand the knowledge discovery from the databases.
- Categorizing the biological data based on various parameters.
- Learn to use data mining tools.

CS 530 Neural Networks

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course the candidates should be able to:

- Understand the automated classification methods.
- Learn the basic theory of artificial intelligence.

CS 512 Cloud Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course the candidates should be able to:

- Understand virtualization of machines.
- Learn to use various cloud platforms

BIN 513 System Biology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After the successful completion of course the candidates should be able to:

- Understand the different types and properties of biological networks..
- Understand using the various databases of biological networks.
- Learn to model the metabolic processes.

BIO 503 Fundamentals of Bioentrepreneurship

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After successful completion of the course, students should be able to:

- Understand role of entrepreneurship in promoting innovation and wealth generation.
- Develop skills for writing business models for new ideas and market segments.

- Explain various financial, marketing, sales and legal issues associated with entrepreneurship.

BIN 514 RNA Structure Function and Transcriptomics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After the successful completion of course the candidates should be able to:

- Understand the structure of various non-coding RNAs and their functions
- Learn techniques of genome wide expression studies.

Reading Elective

BIN 601R Chemoinformatics

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcome:

On completion of this course, students should be able to:

- Understand the computational methods implemented for the chemistry.
- Learn about different databases and techniques of chemoinformatics.

BIN 602R Immunoinformatics

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcome:

On completion of this course, students should be able to:

- Develop an understanding of immunology.

- Understand the computational methods implemented for the immunology.
- Learn about different databases of immunological importance.

BT 529R Drug Discovery

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

On completion of this course, students should be able to:

- Understand basics of R&D in drug discovery and should be able to apply knowledge gained in respective fields of pharmaceutical industry.
- Understand the role of synthetic chemistry in the development of pharmaceutical agents; and the modification of chemical structures to develop new drug molecules.
- Have an advanced understanding of the chemical structure of a pharmaceutical agent and determine the chemical group/s responsible for a given biological effect.
- Demonstrate a basic understanding of pharmacogenomics and bioinformatics as it relates to drug design and discovery.
- Develop an understanding of drug targets as a recognition site for pharmaceutical agents; how the chemical structure of a substance influences interaction with a drug target; and the identification of new drug targets for future drug discovery.

BT 531R Human Genetics and Diseases

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After successful completion of the course students will be able to:

- Understand hereditary and molecular genetics with a strong human disease perspective.
- Describe genetic abnormalities underlying human disease and disorders
- Develop interest in biomedical research, genetic counseling, medicine, and clinical genetics

BT 539R Protein Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcome:

On completion of this course, students should be able to:

- Analyze structure and construction of proteins by computer-based methods
- Describe structure and classification of proteins
- Analyze and compare the amino acid sequence and structure of proteins, and relate this information to the function of proteins
- Explain how proteins can be used for different industrial and academic purposes such as structure determination, organic synthesis and drug design.
- Plan and carry out activity measurements of isolated proteins and characterize their purity and stability.

BANASTHALI VIDYAPITH

Master of Science (Bioscience-Animal Science)
Master of Science (Bioscience-Plant Science)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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M.Sc. Bioscience-Animal Science

Programme Educational Objectives

The M.Sc Bioscience-Animal Science programme aims for the holistic development of the students through the unique and innovative five fold educational ideology of Banasthali Vidyapith.

Animal Science is the study of nature of each kind of animal that helps the zoologist to learn evolution of animal species on earth and their processes and behaviour. The programme focuses on specific knowledge about animal biology and the associated academic disciplines including physiology, ecology, diversity, embryonic development, evolution, immunology, animal tissue culture, entomology, fish biology and animal biotechnology. The program fulfills the requirement of the students to become familiar with basic and advanced concepts of the subject thus providing them the scientific background they need to find career opportunities in any related field of zoology. On completion of the Programme, the student will be able to:

- develop aptitude for learning about the biology and significance of fauna ranging from single cell to multicellular system
- compare and contrast the characteristics of animals that differentiate them from other forms of life
- explain theory of evolution and how descent with modification has shaped animal morphology, physiology, life history, and behavior
- explain how organisms function at the level of the gene, genome, cell, tissue, organ and organ-system
- apply zoological science in aquaculture, agriculture and modern medicine
- gain the ability to work as taxonomist, paleontologist and evolutionary biologist
- access the primary literature, recognize relevant works for a particular topic, and evaluate the scientific content of these works
- demonstrate ability in the experimental techniques and methods of analysis appropriate for their area of specialization within zoology.

M.Sc. Bioscience-Animal Science
Programme Outcomes

PO1: Knowledge: Students will be equipped with an in-depth knowledge in the area of basic and applied zoology including evolution, taxonomy, physiology, molecular biology, genetics, cell biology, and environment.

PO2: Planning abilities: Develop efficient planning abilities with time management, analytical and decisive skills to reach achievable goals.

PO3: Problem analysis: Devise and sustain logical thinking to tackle detailed problem-solving and analytical tasks associated with questions in core and applied zoology.

PO4: Modern tool usage: Learn, select, and apply traditional taxonomy, practical field skills and modern molecular laboratory expertise. Develop competence in the handling of research facilities and operate safely in a laboratory environment, both individually and as a team member.

PO5: Leadership skill: Develop leadership skills to work in a team and take initiative for fulfillment of professional and societal responsibilities.

PO6: Professional Identity: Understand, analyze and communicate the value of their professional roles in different analytical and forensic laboratory, Zoological Survey of India, archeology, wild life management, aquaculture and food processing etc.

PO7: Animal Ethics: Develop empathy and love towards the animals. Apply principles of animal ethics and commit to professional and social responsibilities.

PO8: Communication: Develop skills used in reasoning and communication with scientific community and society. To synthesize information from literature and its communication in form of scientific papers, reports, poster and oral presentations.

PO9: The Zoologist and society: Contribute to society, in the realms of the environment, agriculture, natural resource management, human and animal health well being.

PO10: Environment and sustainability: Utilization of zoological research to enhance sustainable development of programs for conservation and preservation of biodiversity.

PO11: Life-long learning: Develop independent, critical and creative thinker who has a self-motivated passion for life-long learning.

M.Sc. Bioscience-Plant Science
Programme Educational Objectives

The M.Sc. Bioscience-Plant Science programme aims at holistic development of the students through the innovative and unique Five fold Educational ideology of Banasthali Vidyapith.

As a component of the ecosystem, botanists are instrumental regarding their all inclusive and widespread understanding of plants and their importance. Botanists require an understanding of the identification of various plant groups, their taxonomy, physiology, biochemistry, genetics, ecology and economic importance along with the modern approach of plant biotechnology, secondary metabolite production and their medicinal value. The program has identified necessary competencies in the respective areas for which all essential theoretical, practical and field based skills will be provided. On completion of the Programme, the student will be able to:

- become competent botanists at different levels
- elevate understanding regarding professional ethical codes of conduct, societal values and respect for all
- demonstrate standards of digital literacy that would support professional needs in botanical studies
- create awareness in society about the efficient, safe and sustainable use of plants and plant parts
- create awareness about environmental and anthropological threats on plant species, especially pollution and habitat loss
- develop a lifelong respect and perfect coordination towards all other species on this planet
- nurture a temperament that would enable our students to set and work towards self-driven performance-goals, entrepreneurial ventures and overall leadership.

M.Sc. Bioscience-Plant Science
Programme Outcomes

PO1: Botanical Knowledge: Possess acquaintance and command of the core and basic knowledge associated with the botany, including systematics, morphology, anatomy, physiology, genetics, biochemistry, plant pathology, economic botany, ecology, embryology; and lower plants.

PO2: Planning ability: Demonstrate effective planning abilities, including time and resource management, delegation skills and organizational skills. Develop and execute plans and organize work to meet deadlines.

PO3: Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during routine work. Find, analyse, appraise and apply information logically and will make justifiable decisions.

PO4: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern botanical science-related computing tools with an understanding of their limitations.

PO5: Leadership skills: Recognize and believe the as a most gifted species on earth we have to change and motivate others for the betterment of all life on this green planet. For this students will raise related issues, and appear as leaders of the team building when planning changes required for fulfilment of practice, professional and societal responsibilities.

PO6: Professional Identity: Understand, analyse and communicate the value of their professional roles in society (e.g. botanists, ecologists, researchers, educators, managers, employers, employees).

PO7: Botanical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behaviour that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO8: Communication: Communicate efficiently with the botanical community and with society at large, such as, being able to realize and write effectively, make effective presentations and documentation, and give and receive clear instructions.

PO9: The Botanist and society: Apply reasoning informed by the contextual acquaintance to assess societal, environmental, health, safety and legal issues and the consequent responsibilities relevant to the professional botanical practice.

PO10: Environment and sustainability: Understand the impact of the professional botanical solutions to societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development in eco-friendly manner.

PO11: Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

First Semester

Master of Science (Bioscience-Animal Science)
Master of Science (Bioscience-Plant Science)

BIN 405 Bioinformatics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe and identify various databases and tools used for phylogenetic analysis.
- Apply protein structure prediction.
- Demonstrate and apply different tools for data-mining.

BIO 401 Analytical Techniques-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Comprehend the principles of various instrumentation techniques.
- Identify suitable and relevant tools for use in research problems.
- Utilize the scope of the content for designing and performing future experiments.

BIO 418 Biochemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the structure and role of various biomolecules.
- Identify, assess and explain various biochemical pathways.
- Develop understanding of enzymes and their mechanism of action.

BIO 407 Cell and Molecular Biology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand membrane transport and cell signalling mechanisms.
- Develop comprehensive understanding of endo-membrane system.
- Understand molecular mechanisms of prokaryotes and eukaryotes.

BIO 425 Microbiology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe different methodologies for classification of microbes.
- Understand structural, functional and metabolic diversity of bacteria.
- Explain viral structure, properties, replication and cultivation.

BIO 419L Bioscience Lab - I

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate use of various tools and techniques for detection and quantification of biomolecules.
- Perform various biochemical assays for fats, carbohydrate, protein and enzymes.
- Demonstrate microbiological techniques.
- Access, retrieve, and analyze nucleotide and protein sequences using bioinformatics tools.

Second Semester

BIO 406 Biostatistics and Research Methodology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Apply statistical analysis to biological data.
- Identify ethics in scientific research and associated methodologies.
- Develop skills in scientific writing.

BIO 422 Environmental Biology And Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify key factors responsible for ecosystem balance and explain different efforts which can be undertaken for restoration and environmental remediation.
- Comprehend the toxicity of various environmental pollutants and their influence on ecosystem.
- Understand different waste management processes and generation of energy from waste.
- Describe various roles played by microbes in biodegradation, bioremediation and plant growth promotion.

BIO 410 Genetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the theoretical and experimental foundations of classical and molecular genetics.
- Describe the basics of genetic mapping in bacteria, virus and eukaryotes.
- Understand the scope of cytogenetics and its applications.

BIO 411 Immunology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Evaluate and compare the role of various components and mechanisms of the immune system.

- Describe various immune response mechanisms.
- Develop concept of antibody generation and various immunological techniques.

BT 408 Genetic Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Develop comprehensive understanding of gene manipulation techniques.
- Describe various cloning and expression vectors.
- Develop skills for primer designing, gene amplification and expression.

BIO 420L Bioscience Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate techniques used in immunology and genetic engineering.
- Perform key experiments for water quality analysis and other contaminants.
- Solve problems based on gene mapping and population genetics.

Third Semester

Master of Science (Bioscience-Animal Science)

BT 507 Cell and Tissue Culture Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Virtually develop an idea of cell culture laboratory.
- To learn different techniques/methods of cell culture like primary cell culture, subculturing, cryopreservation, thawing etc. along with their applications.
- Basics of animal and plant cell culture knowledge will help them to join any of the cell culture based research institution and industry of repute besides the academics employability.
- The students can establish their own cell culture laboratory as an entrepreneur.

ZOO 517 Biology of Non-Chordates

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify and classify the major groups of organisms belonging to different non chordate phyla.
- To compare and contrast different systems evolved in non-chordates.
- Understand general organization and affinities of minor phyla.

ZOO 518 Biosystematics, Taxonomy and Evolution

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the principles, methods of taxonomy and systematics.
- Explain key concepts in evolutionary biology.
- Develop an understanding of the geological time scale and paleontology.

ZOO 522D Literature Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After successful completion of course students will be able to:

- Develop the competency in identifying the scientific problem.
- Access the primary literatures, understand the scientific reports and extract the useful information from it.
- Write a scientific document highlighting introduction of the research problem, review of literature, conclusions, future prospects and literature cited.
- Communicate significant findings in the form of scientific papers, reports, poster and oral presentations.

ZOO 513L Animal Science Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify and classify museum specimens belonging to non-chordate phyla.
- Explain various adaptations evolved in some representative non chordate animals.

- Demonstrate practical application of tissue culture techniques.

Fourth Semester

ZOO 512 Animal Physiology and Endocrinology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the process of nutrition and respiration in mammals.
- Comprehend the physiology of mammalian circulatory, respiratory and excretory systems.
- Explain the role of hormones and their endocrine and neural control.

ZOO 516 Biology of Chordates and Histology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify and classify the major groups of organisms belonging to chordate phylum.
- Compare and contrast the characteristics of fishes, amphibians, reptiles, birds, and mammals.
- Describe the histological techniques and basic structure of different tissues.

ZOO 523 Neurobiology and Animal Behavior

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand nervous system anatomy and physiology.
- Describe neural and genetic control of animal behavior.
- Explain learning, sexual, social behavior and animal communication.

ZOO 524 Reproduction and Developmental Biology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand events that lead up to the process of fertilization, differentiation and organogenesis in animals.
- Describe reproductive organs and their functions.
- Develop an understanding of methods for assisted reproductive technologies.

ZOO 514L Animal Science Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify and classify museum specimens belonging chordate class.
- Observe and describe ecological adaptations in chordates.
- Perform clinical procedures for blood and urine analysis.
- Develop skill in tissue preservation, microtomy and preparation of permanent microscopic slides.

Discipline Elective

ZOO 521 Insect Diversity, Morphology, Physiology and Ecology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify, classify and describe insect morphology and physiology.
- Understand insect life cycle and development.
- Describe incest social behavior and effect of various biotic and abiotic factors on insect population.

ZOO 520 Fish Biology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand aquatic adaptations in fish.
- Describe general organization, diversity and different systems of fish.
- Develop an understanding of fish endocrinology and behavior.

BT 525 Animal Biotechnology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Comprehend tools of molecular biology and biotechnology for the improved production and protection of animals.

- Evaluate and discuss public and ethical concerns over the use of animal biotechnology.
- Demonstrate an understanding of the key topics in tissue engineering.

BT 526 Animal Biotechnology-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Explain the basic concepts and methods of animal breeding.
- Understand importance of new generation vaccines in animal biotechnology.
- Pursue research using animal models for human and animal diseases.

BT 532 Immunotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe various theories describing antibody formation.
- Explain the mechanism of immune response to various stimuli.
- Elucidate on vaccines and their development

BT 533 Immunotechnology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Perform various experiment using different techniques covered in the course.
- Understand how clinical immunology is performed.
- Compare and describe various diagnostic techniques.

ZOO 515 Applied Entomology and Insect Pest Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Comprehend role of insects in agriculture.
- Describe types of insecticides and evaluate their toxicity.
- Develop skill in insect pest management.

ZOO 519 Capture Fishery

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify highly diverse capture fisheries resources.
- Understand sustainable harvesting and responsible aquaculture practices.
- Pursue a career in fisheries research, resource management, instruction, extension and production.

PHY 532 Biophysics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the concepts of physical principles in the biomolecular systems.
- Know properties and conformations of biomolecules.
- Understand the interaction between physics and biology.

PHY 533 Biophysics-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the concepts of physical principles in the biomolecular systems.
- Know Properties and conformations of biomolecules.
- Understand the interaction between physics and biology.

ENVS 502 Biodiversity and Conservation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Explain importance of biological diversity.
- Describe major threats to biodiversity.
- Recognize and implement the various methods of biodiversity conservation with co-existence of various environmental pressures.
- Identify different geographical biodiversity hotspots and mega-diversity centers.

ENVS 402 Ecology and Environment

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Describe the interaction of organisms with their environment.
- Identify the various threats to biodiversity.
- Explain the concept of biomes.
- Describe the various biogeochemical cycles.

Reading Elective

BT 529R Drug Discovery

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand basics of R&D in drug discovery and should be able to apply knowledge gained in respective fields of pharmaceutical industry.
- Understand the role of synthetic chemistry in the development of pharmaceutical agents; and the modification of chemical structures to develop new drug molecules.
- Have an advanced understanding of the chemical structure of a pharmaceutical agent and determine the chemical group/s responsible for a given biological effect.
- Demonstrate a basic understanding of pharmacogenomics and bioinformatics as it relates to drug design and discovery.
- Develop an understanding of drug targets as a recognition site for pharmaceutical agents; how the chemical structure of a substance influences interaction with a drug target; and the identification of new drug targets for future drug discovery.

BT 531R Human Genetics and Diseases

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand hereditary and molecular genetics with a strong human disease perspective.
- Describe genetic abnormalities underlying human disease and disorders.
- Develop interest in biomedical research, genetic counseling, medicine, and clinical genetics.

BT 534R Intellectual Property Rights

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the concept of IPR and its types.
- Describe the steps for patenting.
- Discuss the role of WTO and WIPO on IPR.

BT 535R Medical Microbiology

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify various bacterial, fungal, viral and protozoan diseases and their epidemiology.
- Understand the relevance of emerging and reemerging diseases.

BT 538R Molecular Plant Breeding

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand strategies and applications of plant breeding technologies.
- Comprehend the knowledge of different plat molecular markers.
- Plan a research career in the area of plant biotechnology.

BT 539R Protein Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Analyse structure and construction of proteins by computer-based methods.
- Describe structure and classification of proteins.
- Analyse and compare the amino acid sequence and structure of proteins, and relate this information to the function of proteins.
- Explain how proteins can be used for different industrial and academic purposes such as structure determination, organic synthesis and drug design.
- Plan and carry out activity measurements of isolated proteins and characterize their purity and stability.

Third Semester

Master of Science (Bioscience - Plant Science)

BOT 519 Phycology, Mycology and Lichenology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Acquire the knowledge related to various life forms, ecological and economical importance of these plant groups.
- After completion of this course student will be able to identify these intrusting forms in their surroundings and will convey the importance to the community which will help in the conservation of these forms to get better ecosystem.

BOT 517 Bryophyta, Pteridophyta and Gymnosperms

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Acquire the knowledge related to various cryptogamic and gymnospermic life forms, ecological and economical importance of these groups.
- After completion of this course student will be able to identify these forms in their surroundings and will attract towards these branches of classical botany.
- Students will be able to understand the morphological diversity of Bryophytes and Pteridophytes, and evolutionary connections between gymnosperms and angiosperms.
- They will know why these plants have to conserve for the sustainable ecosystem.
- After passing this course they will be placed as researchers in research institutes and universities as these branches of botany eagerly searching for passionate young researchers.

BT 507 Cell and Tissue Culture Technology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students will be able to:

- Virtually develop an idea of cell culture laboratory.
- To learn different techniques/methods of cell culture like primary cell culture, subculturing, cryopreservation, thawing etc. along with their applications.
- Basics of animal and plant cell culture knowledge will help them to join any of the cellculture based research institution and industry of repute besides the academics employability.
- The students can establish their own cell culture laboratory as an entrepreneur.

BOT 518D Literature Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes:

After successful completion of course students will be able to:

- Develop the competency in identifying the scientific problem.
- Access the primary literatures, understand the scientific reports and extract the useful information from it.
- Write a scientific document highlighting introduction of the research problem, review of literature, conclusions, future prospects and literature cited.
- Communicate significant findings in the form of scientific papers, reports, poster and oral presentations.

BOT 522L Plant Science Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Explain the puzzles of lower plants i.e., crytpogams.
- Attain the knowledge about the life cycle, morphology, anatomy of important taxa of these plant groups.
- Learn microscopy, anatomy, staining techniques which are basis of botany.
- Understand the course of evolution by studying the interrelationships among cryptogams, gymnosperms and angiosperms.
- Understand the importance of fossil plants.
- Converse expertly through oral and written scientific media about these plants.
- Recognize exact ways of training regarding lower plants and can address issues related to importance of these plants in our ecosystem.

Fourth Semester

BOT 512 Angiosperms

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Increase their capacity to think critically; ability to design and execute an experiment; confidence and ability in communicating ideas.

- This will serve as a lasting and practical basis for a career, for example, in research whether industry or academia - as well as teaching, media, law, commerce, government or management.

BOT 504 Cytogenetics and Plant Breeding

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the chromosomal theory of inheritance and cytological & evolutionary consequences of polyploidy and aneuploidy on fertility in plants.
- Learn about the fundamental concepts in cytogenetics.
- Gain knowledge of the basic diagnostic tools of cytogenetics.
- Familiarize with the common chromosomal aberrations and their evolutionary consequences in plants and animals.
- Understand the implications of chromosomal structural variation to plant breeding.
- Attain the ability to operate basic consideration in order to analyze genetic data from cytogenetic diagnostic. An ability to incorporate cytogenetic considerations in breeding programs, in evolutionary studies, and in genetic analyses.

BOT 507 Plant Pathology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Facilitate to develop learning goals and objectives in their courses and programs, in prioritizing and focusing the learning experiences, and in the selection of appropriate assessment tools.
- Potential students and outside agencies to assess the quality of our academic programs.
- These learning outcomes areas include: Scholar, content and technical expertise, social accountability, communicator, and professional.

BOT 508 Plant Physiology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Demonstrate understanding of the organization of plants from the level of cells through tissues, tissue systems, and organs.
- Demonstrate understanding of developmental patterns and processes of plants.
- Demonstrate understanding of organellar function at the cellular level of architecture.demonstrate understanding water potential and its effect on cellular function.
- Demonstrate detailed understanding of the physiological mechanisms involved in the uptake and transport of water and the translocation of food by plants.
- Demonstrate understanding of the cellular establishment of membrane potential and its role in solute transport.
- Demonstrate understanding of the mechanisms for procurement of mineral ions by plants and mineral nutrition and the role these minerals play in organic molecule synthesis and use.

BOT 523L Plant Science Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Explain and justify the use of advanced techniques in taxonomy, microscopy, cytology, cyto-genetics, genotyping, plant physiology, and plant pathology especially mycology, and to interpret the results of such analyses.
- Utilize technical skills acquired through lab experience and apply these skills in formulating solutions to life science questions.
- Communicate proficiently through oral and written scientific media.
- Identify specific ways training in plant science that can address issues of earthly stewardship and sustainability, and demonstrate a strong desire to help Mankind in a socio-scientific way.

Discipline Elective

BOT 520 Phycology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify these algal forms in their surroundings and will be motivated to better understand this interesting branch of botany.
- They will know the basis of photosynthesis with amazing diversification in these plants.
- After passing this course they will be placed as researchers in marine research, space research and biofuel research institutes.

BOT 521 Phycology-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the various application and career opportunities in algology.
- They will know the industrialization aspects of these plants.
- After passing this course they will be able to work in various industries or build their career in algal research

BOT 515 Bryology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify these Lilliputians of plant kingdom in their surroundings and will be able to collect those from their natural habitats hence motivated to better understand this fascinating group of plants.
- They will know the basis of thallus organization with amazing diversification.
- After passing this course they will be placed as researchers in various institutes and universities.

BOT 516 Bryology-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Know the various advances in the field of bryology.

- They will know the modern trends in bryology.
- After passing this course they will be able to carry on their research in India and abroad.
- This branch of botany is looking dedicated researchers for its sustenance therefore fair chance of getting good opportunities as researchers in various institutes and universities.

BOT 513 Angiosperms Taxonomy and Systematics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand methods and principles of plant classification and nomenclature.
- Learning representative plant families and genera of flowering plants will also help students to identify the plants.
- Learn the embryology, biosystematics, bryodiversity and conservation methods of economically important plants.

BOT 514 Angiosperms Taxonomy and Systematics-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Describe the evolution by natural selection and other causes.
- Get knowledge about the nature of “species” and can compare contrasting concepts of species.
- Describe binomial nomenclature and use scientific names of species correctly.

- List levels of the Linnaean hierarchical classification system and use it properly.
- Discuss advantages and disadvantages of the Linnaean system describe systematics.
- Correctly interpret phylogenetic trees and explain their construction.

BT 521 Plant Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Demonstrate principles for development of various stress resistant plants.
- Understand various techniques used in plant biotechnology.

PHY 532 Biophysics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the concepts of physical principles in the biomolecular systems.
- Know properties and conformations of biomolecules.
- Understand the interaction between physics and biology.

PHY 533 Biophysics-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the concepts of physical principles in the biomolecular systems.
- Know Properties and conformations of biomolecules.
- Understand the interaction between physics and biology.

ENVS 402 Ecology and Environment

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Describe the interaction of organisms with their environment.
- Identify the various threats to biodiversity.
- Explain the concept of biomes.
- Describe the various biogeochemical cycles.

BT 524 Advanced Plant Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Gain advance knowledge in plant biotechnology and their applications in crop improvement, large scale production of plant metabolites
- They are able to get practical insight of techniques.
- They can go further in plant biotechnology research.

ENVS 502 Biodiversity and Conservation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Explain importance of biological diversity.
- Describe major threats to biodiversity.
- Recognize and implement the various methods of biodiversity conservation with co-existence of various environmental pressures.
- Identify different geographical biodiversity hotspots and mega-diversity centers.

READING ELECTIVE

BT 529R Drug Discovery

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand basics of R&D in drug discovery and should be able to apply knowledge gained in respective fields of pharmaceutical industry.
- Understand the role of synthetic chemistry in the development of pharmaceutical agents; and the modification of chemical structures to develop new drug molecules.
- Have an advanced understanding of the chemical structure of a pharmaceutical agent and determine the chemical group/s responsible for a given biological effect.
- Demonstrate a basic understanding of pharmacogenomics and bioinformatics as it relates to drug design and discovery.

- Develop an understanding of drug targets as a recognition site for pharmaceutical agents; how the chemical structure of a substance influences interaction with a drug target; and the identification of new drug targets for future drug discovery.

BT 531R Human Genetics and Diseases

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand hereditary and molecular genetics with a strong human disease perspective.
- Describe genetic abnormalities underlying human disease and disorders.
- Develop interest in biomedical research, genetic counseling, medicine, and clinical genetics.

BT 534R Intellectual Property Rights

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the concept of IPR and its types.
- Describe the steps for patenting.
- Discuss the role of WTO and WIPO on IPR.

BT 535R Medical Microbiology

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students will be able to:

- Identify various bacterial, fungal, viral and protozoan diseases and their epidemiology.
- Understand the relevance of emerging and reemerging diseases.

BT 538R Molecular Plant Breeding

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand strategies and applications of plant breeding technologies.
- Comprehend the knowledge of different plat molecular markers.
- Plan a research career in the area of plant biotechnology.

BT 539R Protein Engineering

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After successful completion of the course, students will be able to:

- Analyse structure and construction of proteins by computer-based methods.
- Describe structure and classification of proteins.
- Analyse and compare the amino acid sequence and structure of proteins, and relate this information to the function of proteins.

- Explain how proteins can be used for different industrial and academic purposes such as structure determination, organic synthesis and drug design.
- Plan and carry out activity measurements of isolated proteins and characterize their purity and stability.

BANASTHALI VIDYAPITH

Master of Science (Biotechnology)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

The M.Sc Biotechnology programme aims for the holistic development of students through the unique and innovative five fold educational ideology of Banasthali Vidyapith. Biotechnology is identified as a potential technology which can impact all facets of life particularly agriculture and health sectors. The Programme has been designed to develop technically skilled personnel who as academicians, researchers, entrepreneurs and professionals can play a pivotal role in biotechnology and its allied sectors. Through a comprehensively designed course structure it is envisaged that students will realise their potential in academics as well as industry. The programme would inculcate moral values accompanied with an understanding of ethical-societal issues and safety concerns that a biotechnologist is increasingly facing. On completion of the Programme, students will be able to:

- identify, analyze and formulate solutions for complex biotechnological problems through team work and multidisciplinary approach,
- design and apply appropriate tools for biotechnological manipulations,
- apply knowledge to solve societal problems keeping in mind the legal and ethical issues concerning genetic manipulation technologies,
- develop scientific communication skills and be well versed with the latest technologies,
- improve public perception of biotechnology and its role,
- identify and generate ideas for entrepreneurial ventures,
- engage in lifelong learning in the broadest context of technological change.

Programme Outcomes

PO1: **Knowledge**: Develop skills and theories associated with reconstruction, explanation and interpretation of knowledge associated with diverse fields of biochemistry, molecular biology, immunology, microbiology, tissue culture, environmental sciences, statistics, bioinformatics, genetics and industrial biotechnology.

PO2: Planning abilities: Demonstrate, design and execute research problems to highlight skills in planning, resource management, organsization and execution in a timely manner.

PO3: Problem analysis: Interpret, compare and analyze following rules of scientific methodology to arrive at a defensible conclusion of a problem.

PO4: Modern tool usage: Learn, identify, select and apply biotechnological tools and techniques for problem solving; choose correct statistical methods for data validation and bioinformatics computational tools and techniques for further analyses and interpretation.

PO5: Leadership skills: Understand the value of organization and team support to form and build units addressed towards problem solving. Ability to motivate, encourage, support and empathize.

PO6: Professional Identity: Cognition of the professional niche to be fulfilled in society as a part of social and economic capital.

PO7: Bioethics and Biosafety: Understand principle of bioethics to govern profession behavior to enable ethical development of biotechnology. Develop thorough understanding and knowledge of levels and types of biosafety to facilitate formation and development of infrastructure and methodology which imposes minimal to no damage to the stakeholders including society and environment.

PO8: Communication: Ability to perceive and facilitate the understanding of science and its associated technology. Develop good written and oral skills, prepare effective presentations, development of standard operating procedures and publish research documents.

PO9: The biotechnologist and society: Identify problems in society related to biotechnology and its scope, formulate a solution, apply and execute it while taking responsibilities for ethical, moral and legal consequences.

PO10: Environment and sustainability: Comprehend and describe the environmental impact of biotechnology research and advancements. Identify possible solutions and methodologies to eliminate or mitigate or restore any negative influences while developing technologies as part of sustainable development highlighted by Convention of Biological Diversity.

PO11: Life- long learning: Self analysis, appraisal and constructive criticism to be used for further improvement which facilitates continued involvement and developments in mediating technological advances.

First Semester

BIN 405 BIOINFORMATICS

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe and identify various databases and tools used for phylogenetic analysis.
- Apply protein structure prediction.
- Demonstrate and apply different tools for data-mining.

BIO 401 ANALYTICAL TECHNIQUES-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Comprehend the principles of various instrumentation techniques.
- Identify suitable and relevant tools for use in research problems.
- Utilize the scope of the content for designing and performing future experiments.

BIO 418 BIOCHEMISTRY

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the structure and role of various biomolecules.

- Identify, assess and explain various biochemical pathways.
- Develop understanding of enzymes and their mechanism of action.

BIO 407 Cell and Molecular Biology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand membrane transport and cell signaling mechanisms.
- Develop comprehensive understanding of endo-membrane system.
- Understand molecular mechanisms of prokaryotes and eukaryotes.

BIO 425 Microbiology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe different methodologies for classification of microbes.
- Understand structural, functional and metabolic diversity of bacteria.
- Explain virul structure, properties, replication and cultivation.

BIO 419L Bioscience Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate use of various tools and techniques for detection and quantification of biomolecules.
- Perform various biochemical assays for fats, carbohydrate, protein and enzymes.
- Demonstrate microbiological techniques.
- Access, retrieve, and analyze nucleotide and protein sequences using bioinformatics tools.

Second Semester

BIO 406 Biostatistics and Research Methodology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Apply statistical analysis to biological data.
- Identify ethics in scientific research and associated methodologies.
- Develop skills in scientific writing.

BIO 422 Environmental Biology and Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify key factors responsible for ecosystem balance and explain different efforts which can be undertaken for restoration and environmental remediation.
- Comprehend the toxicity of various environmental pollutants and their influence on ecosystem.

- Understand different waste management processes and generation of energy from waste.
- Describe various roles played by microbes in biodegradation, bioremediation and plant growth promotion.

BIO 410 Genetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the theoretical and experimental foundations of classical and molecular genetics.
- Describe the basics of genetic mapping in bacteria, virus and eukaryotes.
- Understand the scope of cytogenetics and its applications.

BIO 411 Immunology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Evaluate and compare the role of various components and mechanisms of the immune system.
- Describe various immune response mechanisms.
- Develop concept of antibody generation and various immunological techniques.

BT 408 Genetic Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60) **4 0 0 4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Develop comprehensive understanding of gene manipulation techniques.
- Describe various cloning and expression vectors.
- Develop skills for primer designing, gene amplification and expression.

BIO 420L Bioscience Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate techniques used in immunology and genetic engineering.
- Perform key experiments for water quality analysis and other contaminants.
- Solve problems based on gene mapping and population genetics.

Third Semester

BIO 507S Critical Analysis of Classical Papers/ Landmark Discoveries (Seminar)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Analyze and give a critical description of the papers studied.
- Discuss the significance of the research work.

BT 504 Bioprocess Engineering and Technology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify bioreactor design and differentiate between types.
- Explain kinetics of scale up and sterilization along with processes of downstreaming.
- Demonstrate large scale production of biomolecules.

BT 507 Cell and Tissue Culture Technology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Develop comprehensive concepts of cell and tissue culture techniques and methodology.
- Demonstrate use of various plant and animal tissue culture techniques.
- Explain applications of cell and tissue culture in agriculture, horticulture, medicine and pharmaceutical industry.

BT 505L Biotechnology Lab-I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

After successful completion of the course, students should be able to:

- Perform production and scale up of some industrially relevant bioactive molecules from microbes.
- Demonstrate gene transfer techniques.

- Perform cell and tissue culture techniques.

Fourth Semester

BT 528D Dissertation

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**48**	**24**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Gain an exposure of working in the academic institutions, research laboratories and industries.
- Apply the understanding developed from the earlier courses in carrying out solutions to research problems.
- Identify, formulate and execute a research hypothesis.
- Write a scientific document highlighting introduction of research problem, objectives, review of literature, methodology, results, discussions, conclusions, significant outcomes and references.
- Develop the skills of presenting research findings in the scientific journals.

List of Discipline Elective

BIO 503 Fundamentals of Bioentrepreneurship

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand role of entrepreneurship in promoting innovation and wealth generation.
- Develop skills for writing business models for new ideas and market segments.

- Explain various financial, marketing, sales and legal issues associated with entrepreneurship.

BIO 505 Microbial Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Utilize various strategies for strain improvement, overexpression, maintenance and containment of microbes.
- Describe strategies used for large scale production of various industrially relevant bioactive molecules from microorganisms.

BT 511 Enzyme Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Develop understanding of enzymes and their mechanism of action and regulation.
- Explain the production of enzymes.
- Learn wide applications of enzymes and their future potential.

BT 513 Food Process and Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Explain strategies of food preservation, spoilage and quality assessment.

- Understand various policies related to GM food and its safety assessment.
- Demonstrate the principles for production of various processed food.

BT 423 Genomics and Proteomics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe principles of functional genomics.
- Develop an understanding of proteomics and associated techniques.
- Understand comprehensive concept of nucleotide and protein sequencing.

BT 521 Plant Biotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate principles for development of various stress resistant plants.
- Understand various techniques used in plant biotechnology.

BT 522 Recombinant DNA Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Explain techniques used for DNA synthesis, amplification and sequencing.

- Describe strategies of cloning in both prokaryotes and eukaryotes.
- Identify novel diagnostic tools of rDNA and gene therapy.

BT 532 Immunotechnology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe various theories describing antibody formation.
- Explain the mechanism of immune response to various stimuli.
- Elucidate on vaccines and their development

BT 525 Animal Biotechnology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

At successful completion of this course students will be able to:

- Comprehend tools of molecular biology and biotechnology for the improved production and protection of animals.
- Evaluate and discuss public and ethical concerns over the use of animal biotechnology.
- Demonstrate an understanding of the key topics in tissue engineering.

PHY 532 Biophysics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course, the students will be able to-

- Understand the concepts of physical principles in the biomolecular systems.
- Know properties and conformations of biomolecules.
- Understand the interaction between physics and biology.

List of Reading Elective

BT 529R Drug Discovery

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of this course, students should be able to:

- Understand basics of R&D in drug discovery and should be able to apply knowledge gained in respective fields of pharmaceutical industry.
- Understand the role of synthetic chemistry in the development of pharmaceutical agents; and the modification of chemical structures to develop new drug molecules.
- Have an advanced understanding of the chemical structure of a pharmaceutical agent and determine the chemical group/s responsible for a given biological effect.
- Demonstrate a basic understanding of pharmacogenomics and bioinformatics as it relates to drug design and discovery.
- Develop an understanding of drug targets as a recognition site for pharmaceutical agents; how the chemical structure of a substance influences interaction with a drug target; and the identification of new drug targets for future drug discovery.

BT 531R Human Genetics and Diseases

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course students will be able to:

- Understand hereditary and molecular genetics with a strong human disease perspective.
- Describe genetic abnormalities underlying human disease and disorders.
- Develop interest in biomedical research, genetic counseling, medicine, and clinical genetics.

BT 534R Intellectual Property Rights

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completing this course, students will be able to:

- Understand the concept of IPR and its types.
- Describe the steps for patenting.
- Discuss the role of WTO and WIPO on IPR.

BT 535R Medical Microbiology

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify various bacterial, fungal, viral and protozoan diseases and their epidemiology.
- Understand the relevance of emerging and reemerging diseases.

BT 538R Molecular Plant Breeding

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completing this course, students will be able to:

- Understand strategies and applications of plant breeding technologies.
- Comprehend the knowledge of different plat molecular markers.
- Plan a research career in the area of plant biotechnology.

BT 539R Protein Engineering

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On completion of this course, students should be able to:

- Analyze structure and construction of proteins by computer-based methods.
- Describe structure and classification of proteins.
- Analyze and compare the amino acid sequence and structure of proteins, and relate this information to the function of proteins.
- Explain how proteins can be used for different industrial and academic purposes such as structure determination, organic synthesis and drug design.
- Plan and carry out activity measurements of isolated proteins and characterize their purity and stability.

BANASTHALI VIDYAPITH

Master of Science (Chemistry)

Curriculum Structure

First Semester Examination, December 2019
Second Semester Examination, April/May 2020
Third Semester Examination, December 2020
Fourth Semester Examination, April/May 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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MASTER OF SCIENCE

14 (HE) B2:

I. The courses of study for M. Sc. Examination shall extend over a period of two years divided into four semesters with an examination at the end of each semester. First and Second semester examinations in the First Year and the Third and Fourth semester examinations in the Second year.

II. First and Third Semester examinations will normally be held in the month of December and Second and Fourth Semester examinations will normally be held in April/May every year.

III. The candidate can offer M. Sc. Examination in one of the following subjects –

(i) Physics
(ii) Chemistry
(iii) Pharmaceutical Chemistry
(iv) Bio-science
(v) Bio-technology
(vi) Applied Microbiology & Biotechnology
(vii) Bio-informatics
(viii) Computer Science
(ix) Electronics
(x) Mathematical Science

IV. The Examination shall be conducted by means of continuous assessment / written papers / Practicals / Dissertations / Project Report/ Seminar wherever prescribed.

V. The following shall be the Scheme of Examination:

Programme Objectives

Banasthali Vidyapith's educational ideology, aims to nurture future scientist through all round development of the student personality by inculcating proper sense of values and knowledge besides maintaining a harmonious balance of spiritual and scientific values. In view of this, the program objective of department of chemistry aims:

- To impart critical thinking by providing them with a foundation in chemistry that stresses scientific reasoning.
- To provide a real sense of education by inculcating in them ethics and values.
- To demonstrate information literacy skill for acquiring the ability to synthesize, separate and characterize compounds using published reactions, standard laboratory equipment, and modern instrumentation as a student and as a lifelong learner.
- To provide a foundation to carry accurate quantitative and qualitative measurements with an understanding of the theory and draw useful conclusion.
- To impart basic technical skills to solve pertaining problems independently, in concerned or interdisciplinary subjects.
- To create an awareness regarding effective and safe use of chemicals.

Programme Outcomes

PO1: Chemistry knowledge: Develop an insight of the core and importance of chemistry for society and individual well being

PO2: Planning ability: Acquire the skills of planning and conducting advanced chemical experiments and applying structural-chemical characterization techniques

PO3: Problem analysis: Identify, formulate, research literature, and analyze various analytical and experimental techniques taught during the course, for solving problems and make reasonable conclusions. The graduates should be able to systematically break up complex problems in realizable steps and solve them problems reaching substantiated conclusions

PO4: Communication: Communicate both written and oral, for specialized and non-specialized audiences

PO5: Modern tool usage: Use modern instrument and methods for dealing with structural problem taught during the course besides understanding its limitations. The graduate will be able to use modern tools, software, equipment etc. to analyze and obtain solution to the problems

PO6: Professional identity: Work as a Chemistry professional, and qualify for training as scientific researcher. Altitude of Professionalism to function effectively in the complex modern work environment /society with the ability to assume professional leadership roles and achieve professional understanding and appreciation of ethical behavior, social responsibility and diversity, both as individuals and in team environments. Explore new areas of research in both chemistry and allied fields of science and technology

PO7: Environment and sustainability: The graduates should practice their profession considering environmental protection and sustainability

PO8: Ethics: Honor the hard work of chemists, problem faced and how they surpassed the problem while performing novel experimental techniques and also get an understanding of harmful effects of chemicals and their necessity to dump them safely for individual and social well being

PO9: Chemist and society: The students will be able to study the impact of process industry on the global, economic, and societal context

PO10: Life-long learning: Longitude of not only opening careers in the branch in the concerned subject but also recognize the application of chemistry in context of problem in environmental, food processing, pharmaceutical, biochemical, agriculture, fuels and chemicals, textile processing, mining and many other industries and will be able to apply new innovative and novel approach to solve them.

M. Sc. Chemistry

First Semester

CHEM 401 Analytical Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes

On complition of course, the students will be able to:

- apply knowledge of basic statistics to validate the results of analysis.
- understand various chromatographic techniques and it's applications in separation of mixtures, purification of samples, and qualitative and quantitative analysis.
- apply the concept of electrophoresis.
- explain the principle and applications of thermal methods of analysis and atomic spectroscopy

CHEM 405 Inorganic Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- appreciate the role of molecular orbital theory in explaining geometry of molecules.
- analyze the bonding and structural aspects of chemical species of main group elements.
- explain the mechanistic aspects of metal complex reactions and relate it to the stability of metal complexes.
- determine the symmetry operations of molecules.
- apply group theory to study the hybridization and vibrational modes of molecules.

CHEM 406 Organic Chemistry

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On complition of course, the students will be able to:

- understand the concept of aromaticity, nonaromaticity and antiaromaticity in organic compounds.
- explain the reaction mechanism, preparation, reactivity and stability of reaction intermediates.
- understand and apply the concepts of stereochemistry.
- explain the aliphatic nucleophilic substitution reactions.

CHEM 408 Physical Chemistry

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On complition of course, the students will be able to:

- calculate the energy of one dimensional, three dimensional box, harmonic oscillator, rigid rotor and hydrogen atom, and explain the variation and perturbation theory and its application for hydrogen atom.
- apply the concept of nuclear reactions and calculate the fission product yield.
- understand the radioactive techniques: neutron activation analysis, GM counter, ionization counter and tracer techniques.
- derive the relationship between thermodynamic equations and solve the numerical problems.
- explain the collision theory, activated complex theory and Lindemann's theory of reaction rates.

MATH 407 Mathematics for Chemists

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- Use matrices techniques for solving system simultaneous linear equations.
- Apply elementary transformations to reduce the matrix to Echelon and normal form and determine its rank.
- Solve differential equation problems in the field of Chemistry.
- Demonstrate knowledge of probability and some basic statistical measures.

CHEM 402L Chemistry Lab-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

On complition of course, the students will be able to:

- develop their skills for qualitative and quantitative research in different fields
- perform various analytical operations to qualify and quantify different organic and inorganic samples
- present information and write reports in a clear, effective and scientific manner

Second Semester

CHEM 412 Special Topics in Physical Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the principles of advanced spectroscopic techniques.
- understand the Raman effect and rotational vibrational Raman spectra used for the structure determination.
- calculate the bond length of compounds and reduced mass by microwave spectroscopy
- calculate binding energy of electrons.
- explain the X-ray diffraction and measurements, and band theory of conductance.

CHEM 407 Organic Reaction Mechanism

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the aromatic electrophilic and nucleophilic substitution reactions, and free radical reactions.
- explain the addition to C-C and C-X multiple bonds, and elimination reactions.
- understand the pericyclic reactions.

CHEM 411 Photo Inorganic Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the basic and fundamental concepts involved in photochemistry.
- explain the physical and photochemical processes for the excitation of molecules using Jablonski diagram.
- understand the optical properties, optical rotatory dispersion and its applications.
- explain the types and mechanism of photochemical reactions of transition metal complexes.
- describe the charge transfer transitions in transition metal complexes.

CHEM 409 Spectral Techniques in Inorganic Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- explain the rules for predicting molecular structure of metal complexes with the help of electronic spectral study.
- apply the knowledge of heteronuclear magnetic resonance spectroscopy for characterization of inorganic compounds.
- characterize some iron and tin complexes with the help of Mössbauer spectroscopy.
- explain the bonding and structures of paramagnetic metal complexes using ESR spectroscopy.
- characterize inorganic compounds which have quadruple nucleus with the help of nuclear quadrupole resonance spectroscopy.

CHEM 410 Spectroscopy

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- explain the principle and instrumentation of UV-visible, IR, NMR and mass spectroscopy.
- elucidate the structures of compounds using UV-visible, IR, NMR and mass spectral data.
- understand the reaction mechanisms using NMR and mass spectral data.
- characterize the chemical species using UV-visible and IR spectral data.

CHEM 403L Chemistry Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

On complition of course, the students will be able to:

- develop their skills for qualitative and quantitative research in different fields.
- perform various analytical operations to qualify and quantify different analytes.
- outline synthetic strategies for important chemicals.
- check the purity of synthesized compounds through TLC, conductance and magnetic susceptibility measurements, and UV, FT-IR spectral data

Third Semester

CHEM 514 Bioinorganic and Bioorganic Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- discuss structures and properties of carbohydrates, amino acids and proteins.
- understand metalloenzymes, mechanism of action of enzymes and their role in biological process.

- explain the structures of haemoglobin, myoglobin and mechanism of dioxygen transport in living system.
- elaborate electron transport chain and its role in energy generation, nitrogen fixation and photolysis of water.
- explain the structures of different biomolecules through model complexes of iron, cobalt and copper.

CHEM 516D Literature Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- survey literature in systematic manner.
- present information and write reports in a clear, effective and scientific manner.
- develop their skills for future research.

CHEM 509 Organic Chemistry (Chemistry of Natural Products)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- explain the synthesis and biogenesis of terpenoids, carotenoids, alkaloids, steroids, porphyrins, prostaglandins and flavanoids.
- elucidate the structures of terpenoids, alkaloids, steroids and flavonoids.
- identify natural products and their probable biosynthetic pathways.
- understand the key metabolic pathways.

CHEM 521 Physical Spectroscopy

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the principles of advanced spectroscopic techniques.
- understand the Raman effect and rotational vibrational Raman spectra used for the structure determination.
- calculate the bond length of compounds and reduced mass by microwave spectroscopy
- calculate binding energy of electrons .
- explain the X-ray diffraction and measurements, and band theory of conductance.

CHEM 505L Chemistry Lab -III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

On complition of course, the students will be able to:

- develop their skills for qualitative and quantitative research in different fields.
- perform various analytical operations to qualify and quantify different analytes.
- outline synthetic strategies for important chemicals.
- check the purity of synthesized compounds through TLC, conductance and magnetic susceptibility measurements, and UV, FT-IR spectral data.

Fourth Semester

CHEM 501 Advanced Inorganic Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- explain the principles and concepts of Green Chemistry.
- minimize the use of organic solvents by using solvent-free reactions and supercritical fluids.
- predict the structure, bonding of metal carbonyls, metal nitrtosyl, dinitrogen and dioxygen complexes, vibrational spectra of metal carbonyls for bonding and structural elucidation.
- apply the principles of biomimetic chemistry in design and synthesis of receptors for recognition of various hosts: cationic, anionic and neutral; supramolecular reactivity, catalysis and supramolecular devices.

CHEM 502 Advanced Physical Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the oscillatory reactions, rate equations of different types of reactions, and thermodynamic excess function of non ideal solutions.
- explain the Maxwell-Boltzman, Fermi-Dirac and Bose-Einstein statistics.
- explain the concept of entropy productions and Onsager's reciprocity relation.
- understand the basics of electrochemistry and polarography.
- explain the structure of electrified interface, and double layer parallel-plate condenser models.

CHEM 510 Organic Synthesis

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60) **4 0 0 4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the fundamentals of organic synthesis such as disconnection approach of 1,3-difunctional and 1,5-difunctional compounds
- apply the concepts of microwave assisted synthesis in various organic reactions.
- apply the mechanistic aspects of various name reactions in synthetic organic chemistry.

CHEM 511 Organotransition Metal Chemistry

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Learning Outcomes:

On complition of course, the students will be able to:

- use the basic principles of descriptive chemistry and molecular orbital theory to describe chemical bonding and structure of organometallic compounds.
- explain and predict the chemical behavior and reactivity of organometallic compounds.
- describe and explain catalytic processes using an organometallic compound as a catalyst.
- show and explain how organometallic compounds are used as catalysts in organic synthesis.
- describe physical characterization methods used to study the structure and behavior of organometallic compounds.

CHEM 506L Chemistry Lab-IV

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **0 0 12 6**

Learning Outcomes:

On complition of course, the students will be able to:

- develop their skills for qualitative and quantitative research in different fields.
- perform various analytical operations to qualify and quantify different organic and inorganic samples.
- elucidate the structures of organic compounds by UV, FT-IR, Mass and NMR spectral data.
- present information and write reports in a clear, effective and scientific manner.

Discipline Elective Papers:

CHEM 519 Nanomaterials

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- understand nanomaterials and their properties.
- fabricate nanomaterials and characterize them.
- explain the stability of nanomaterials.

CHEM 512 Photo-organic and Heterocyclic Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- The students will be able to demonstrate advanced knowledge and understanding in aspect of photochemical reactions.
- The students will be able to introduce about basic chemistry of the heterocyclic.

- The students will get familiar with particular properties and reactions for the most important heterocyclic as well as different systems of nomenclature.
- The students will develop fundamental theoretical understanding of heterocyclic chemistry.
- The students will be able to fully comprehend the chemistry of many heterocyclic products, in use such as drugs and food.

CHEM 522 Polymer Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On complition of course, the students will be able to:

- explain the various polymerization processes.
- understand the synthesis and properties of different polymers.
- appreciate the importance of recycling and disposal of rubber and polyurethane waste.
- differentiate the synthesis properties and uses of various inorganic polymers.

ENVS 405 Environmental Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the various chemical processes occurring in the air, water and soil.
- Explain the effect of hydrocarbons and synthetic compounds on biological organisms.

- Explain the degradation of hydrocarbon and synthetic compounds.
- Illustrate the working principle, merits and demerits of analytical techniques.

Reading Electives

CHEM 515R Forensic Science

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On complition of course, the students will be able to:

- appreciate the critical thinking and analysis abilities.
- develop laboratory skills to exacting standards to precision and care.
- apply diverse informations to solve real problems.

CHEM 517R Metals in Medicines

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On complition of course, the students will be able to:

- understand the role of metal complexes in the treatment of various disease.
- develop their insights for heavy metal toxicities and detoxification through chelation therapy.

CHEM 518R Nano Catalysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On complition of course, the students will be able to:

After completion of this course the student will be able to understand the basic mechanism of chemical reaction and the role of catalysis.

CHEM 520R Pharmaceutical Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

- Develop understanding of drugs and their uses.
- Apply the concept of organic synthesis in drug synthesis.

BT 604R Renewable Energy Resources

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students will be able to:

- Understand the various forms of conventional and non conventional energy resources.
- Design working models of renewable energy.
- Understand the applications and limitations of renewable energy sources.

BIO 602R Bioethics, Biosafety and IPR

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Explain role of biotechnology in sustainable research and various ethical implications.
- Understand biosafety–objective, implementation, necessity and legislations.
- Develop preliminary understanding of Intellectual Property with emphasis on patents.

Online Reading Elective

ICT in Teaching and Learning

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On complition of course, the students will be able to:

- use learning assistance for learning and teaching.
- develop new teaching and learning methods, techniques and tools.

BANASTHALI VIDYAPITH

Master of Science (Environmental Science)

Curriculum Structure

First Semester Examination, December-2019

Second Semester Examination, April/May-2020
Third Semester Examination, December-2020

Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Banasthali Vidyapith is an epitome of tradition and modernity. Vidyapith aims to preserve and inculcate the essential values and ideals of Indian culture. It believes in simple living and high thinking. Our educational ideology is based on the concept of fivefold education focusing on physical, practical, aesthetic, moral and intellectual aspects in order to develop a balanced personality.

The M.Sc. in Environmental Science is an interdisciplinary programme which emphasizes the current issues of environment and serious environmental challenges of local, regional and international level that the world confronts. Students will be able to comprehend the interaction between man and its environment along with effect of human activities on the environment and its functions through a series of academic courses and co-curricular activities. Additionally, students will acquire critical thinking and problem solving skills in order to enrich the quality of the environment.

This programme values an integrated approach on learning, conservation, resource management together with inculcation of solution centric approach in resolving the environmental problems to achieve sustainable development. The programme also envisions developing practical leaders having academic excellence and passion to work for the betterment of the environment and create a better dwelling place built on the principles of environmental justice and sustainability.

The main objectives of the M.Sc. Environmental Science programme are:

- To prepare competent environmental professionals in India and across the globe.
- To prepare individuals who are environmentally conscious, empathetic and aware.
- To cultivate an interconnected and interdisciplinary approach towards environmental studies to appreciate the interconnected nature of the world and surroundings in which they live.

- To provide environmental education in a stimulating environment integrated with nationally and internationally recognized research to develop solutions for common environmental issues.
- To prepare students that will communicate excellently about environmental issues in speech and writing.
- To instruct digital literacy to support their professional growth.
- To develop ethical reasoning, diverse viewpoints and decision-making aptitude in students so they can confront environmental issues while considering the perspectives of a variety of stakeholders and systems.
- To foster a spirit in students which lets them to work towards attaining goals and cultivate entrepreneurial capacities.

Programme Outcomes

PO1: **Environmental Knowledge:** Describe the diverse concepts and methods of environmental sciences and their application in various aspects of environmental issues.

PO2: **Planning abilities:** Demonstrate effective planning to deal with different problems associated with environmental issues such as solid waste management, Energy auditing and Impact assessment of various developmental activities.

PO3: **Problem analysis:** Formulate mitigation measures for various environmental issues such as waste management and pollution, food and agriculture, energy, climate change, population, resource management and loss of biodiversity.

PO4: **Design/development of solution for problems:** The research skills strengthen them to formulate hypothesis, identification of environmental problems and develop solution for the betterment of the environment.

PO5: **Modern tool usage:** Apply various tools commonly used in field research, particularly in the study of air water and soil quality along with spatial analysis software and tools such as GIS and GPS technology.

PO6: **Leadership skills:** Use their knowledge of EIA and Environmental laws to critically think about their roles and identities as citizens, consumers and environmental actors in an interconnected world.

PO7: **Professional Identity:** Demonstrate the ability to interpret the consequences of developing projects and consult various environmental agencies to a focused solution.

PO8: **Environmental Ethics:** Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

PO9: **Communication:** Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, along with written and oral communication needed to conduct high-level work as interdisciplinary scholars.

PO10: The Environment and society: Describe various problems associated with sustainable development of project and its impact on society.

PO11: Environment and sustainability: Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.

PO12: Life- long learning: Prepare them for meaningful careers and higher education in fields related to environmental science and beyond.

First Semester

ENVS 412 Climate change and Environment

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the concept of climate change.
- Identify the indicators of climate change and explain the various theories.
- Explain the impact of El Niño and La Niña.
- Describe carbon sequestration policies related to climate change.

ENVS 402 Ecology and Environment

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the interaction of organisms with their environment.
- Identify the various threats to biodiversity.
- Explain the concept of biomes.
- Describe the various biogeochemical cycles.

ENVS 405 Environmental Chemistry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the various chemical processes occurring in the air, water and soil.
- Explain the effect of hydrocarbons and synthetic compounds on biological organisms.
- Explain the degradation of hydrocarbon and synthetic compounds.
- Illustrate the working principle, merits and demerits of analytical techniques.

ENVS 409 Fundamentals of Remote Sensing and GIS

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Explain about Remote Sensing, Geographical Information System and Global Positioning System.
- Outline and interpret the elements of aerial photographs.
- Describe principles and applications of thermal and microwave remote sensing.
- Differentiate GIS and science of map making, non spatial versus spatial data

ENVS 411 Introduction to Computer for Environmental Science

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the elements of a computer system and functions of its components
- Use various computer operating systems.
- Create worksheets, charts, documents, inserting tables and pictures and presentation package.
- Use photographs and document editing software.

ENVS 403L Environment Lab – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After the completion of this course, students will be able to:

- Conduct soil sample analysis.
- Conduct water sample analysis.
- Use MS office Package, CorelDraw, Internet services.
- Create and interpret geospatial data.

Second Semester

ENVS 401 Applications of Remote Sensing for Natural Resource Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Use geographical and spatial databases pertaining to land use land cover.

- Perform interactive geospatial analysis, display and interpret results.
- Assess the biophysical and social applications of remote sensing.
- Develop skills to access and plot geospatial data for natural resource management.

ENVS 502 Biodiversity and Conservation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Explain importance of biological diversity.
- Describe major threats to biodiversity.
- Recognize and implement the various methods of biodiversity conservation with co-existence of various environmental pressures.
- Identify different geographical biodiversity hotspots and mega-diversity centers.

ENVS 406 Environmental Legislation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Explain fundamental concepts in environmental law and policy.
- Describe the main Environmental Law and Policy regime of the country.
- Outline various international environmental laws in incorporated into environmental policies of national and state governments.
- Examine and analyse legal approaches to pollution control, environmental planning and natural resource management.

- Examine implementation issues associated with environmental regulation and environmental regimes

ENVS 414 Environmental Statistics and Research Methodology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Apply statistical tools to perform data analysis and data interpretation.
- Develop problem formulation using multiple statistical relationships and solve them using standard techniques.
- Draw conclusions from the use of tables, graphs, and charts.
- Have the versatility to work effectively in a broad range of analytic and scientific positions.

ENVS 415 Environmental Toxicology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Recognize dangerous toxic compounds and what properties make them toxic.
- Discuss the toxicological concepts of different toxic substances.
- Predict the transport and fate of toxicants in environment.
- Assess the effect of toxic substances on the environment health.

ENVS 413L Environment Lab-II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

After the completion of this course, students will be able to:

- Perform water quality analysis.
- Perform biochemical analysis of plant samples.
- Access and plot geospatial data for environmental modeling.
- Demonstrate applications of remote sensing in natural resource management.

Third Semester

ENVS 501 Air Pollution Monitoring, Control Technology and Management

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe various air pollutants and their sources.
- Describe the consequences on human health.
- Predict the control measures of air pollutant depending upon source and type.
- Illustrate stack sampling and mitigation strategies of SOx and NOx

ENVS 510 Solid Waste Management

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe solid waste generation, composition and characterization.
- Describe waste recycling, 3R technology and fly ash management.
- Outline the landfill design.
- Discuss monitoring and control of radiation pollution.

ENVS 511 Water Pollution Monitoring, Control Technology and Management

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe water pollution and water resource management
- Describe waste water sampling method
- Illustrate characterization of waste water.
- Distinguish primary, secondary and tertiary waste water treatment methods.

ENVS 514L Environment Lab-III

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

After the completion of this course, students will be able to:

- Illustrate physical and chemical characterization of waste.
- Illustrate the process of vermiculture.

- Enlist major steps of Environmental Impact Assessment (EIA) process.
- Determine sound level from various sources.

Fourth Semester

ENVS 516P Project

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After completion of this course students should be able to:

- Demonstrate competence for independent work in the field of Environmental Science and Technology.
- Develop competency in, collection, classification, interpretation
- Develop skills to analysis the collected data.
- Handle the complex tasks of lab experiments including project report writing.

Discipline Electives

ENVS 503 Biotechnology Application to Environmental Science

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe heavy metal pollution and outline control measure of global warming.
- Describe ozone depletion, acid rain and nuclear accidents
- Describe biosensor development to monitor pollution.
- Explain the management of sludge and biodegradation of hydrocarbons.

ENVS 504 Disaster Management and Mitigation Strategies

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Explain natural and manmade disaster and associated socio economic impact.
- Discuss key concepts, definitions and perspectives of disaster Management
- Describe the Disaster Management Cycle.
- Describe planning for hazard mitigation.

ENVS 505 Energy Auditing and Conservation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe Energy audits for building.
- Describe energy conservation measures.
- Explain energy efficient lighting technologies and its application in commercial and residential sectors.
- Describe Energy storage technologies and Energy Auditing.

ENVS 507 Environmental Health Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Explain the concept of environmental health.
- Identify different environmental factors that affect health.

- Discuss the preventive and protection measures for various water borne diseases.
- Describe the seasonal changes and protection measures for various air borne bio-allergen.

ENVS 508 Environmental Impact Assessment and Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe Scope of Environmental Impact Assessment and its Objectives.
- Describe various approaches for various environmental impact studies
- Illustrate various steps of Environmental Impact Assessment and its methodologies.
- Construct Environmental Impact Assessment plan for Industrial projects

ENVS 407 Environmental Physics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- Apply the concepts and laws of physics that govern the environment.
- Measure different environmental parameters.
- Describe applications of laser and detection of environmental pollutants by laser absorption.

- Describe LiDAR technique and its applications.

Reading Electives

ENVS 512R Agroforestry

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe agroforestry and agroforestry interventions.
- Assess the role of Agroforestry as a sustainable land-use activity.
- Describe Nutrient cycling and role of agroforestry in soil and water conservation
- Describe various energy plantation methods.

ENVS 513R Energy Resources and Conservation

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the non-conventional sources of energy.
- Explain concepts on energy utilization and conservation.
- Emphasize energy conservation strategies in residential, industrial and transportation sector.
- Describe National Energy Policy.

ENVS 515R Man and Environment

Max. Marks : 100	**L**	**T**	**P**	**C**

(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the complex interactions of humans and ecological systems in the natural world.
- Synthesize, and apply a wide range of scientific literature in the ecological and environmental science.
- Interpret a wide range of scientific literature in ecology and environmental science.
- Apply the information in the realms of environmental sciences and sustainability.

ENVS 517R Water and Sustainable Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Classify major causes of exploitation of water resources, particularly in the Indian and Asian context.
- Summarize rainwater harvesting and water conservation measures.
- Describe methods of Irrigation management.
- Describe importance of Wetlands and its conservation

GEOG 513R Environmental Challenges and Disaster Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain approaches to study environmental development and crisis.
- Describe world energy crisis with its causes and suggested measures for improvement.
- Describe several environmental problems their causes, consequences and mitigation.
- Depict the major disasters and their management with the help of case studies.

GEOG 514R India: Socio-Political and Environmental Scenario

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Understand the current issues related with boundaries, water sharing, agricultural disparities, food security in India.
- Describe problems in Agricultural Development.
- Discuss Gender Issues and Women Safety.
- Find the role of non – conventional energy resources for solving energy crisis.

GEOG 515R Rajasthan: Challenges and Prospects

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the major environmental, socio economic problems of Rajasthan.
- Explain desertification, Aravalli development, agriculture and tourism of Rajasthan.
- Analyze existing state and national policies in terms of socio economic conditions.
- Aware society regarding existing policies related to child marriage, Female feticide and other Social problems.

GEOG 517R Transforming India

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Assess the ongoing governmental policies applicable to socio-economic and health sectors.
- Aware society about the injustice caused to Women in terms of Triple Talaq.
- Explain current livelihood struggle in the society and the role of skill development in enhancing quality of life.
- Suggest the measures of improvement in the policies.

GEOL 514R Geo Tourism

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Elucidate the criterion require for designating geotour sites.
- Explore the geological and geographical attributes of the geosites.
- Develop a geo-conservation plan for geotour sites.
- Evaluate the potential of geosites for revenue generation.

GEOL 517R Indian Mineral Deposits, Economics and Mining Ethics

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the distribution of mineral resources in India.
- Evaluate the mineral resources and reserves in Indian and global perspective.
- Familiarize with the concept of mineral legislation and policies.
- Delineate the different environmental issues associated with mining activities.

GEOL 518R Innovation and Entrepreneurship in Earth Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Understand necessary steps to open a new venture.

- Gain an understanding of creating products or services, launching innovative projects and making R&D investments in a start-up context.
- Develop marketing strategies for tools and technical products used in earth sciences.
- Familiarize with the legal concepts and financial planning for a successful new venture.

GEOL 521R Natural Hazards and Disasters

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the key concepts, definitions, perspectives of all hazards and management.
- Describe prevention and mitigation of natural hazards.
- Depict the preparedness response and recovery management of natural disasters.
- Elucidate the sustainable development methods in disaster mitigation.

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BANASTHALI VIDYAPITH

Master of Science (Geology)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Banasthali Vidyapith is an epitome of tradition and modernity. Vidyapith aims to preserve and inculcate the essential values and ideals of Indian culture. It believes in simple living and high thinking. Our educational ideology is based on the concept of fivefold education focusing on physical, practical, aesthetic, moral and intellectual aspects in order to develop a balanced personality. Geology is one of the disciplines of Earth Sciences that incorporates the scientific aspects of origin, evolution, nature, composition and structure of the Earth. It includes physical chemical and biologically active processes that shape the surface and interior of the Earth.

Geologists are involved in identification of minerals, rock and fossils. They provide systematic approach in understanding of minerals composition and structure. They also emphasizes on occurrence and genesis of rocks, deformational history, geotectonic events within the geological time scale, landforms, fossils and available economic Earth resources.

This Postgraduate curriculum is designed to provide an advanced knowledge in geology, and incorporates the ideas transfer from other sciences to geological problems. The Course provides hands on experience in practical knowledge from laboratory works and fieldwork as required for industry and academia. The curriculum promotes research projects from specialized area of geosciences and provides essential competencies to analyze and synthesize geosciences related problems.

The main objectives of the M.Sc. Geology program are:

- To promote advanced study and original research in one or more areas of Geology, Geophysics, Hydrogeology and Engineering Geology.
- To produce technically qualified, well-rounded geologist trainee for mining, engineering, ground water and petroleum, with the potential to become leaders of industry, enterprises, and state institutions.

- To become licensed Professional Geologists for new startups with in India and abroad.
- To recognize public issues related to geological hazard and be ready and able to contribute to their resolution for society.
- To develop a basic understanding of energy resources and their formation, availability and exploration techniques.
- To acquire information about modern analytical and exploration techniques.
- To inculcate effective skills for presentation of data, models, hypothesis, communication and management skills; required for professional development in the sphere of academic, research and job perspective.

Programme Outcomes (PO)

PO1: **Geology Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the Earth Sciences' profession, including public sector and private sector, viz. mining industries; civil engineering department, petroleum Industries, and groundwater departments.

PO2: **Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, during field training based studies, which is an integral part of the program designed to consolidate the students understanding by applying classroom-taught concepts in the field.

PO3: **Problem Analysis**: Utilize the principles of scientific inquiry, thinking analytically, clearly and critically, while solving problems and making a decision during real-time geo-research problems.

PO4: **Modern Tool Usage**: Learn, select, and apply appropriate methods and procedures, resources, and modern geo-research-related analytical and computing tools.

PO5: **Leadership Skills**: Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfillment of geological practice (including civil engineering mega-structure construction, mining activity related to geo-recourse exploitation), professional and societal responsibilities.

PO6: **Professional Identity**: Understand, analyze and communicate the value of their professional roles in society as Geoscientists in public sector as well as in private sectors to search new reserves, evaluate its economic viability and find out judicious techniques to extract it.

PO7: **Geological Ethics**: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate the highest standards of integrity, morality, professional conscience, and moral responsibility while making decisions.

PO8: **Communication**: Acquire necessary competence in both oral written communication required to convey the results, advice, and recommendations from geological investigations to a variety of end users (e.g., policymakers, the stake holders, the public, and the media).

PO9: **The Geologists and Society**: Understand the role of Geology in service of the society of an instrumental view of nature contributing to its exploitation, and helping providing the raw materials needed for economic development, frequently with high ecological impacts.

PO10: **Environment and Sustainability**: Understand and apply information related to environmental geology and geo resource conservation in issues of environmental contexts and sustainable development.

PO11: **The Geology and Economics**: Geology plays an essential role in many areas of the economy. Economic growth and sustainability, as well as societal well-being, requires reliable supplies of energy and mineral resources, the supply of clean water and the secure and sustainable production of food. All this will be contingent on sustained investment in technology, infrastructure, education, and skills development.

PO12: **Life- Long Learning**: Acquire lifelong learning with the aim of improving knowledge, skills, and competencies within a personal, civic, social and/or employment-related perspective.

First Semester

GEOL 411 Geochemistry and Isotope Geology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the composition of the Earth and processes by which the chemical elements have been synthesized over the history of the cosmos.
- Explain the origin and geochemical evolution of atmosphere, biosphere, hydrosphere and major global geochemical cycles.
- Describe the major principles and methods involved in geochemical prospecting.
- Explain the structure of atomic nuclei, its effects on nuclear stability, fractionation of stable isotopes, radiogenic isotopes geochemistry and their application in dating and palaeoclimate reconstruction.

GEOL 414 Geomorphology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain erosion and deposition features formed due to various geomorphic process
- Delineate various climatic conditions that helps to modify the landforms.

- Describe the application of geomorphology in multidiscipline such as civil engineering, hydrology.
- Explain the interaction between climate, tectonics and sea level interaction in fluvial environment.

GEOL 416 Geotectonics and Structural Geology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Recognize and interpret the geological structure of deformed continental regimes, from mildly deformed upper crustal regimes to complexly deformed deeper crustal regimes.
- Interpret the relative timing of formation of structures, the kinematics of deformation, and the progressive deformation histories in these regimes.
- Interpret stress regimes strain rate and fluid pressure histories during continental deformation.
- Apply the information of structural geology in the mining and resource exploration environment.

GEOL 419 Mineralogy and Analytical Techniques

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the crystal structure, physical and optical properties of minerals.

- Demonstrate the relationship between the internal structure of minerals with their external form and effect on physical properties.
- Explain the mineralogical concepts of polymorphism, solid solution, exsolution and twinning.
- Discuss the various analytical technique used for identification and detection of minerals and rocks.

GEOL 421 Sedimentary Petrology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the principles of sedimentary petrology, the characteristics and the origin of the sedimentary rocks.
- Explain formation of sediments, transportation, deposition and formation of sedimentary rocks.
- Depict the classification of sedimentary basins with reference to plate tectonics and sedimentation.
- Identify the provenance for the sediments.

GEOL 412L Geology Lab-I with Field Work

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After the completion of this course, students should be able to:

- Interpret the toposheets for civil engineering purposes.

- Interpret the geological history of the given area supplemented with structural data in geological maps.
- Make systematic descriptions of minerals in hand-specimen & thin-section and elaborate the laboratory methods for preparation of mineral or rock sections.
- Determine the average slope angle and river morphometry.
- Describe the petrography of common sedimentary rocks both at macroscopic and microscopic level.
- Analyze and interpret geochemistry of common sedimentary rocks using various plots and graphs.

Second Semester

GEOL 415 Geophysics and Exploration Method

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Develop integrated overview of exploration methods and the physics of waves, focusing on seismic reflection and refraction.
- Explain the principal theories and specialized techniques used in land and marine survey.
- Detect economically viable deposits such as ore minerals, fossil fuels and reservoirs.
- Work in academic, research and industries related with geophysical exploration.

GEOL 417 Igneous Petrology

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the various physical and chemical processes forming igneous rocks.
- Describe and apply phase equilibria principles to common igneous rock.
- Describe the various geochemical indices for mineralogical and petrological evolution of igneous rocks.
- Describe the petrography and petrogenesis of important igneous rocks of Indian occurrence.

GEOL 418 Metamorphic Petrology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Identify metamorphic mineral assemblages, texture, structures to decipher the order of crystallization of minerals.
- Describe the metamorphic reaction responsible for metamorphism of rock.
- Recognize pressure-temperature-time (P-T-t) path associated with tectonic setting of metamorphosed rocks.
- Describe composition of the fluid phase in the rock during metamorphism.

GEOL 420 Ore Genesis and Economic Geology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the minerals that can be used for economic and/or industrial purposes.
- Identify and describe the precious and base metals, nonmetallic minerals and building stone.
- Explain the ore formation processes and its geological setting.
- Estimate the resource and reserves availability.

GEOL 422 Stratigraphy

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain rock successions and their interpretation in terms of geological time scale.
- Elaborate its application in petroleum geology and archaeology.
- Identify various sedimentary basins of India.
- Explain the straigraphic boundary problems in India.

GEOL 413L Geology Lab-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the petrography of common igneous and metamorphic rocks both at macroscopic and microscopic level.
- Interpret the gravity, bore-hole and seismic data used in exploration geophysics.
- Analyze and interpret geochemistry of common igneous and metamorphic rocks using various plots and graphs.
- Identify different rock types in various stratigraphic horizons of India.
- Develop a systematic procedure for megascopic identification and description of economic fuel minerals their origin, mode of occurrence and utilization.
- Prepare map showing distribution of metallic, non-metallic, fuel and Industrial mineral in India.

Third Semester

GEOL 516 Hydrogeology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the distribution and movement of groundwater in the soil and rocks of the Earth’s crust.
- Describe hydrological cycle and related parameters.

- Determine the physical and chemical parameters to assess groundwater quality.
- Evaluate the major geological factors controlling groundwater exploration.

GEOL 522 Palaeontology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the characteristics and preservation of fossils.
- Explain the evolution of life and their environment forms from fossil records.
- Explain the morphology of microfossils and their application in determining palaeoclimate, sea level change.
- Elucidate the geology of oil and gas reservoirs and their location.

GEOL 523 Remote Sensing and GIS in Geology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the principles of platforms and sensor characteristics, satellite orbits and data characteristics.
- Elucidate principles and applications of advance techniques including multispectral, hyperspectral, thermal-infrared, microwave remote sensing.
- Describe the concepts and components of GIS and GPS.
- Describe the applications of Geographical Information System in various fields of geology.

GEOL 515L Geology Lab-III with Field Work

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the morphological characters of invertebrates and vertebrate fossils.
- Identify microfossils and their separation from matrix through microscope.
- Assessment of water quality and determination of aquifer properties.
- Process and analyze remote sensing data.

Fourth Semester

GEOL 511D Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**48**	**24**

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe the recent development and advanced techniques in geology leading to practical implementation to solve complex research problems.
- Interact and work in academic, research and industrial environment.
- Use different interpretation skills and data processing techniques to solve real time research problems.
- Synthesize the outcomes in form of written manuscripts.'

Discipline Electives

GEOL 512 Environmental Geology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the application of geologic information to the entire spectrum of interactions between people and physical environment.
- Describe and mitigate the exposure of natural hazards on humans.
- Elucidate several types of pollutions and their sources.
- Explain the vulnerability of natural hazards.

GEOL 519 Marine Geology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students will be able to:

- To introduce various aspects of marine geology including physical, chemical, biological, geological in particular and concepts of Palaeoceanography.
- Interpret the sedimentary process leading to deposition of sediments found in different water depths and marine settings.
- Explain the major ocean driving forces and significance of sea-level changes in the geological record.
- Recognize the role of proxy indicators for paleo oceanographic interpretation.

GEOL 520 Mining and Engineering Geology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students should be able to:

- Recognize geochemical, geological, geophysical sampling method to locate ore bodies.
- Describe the suitable mining methods and time-plan to carry out mining activity on different sites.
- Explain the methods of ore processing and beneficiation.
- Consider the geological factors controlling the site selection for civil engineering projects.

GEOL 513 Fuel Geology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Explore coal deposits, their mode of occurrences, structures in coal seams and application of coal petrography.
- Describe the geology of petroleum reservoirs, prospective and their exploration techniques.
- Describe the source of radioactive minerals, chemistry, prospects and exploration techniques.
- Provide feasible solutions for radioactive waste management.

Reading Electives

ENVS 512R Agroforestry

Max. Marks : 100	L	T	P	C

(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe agroforestry and agroforestry interventions.
- Assess the role of Agroforestry as a sustainable land-use activity.
- Describe Nutrient cycling and role of agroforestry in soil and water conservation
- Describe various energy plantation methods.

ENVS 513R Energy Resources and Conservation

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the non-conventional sources of energy.
- Explain concepts on energy utilization and conservation.
- Emphasize energy conservation strategies in residential, industrial and transportation sector.
- Describe National Energy Policy.

ENVS 515R Man and Environment

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the complex interactions of humans and ecological systems in the natural world.

- Synthesize, and apply a wide range of scientific literature in the ecological and environmental science.
- Interpret a wide range of scientific literature in ecology and environmental science.
- Apply the information in the realms of environmental sciences and sustainability.

ENVS 517R Water and Sustainable Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Classify major causes of exploitation of water resources, particularly in the Indian and Asian context.
- Summarize rainwater harvesting and water conservation measures.
- Describe methods of Irrigation management.
- Describe importance of Wetlands and its conservation

GEOG 513R Environmental Challenges and Disaster Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain approaches to study environmental development and crisis.
- Describe world energy crisis with its causes and suggested measures for improvement.
- Describe several environmental problems their causes, consequences and mitigation.

- Depict the major disasters and their management with the help of case studies.

GEOG 514R India: Socio-Political and Environmental Scenario

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Understand the current issues related with boundaries, water sharing, agricultural disparities, food security in India.
- Describe problems in Agricultural Development.
- Discuss Gender Issues and Women Safety.
- Find the role of non – conventional energy resources for solving energy crisis.

GEOG 515R Rajasthan: Challenges and Prospects

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe the major environmental, socio economic problems of Rajasthan.
- Explain desertification, Aravalli development, agriculture and tourism of Rajasthan.
- Analyze existing state and national policies in terms of socio economic conditions.
- Aware society regarding existing policies related to child marriage, Female feticide and other Social problems.

GEOG 517R Transforming India

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Assess the ongoing governmental policies applicable to socio-economic and health sectors.
- Aware society about the injustice caused to women in terms of Triple Talaq.
- Explain current livelihood struggle in the society and the role of skill development in enhancing quality of life.
- Suggest the measures of improvement in the policies.

GEOL 514R Geo Tourism

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Elucidate the criterion require for designating geotour sites.
- Explore the geological and geographical attributes of the geosites.
- Develop a geo-conservation plan for geotour sites.
- Evaluate the potential of geosites for revenue generation.

GEOL 517R Indian Mineral Deposits, Economics and Mining Ethics

Max. Marks : 100 **L T P C**

(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the distribution of mineral resources in India.
- Evaluate the mineral resources and reserves in Indian and global perspective.
- Familiarize with the concept of mineral legislation and policies.
- Delineate the different environmental issues associated with mining activities.

GEOL 518R Innovation and Entrepreneurship in Earth Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Understand necessary steps to open a new venture.
- Gain an understanding of creating products or services, launching innovative projects and making R&D investments in a start-up context.
- Develop marketing strategies for tools and technical products used in earth sciences.
- Familiarize with the legal concepts and financial planning for a successful new venture.

GEOL 521R Natural Hazards and Disasters

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain the key concepts, definitions, perspectives of all hazards and management.
- Describe prevention and mitigation of natural hazards.
- Depict the preparedness response and recovery management of natural disasters.
- Elucidate the sustainable development methods in disaster mitigation.

BANASTHALI VIDYAPITH

Master of Science (Home Science - Human Development)
Master of Science (Home Science-Food Science and Nutrition)
Master of Science (Home Science - Clothing and Textile)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

HOME SCIENCE PROGRAMME

The quality of life of society and the family determines positive functioning. Home Science has a vital role to play in increasing the capacity of the family and the community. At Banasthali Vidyapith, the faculty of Home Science strives to work dedicatedly towards women's empowerment through socially-relevant, holistic, interdisciplinary education, in keeping with its unique philosophy of Panchmukhi Shiksha (Five fold education). Home Science curriculum is offered in a composite form as per the development trends incorporating multi-disciplinary skills, linking the general studies with professional courses integrating theory and practice, and flexibility to the credit based system to meet the challenges in Indian ethos and global context. The curriculum is continually innovated to make it globally valuable, locally relevant and responsive to the changing times and needs. The course sensitizes students to the needs of others, especially of those less advantaged, and fosters a service orientation. The faculty also aims to contribute to the national and international knowledge base in Home Science and allied fields. Due emphasis has always been given to the skill development and enhancement in the students.

The degrees offered by the faculty include B.Sc. (Home Science) and M.Sc. (Home Science) in Food Science and Nutrition, Human Development and Clothing and Textile. PhD is awarded in all the five branches of Home Science. Home Science is also offered as a subject in B. A. programme.

Program Educational objectives

Objectives of the Home Science programme are

- To acquaint students with interdisciplinary nature of Home Science as an integrated body of knowledge, all interwoven to enhance the quality of life, and multidisciplinary nature of subjects dealing with art and science of living
- To provide education through integrated approach of combining theory, practical, and field work emphasizing gender neutral, family focus , region specific and career perspective
- To prepare students to become actively involved in local and regional professional service activities which allow continuous initiative for empowering the individual, family and community

- To inculcate scientific thinking to undertake research projects of national and international recognition and publish multidisciplinary papers

Programme Outcomes

- **PO1 Knowledge** – Have knowledge and holistic understanding of the core courses related to Home Science including Human Development, Foods and Nutrition, Clothing and Textile, Human Management, Extension Education and Communication; and basic courses associated with discipline of Home Science, including Social Sciences, Biological sciences, Physical sciences, Technology and Management.
- **PO2 Planning Abilities**- Apply skills in designing, implementing, monitoring and evaluating programmes effectively for individuals, family, community, and for vulnerable groups of society.
- **PO3 Problem Analysis**- Solve problems concerning home, family, and society for ensured physical and mental health in the changing socio-economic scenario viz. dietary problems, behavioral problems, clothing problems, social problems by applying scientific methods; through critical thinking, assessing, analyzing, finding appropriate solutions and taking decisions
- **PO4 Modern Tool Usage**- Ability to select and use appropriate methods and procedures; tools and equipments; raw materials and other resources for knowledge, skill enhancement, designing and creation of new products, assessment and evaluation
- **PO5 Leadership Skills**- Apply leadership skills; inspiring, taking responsibility, delegating tasks while working in a team, communicating with other teams, providing guidance to lesser skilled in various settings be it family, industry or institutions or carrying out research projects
- **PO6 Professional Identity**- Take various professional roles in industries, govt./non-govt. organizations, institutes as educators, entrepreneurs, counselors, social workers, consultants, designers, researchers and exhibit competencies & skills

- **PO7 Ethics**- Apply ethical practices while data collection, and conducting experiments; involving human beings as well as animals, delivering professional responsibilities
- **PO8 Communication**- Use soft skills for clear, accurate, unambiguous effective communication using verbal and non-verbal skills at inter / intra personal and professional level
- **PO9 Home Science and Society**- Apply knowledge and competencies developed as graduates to impart knowledge, identify, analyze and address family and societal issues to improve quality of life of individual, family and society as a whole, also covering marginalized and vulnerable groups of society.
- **PO10 Environment and Sustainability**- Critically evaluate impact of household and industrial practices on environment. Appreciate use of sustainable practices for improved physical, emotional, social, psychological environment at micro/macro level
- **PO11 Life-Long Learning–** Ability to reason out, learn and improve oneself in the changing dynamic scenario by strengthening the strength and weakening of weaknesses for sustainable developmental needs, technological changes, career requirements and new avenues.
- **PO12 Project**- Provide opportunity to students to get acquainted with innovative projects and develop skills to plan and undertake intervention projects.

Program specific Outcomes:

M.Sc. (Home Science) Human Development

Focus on developing knowledge and competence for:

- Teaching and research in academic and other institutions
- Planning and conducting intervention, guidance and advocacy for empowerment of families and communities
- Supervisory, training and consultancy roles and responsibilities in government and non-government agencies/institutions
- Entrepreneurship in specific areas of human development
- Orientation to the socio-cultural and economic environment for planning, monitoring and evaluation of various programmes for children and families
- Advocacy and policy related roles

M.Sc. (Home Science) Food Science and Nutrition

Focus on developing knowledge and competence for:

- Academic and research institutions
- Prepare professional to work with government and non-government organization, hospitals, food service institutes and industry in various capacity
- Planning, Mentoring and evaluation of nutrition and health programmes training and IEC activities of regional and national programmes
- Ensuring food safety and quality for consumers
- Advocacy, consultancy and entrepreneurial ventures

M.Sc. (Home Science) Clothing and textile

Focus on developing knowledge and competence for:

- Related area of educational, commercial and research establishments
- Selection and design of fabrics, apparel and accessories for commercial marketing
- Entrepreneurial management in textiles and clothing enterprises/ industry
- Enhance self employment through entrepreneurial skill training
- Intensive and extensive theoretical and experiential learning and training in fusion of traditional and modern

Human Development

First Semester

CS 422 Introduction to Computers

CS 422L Introduction to Computers Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Demonstrate knowledge of the computer system
- Have ability to define operating system and Network applications
- Have an understanding of the proper contents of a computer system and these software tools like MS- WORD, MS-EXCEL, MS-PowerPoint and CorelDraw/Adobe Illustrator
- Understand different types of images and their format

HSC 403 Advanced Study in Human Development: Conception to Childhood

HSC 403L Advanced Study in Human Development: Conception to Childhood Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Gain knowledge of various aspects and concerns of development with special focus from conception to middle childhood stages
- Get insight into contemporary issues related to these stages
- State various customs and ceremonies in Indian communities related to prenatal, birth and infant care

- Analyze and effectively deal with developmental and adjustment issues from conception to childhood stages

HSC 418 Research Methods in Human Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the significance of research methodology in human development
- Distinguish between different types of tools and methods of research
- Analyze a research problem and design research proposals and prepare research report

HSC 424 Techniques of Studying Human Development and Scientific Writing

HSC 424L Techniques of Studying Human Development and Scientific Writing Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Appraise various methods and techniques of studying and researching in human development
- Prepare, implement and evaluate tools appropriate in context of the Human Development discipline
- Write correct in text citations and complete references in approved style(s)
- Communicate effectively with a range of audiences
- Get proficiency in scientific writing for different types of publication

HSC 427 Theories of Human Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe a theory, need for theory, different perspectives and approaches
- Equipped with knowledge regarding general issues of different theories and their classification
- Design practical applications of different theories
- Critically analyze theories in relation to various aspects of human development

Second Semester

HSC 401 Adolescence and Youth

HSC 401L Adolescence and Youth Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain different developmental aspects and characteristic features of adolescence
- Get better insight into the specific issues, concerns and problems of adolescents
- Plan and design effective programs to help youths in difficult circumstances

HSC 406 Contemporary Issues and Concerns in Human Development

HSC 406L Contemporary Issues and Concerns in Human Development Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the current trends, issues related to various aspects of human development
- Interpret the research trends related to various issues and aspects of human development
- Identify and reason out contemporary burning issues affecting family
- Summarize the role of advocacy in promoting issues and concerns related to human development

HSC 407 Early Childhood Care and Education

HSC 407L Early Childhood Care and Education Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe historical development, aims and principles of early childhood care and education
- Discuss social issues and need for involvement of parents in ECCE
- Identify types of services available related to early childhood care and education in other countries and in India
- Plan programmes, design materials and activities for normal as well as special need early childhood children
- Implement programmes in mock situations and evaluate them

HSC 420 Social Psychology

HSC 420L Social Psychology Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand basics of social psychology and their applications
- Identify powerful sources that influence behaviors of human beings in social situations
- Analyze, design and implement programmes and services with reference to psycho social aspect of human development
- Plan group discussions on various social issue of human behavior

HSC 423 Statistical Methods in Human Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Discuss the significance of statistics in the discipline of Human Development
- Describe basic concepts of statistical inferences and test of significance
- Apply the appropriate statistical technique for analysis and interpretation of data

HSC 428P Work Experience/Internship

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**4**	**2**

Third Semester

HSC 502 Adulthood and Ageing

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand developmental changes during adulthood and old age
- Demonstrate different aspects of development and adjustments with reference to adulthood and old age
- Examine the principles and influencing factors of development with specific focus on adulthood and old age
- Evaluate the status of adults and elderly in contemporary society

HSC 508 Child in the Family

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes

On successful completion of the course students will be able to:**:**

- Understand family as component of social cultural milieu and context
- Deal the sensitive issues and crisis situations of family
- Understand human rights and duties
- Play significant and appropriate role in family and social context

HSC 520 Introduction to Guidance and Counseling

HSC 520L Introduction to Guidance and Counseling Lab

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain core idea behind guidance and counseling and new emerging areas

- Assess guidance needs of different groups of people using suitable tools
- Plan, implement and evaluate guidance services and programmes
- Collect information about recent researches in field of guidance and counseling
- Explore the vocational opportunities in the field of guidance and counseling

Discipline Electives

HSC 554 Persons with Special Needs

HSC 554L Persons with Special Needs Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Identify special need persons and assess their problem
- Identify and classify the needs of special persons
- Differentiate causes, effect and special services required for each category
- Evaluate programmes, policies, and institutions of special need persons

HSC 511 Curriculum for Early Years

HSC 511L Curriculum for Early Years Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Realize the importance of early years and why childhood matters
- Prepare strong plan of action to facilitate different developmental aspects of early years; physical, motor, language, cognitive, social, emotional and moral
- Plan and prepare models and teaching aids for early year teaching

HSC 549 Media Planning and Social Marketing

HSC 549L Media Planning and Social Marketing Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand various mass media and their role in national development
- Write script for different media
- Define social marketing and understand the concepts of behaviour change for social good
- Apply the basic and advanced techniques for development of social marketing strategies
- Develop price, promotion and place strategies for a chosen social marketing issue
- Understand how to effectively manage the implementation and evaluation of social marketing projects

HSC 555 Planning for Innovative Project and Management

HSC 555L Planning for Innovative Project and Management Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand the need and feasibility of innovative programmes and projects
- Identify the areas of innovative projects
- Utilize the resources available for programme planning
- Monitor and evaluate projects to ensure the quality

Fourth Semester

HSC 501 Abnormal Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Familiarized with various concepts and areas of abnormal psychology
- Able to explain various approaches and therapeutic measures of dealing with abnormal behaviors
- Skilled to deal with different disorders and abnormalities

HSC 525 Parent and Community Education

HSC 525L Parent and Community Education Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Appreciate the importance of parent and community involvement for overall development of children
- Apply effective methods and techniques for parent and community involvement
- Develop appropriate skills to work with parents and the community
- Plan programmes of parent education and community mobilization

Specialization I : Guidance and Counseling

HSC 517 Guidance and Coping in Crisis

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe general nature of crisis situation, common reactions and consequences of traumatic events
- Classify different problems behavior and difficult circumstances
- Analyze causes and effect of different problems behavior
- Explore best counseling strategies for different problem behavior

HSC 527 Principles and Procedures in Guidance and Counseling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Get an insight into major theories in the field of guidance and counseling, process involved in different counseling approaches and their application
- Apply learned knowledge and skills to plan different therapies required to enhance the quality of life

HSC 537L Practicing Guidance and Counseling Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- An ability to analyze a problem, and to identify and define the counseling requirements appropriate to its solution
- An ability to design implement and evaluate counseling solution to meet given set of behavioral problems
- An ability to deal with range of clients and communicate effectively
- An ability to apply theories in the design, reason about, explain and implementation of counseling programmes

Specialization II : Early Childhood Education

HSC 513 ECE Centers Organization, Administration and Management

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Gain knowledge for planning, organizing and managing different ECE centers
- Describe the roles and responsibilities of in charge of ECE center
- Classify different ECE centers on the basis of administrative and managerial strategies
- Learn organizational and administration skills for managing ECE centers
- Get insight into problems and issues of legal and ethical nature

HSC 518 Innovative Programmes and Curriculum Planning for ECE Centers

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Discuss the context of innovative approaches towards ECCE centers
- Analyze the innovative approaches towards ECCE programmes in international, national and regional context
- Apply the innovative techniques in ECE Classrooms

HSC 536L Management and Innovations in Early Childhood Education Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcomes:

- Plan, implement, supervise, participate, monitor and evaluate different ECCE programmes
- Acquire skills for organization and management of ECE centers
- Design ECE center lay outs for varied groups
- Plan, set up and develop their own ECE center

Food Science and Nutrition

First Semester

HSC 402 Advanced Food Science

HSC 402L Advanced Food Science Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Apply and incorporate the principles of Food Science in practical, real-world situations and problems
- Explain the basic principles of sensory analysis and other analytical techniques associated with food
- impart awareness on the concept of 'new food product development' and current topics of importance to the Food industry
- Apply the various techniques in the quality evaluation of foods and demonstrate practical proficiency in a food analysis laboratory

HSC 413 Human Physiology

HSC 413L Human Physiology Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe the anatomy and physiology of various organs to understand the integrated functioning of all systems in human body

- Relate the dysfunction of organ and occurrence of disease in relation to different internal and external physiological, pathological and environmental conditions
- Analyze blood and urine samples for various parameters

HSC 417 Research Methods in Food Science and Nutrition

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the significance of research methodology in Food Science and Nutrition
- Distinguish between different types of tools and methods of research
- Analyze a research problem and design research proposals and prepare research report

HSC 419 Scientific Writing and Nutrition Communication

HSC 419L Scientific Writing and Nutrition Communication Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand the structure of various scientific documents
- Write correct in text citations and complete references in approved style(s)
- Comprehend the barriers that lead to ineffective communication
- Apply their minds to come up with the optimal combination of media for nutrition related behaviour change
- Conceive and write short radio programmes, newspaper articles on nutrition

Second Semester

HSC 405 Biochemistry - I : Biomolecules and Energetics

HSC 405L Biochemistry - I : Biomolecules and Energetics Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the biochemical basis of not only macro and micro nutrients but also of the various body processes like digestion, gaseous transport, muscle contraction and the like
- Explain the biochemical basis of food energy production and energy transfer in human beings
- Understand process of detoxication of harmful foreign and endogenous substances by the body tissues
- Carry out biochemical estimations in food composition, analysis and nutritional assessment
- Standardize methods for different estimations

HSC 409 Food Microbiology

HSC 409L Food Microbiology Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Identify the important pathogens and spoilage microorganisms in foods and the conditions under which they grow
- Utilize laboratory techniques to identify microorganisms in food
- Describe role and significance of microbial inactivation, adaptation and environmental factors on growth and response of microorganisms in various environments

- Identify the conditions under which the important pathogens and spoilage microorganisms are commonly inactivated, killed or made harmless in foods
- Recognize the elements of the Hazard Analysis Critical Control Point (HACCP) system
- Define "food borne disease outbreak", and design a good food borne disease surveillance program

HSC 414 Nutritional Epidemiology Paediatric and Geriatric Nutrition

HSC 414L Nutritional Epidemiology Paediatric and Geriatric Nutrition Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- get acquainted with elements of descriptive nutritional epidemiology and its importance in community and public health/ nutrition research
- provide lactational counselling
- suggest feeding solutions to pre term and low birth weight infants
- become ambassadors for exclusive breastfeeding and timely weaning
- prescribe preventive health and therapeutic diets to the elderly

HSC 415 Problems in Human Nutrition

HSC 429L Problems in Human Nutrition Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Differentiate the nutritional deficiency diseases on the basis of clinical symptoms
- Field survey on biochemical and clinical manifestations, preventive and therapeutic measures of the problems in human nutrition
- Compose various diets with the help of functional foods and nutraceuticals for management of diseases
- Review prevalence of various diseases in Indian scenario

HSC 422 Statistical Methods in Food Science and Nutrition

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Discuss the significance of statistics in the discipline of Food Science and Nutrition
- Describe basic concepts of statistical inferences and test of significance
- Apply the appropriate statistical technique for analysis and interpretation of data

HSC 428P Work Experience/Internship

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Third Semester

HSC 506 Applied and Community Nutrition

HSC 506L Applied and Community Nutrition Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand the applications of nutrition in public health
- Comprehend the determinants of food and nutrition security
- Work and collect data pertaining to nutrition and health in the field situation
- Design strategies to facilitate community participation
- State the strengths and weaknesses of the ongoing nutrition programmes

HSC 547 Institutional Food Administration (IFA) and Country and Continental Cuisines

HSC 547L Institutional Food Administration (IFA) and Country and Continental Cuisines Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe the food service management in different settings
- Estimate the various types of food service in different situations
- Estimate the cost of any meal
- Plan and develop different types of menu for food service establishment

HSC 521 Metabolism and Diagnostic Biochemistry

HSC 521L Metabolism and Diagnostic Biochemistry Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the metabolism of carbohydrate, lipid and protein :the macronutrients present in food along with the role played by vitamins

and minerals : the micronutrients and relationship between human nutrition and metabolism

- Carry assessment of nutritional status of individuals through biochemical indices in quantitative terms
- Carry out biochemical estimations and biochemical basis of diagnosis of certain diseases

Discipline Electives

HSC 505 Advanced Nutrition

HSC 505L Advanced Nutrition Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Apply various methods of estimation of body composition
- estimate protein quality of food stuffs
- estimate nutritional requirements of different groups and make recommendations through life cycle
- conduct laboratory and anthropometric methods of assessment of nutritional status

HSC 544 Food Standards, Safety and Regulations

HSC 544L Food Standards, Safety and Regulations Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand quality standards of raw and processed food
- Understand food packaging law and regulation
- Assess quality of food products

HSC 524 Nutrition in Diseases and Disorders

HSC 524L Nutrition in Diseases and Disorders Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Find out causes, clinical manifestation, preventive and therapeutic measure of disabling diseases, malabsorption syndrome and genetic defects
- explain the role of probiotics, prebiotics, functional and nano food for maintaining health
- Counsel patients to take therapeutic measure and diet modifications

Fourth Semester

HSC 523 Nutrition for Health and Fitness

HSC 523L Nutrition for Health and Fitness Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the components of health and fitness and the role of nutrition
- Explain the role of sports nutrition for the enhancement of performance
- evaluate and make recommendations to maintain the fitness and well being of an individual

HSC 530 Techniques and Instrumentation in Nutrition Research

HSC 530L Techniques and Instrumentation in Nutrition Research Lab

Max. Marks : 100	L	T	P	C

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Familiarized with instruments and techniques used in Food Science and Nutrition Research
- Skilled to analyze macro and micro nutrients of food stuffs with precision and accuracy

Specialization I : Food Processing

HSC 515 Food Processing and Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe the source and variability of raw food material and their impact on food processing operations
- Explain the principles and current practices of processing techniques and the effects of processing parameters on product quality
- Describe the unit operations required to produce a given food product
- Explain the properties and uses of various packaging materials
- Describe the transport processes and the unit operations in food processing as demonstrated both conceptually and in practical laboratory settings

HSC 516 Food Product Development Safety and Quality Control

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Describe the various aspects of product development
- Apply the knowledge of quality assurance in food industries
- Explore sensory and nutritional attributes of new product

HSC 535L Food Processing and Quality Assurance Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Design and develop new food products for human consumption
- Evaluate sensory and nutritional attributes of new product
- Appreciate the effect of processing upon the nutritional properties of foodstuffs

Specialization II :Therapeutic Nutrition

HSC 509 Clinical Nutrition and Dietetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Skilled in the methods of assessment of nutritional status of the patients
- Able to be employed as dietician in hospitals and other health organizations
- Able to conduct the researchers in the field of therapeutic nutrition
- Prepared to work as independent dietician and dietary counselors
- Ready to run therapeutic kitchens and increases their employability in such kitchens

HSC 522 Nutrition and Critical Care

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- understand the nuances of nutrition care process in ICUs
- deeply know the "Medical nutrition therapy" (MNT) for life threatening prevalent diseases and disorders
- use evidence based practice in hospital settings
- Skilled to plan therapeutic diet for different types of diseases

HSC 538L Therapeutic Nutrition Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Learning Outcomes:

On successful completion of the course students will be able to:

- Prepare a safe and nutritious general (house) tube feed for home based patients
- Plan and to prepare therapeutic diet for different types of diseases
- Suggest suitable nutritional supplements for specific health conditions

Clothing and Textile

First Semester

HSC 404 Apparel Pattern Making

HSC 404L Apparel Pattern Making Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Acquire basic skills and knowledge to make paper patterns by different methods
- Develop an understanding of sizing systems and pattern grading techniques used in garment industry
- Create designs for apparels using construction details applying elements of arts and principles of designs
- Produce paper patterns of different designs in different sizes

HSC 411 Historic Costumes

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Learn to identify the causes for origin of clothing with respect of various theories involved.
- Become well acquainted with evolution of different details of costumes in different era and traditional forms of costumes prevailing in various countries and at different parts of same country Develop appreciation of the tradition and heritage of the past clothing.
- Get inspiration from historic silhouettes and designs for the present and future styles of clothing.
- Analyze design sketch, adapt and translate it into product

HSC 416 Research Methods in Clothing and Textile

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain meaning , importance, types of research and methods of data collection
- Outline research proposal
- Write research report

HSC 425 Textile Chemistry

HSC 425L Textile Chemistry Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain the fundamental principles of polymer science
- Interpret chemistry, production and fundamental properties of natural and man-made fibers
- Explain diverse global community and ecology within their physical, biological and social dimensions
- Make informed judgments on softening of water, desizing, scouring, bleaching and starching of textile substrate

Second Semester

HSC 408 Fashion Business and Communication

HSC 408L Fashion Business and Communication Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Explore dynamics of fashion , its development and role of fashion designers
- Gain understanding of fashion business fashion communication
- Describe managerial aspects of fashion retailing
- Illustrate fashion figures, garment details, accessories and theme rendering
- Develop fashion line using elements of art and design

HSC 410 Garment Production Technology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain functions of different sections of garment production unit
- Define and explain the principles and methods of making and joining various garment parts
- Extend and expand ideas about materials and technologies available for apparel industry so as to further develop their creativity and critical thinking
- Examine and evaluate the quality of apparels during production

HSC 412 Historic Textiles

HSC 412L Historic Textiles Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Summarize the differences in regional embroideries, resist dyed textiles and handloom weaving of India
- Classify a specific embroidery style; block printed textiles and hand-woven textile of India and other countries on the basis of colors, motifs, patterns and layout
- Describe the influencing factors for the evolution and development of different Indian traditional textiles
- Develop portfolios of designs of different types of traditional textiles
- Prepare embroidery articles

HSC 421 Statistical Methods in Clothing and Textiles

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Gain knowledge and understanding of various statistical methods for analysis and interpretation of qualitative and quantitative data in clothing and textile field
- Critically analyze the rationale used in parametric and non-parametric tests and apply them to draw inferences

HSC 426 Textile Testing
HSC 426L Textile Testing Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain and use methods and techniques to analyze textile fiber, yarn and fabric properties for end use performance
- Use different testing equipments, their underlying principles, the international accepted standards, test methods and the language of measurement
- Analyze the discriminatory selection of textiles for specific end uses

HSC 428P Work Experience/Internship

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Third Semester

HSC 504 Advanced Apparel Designing and Construction
HSC 504L Advanced Apparel Designing and Construction Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Create designs and layout for special fabrics
- Handle different types of fabrics which will improve their sewing skill levels
- Gain knowledge about different aspects of fit and apply them to create correct fit in the garment
- Develop an understanding of quality standards for different components of garment
- Develop patterns for complex designs and tailored garments and, construct them

HSC 512 Dyeing and Printing

HSC 512L Dyeing and Printing Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Thoroughly comprehend the theories of dyeing, the laws of dyeing kinetics, the manufacturing principles of dyeing machinery and the preparation ofvarious classes of dyes
- Apply procedures and control of production, analyze structures, processes and techniques for optimization and quality assurance of dyeing
- Describe the different methods of printing styles and machines used at industrial level.
- Evaluate the technical advantages of each style of printing
- Use the technical competency in dyeing and printing with different dyes on different fabrics
- Find many research possibilities by getting in-depth technical knowledge of dyeing and printing practices at industrial level

HSC 529 Technical Textiles and Textile Ecology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand meaning, classification and application of technical textiles
- Explain effect of industrial pollution on health and environment
- Know red listed chemicals, allergic dyes, carcinogenic amines and harmful dyes
- Describe eco parameters and eco friendly textiles
- Understand treatment and disposal of textiles effluent and dyes

HSC 532 Textile Merchandising

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Critically analyze the multifaceted profile of textile industry of India
- Learn how to market and sell their own textile products
- Understand the types of retail environments and merchandising strategies
- Pursue themselves in the field of retail management in boutiques, importers, designers and manufacturers as fashion advertising agents, store managers, fashion product developers, fashion retailers, window dressers, and fashion promotion specialists

Discipline Electives

HSC 514 Fabric Manufacture

HSC 514L Fabric Manufacture Lab

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain and create basic weaves on handloom
- Interpret methods of developing fabric using fibre, yarn and different fabric making techniques.
- Analyze the discriminatory selection of textiles for specific end uses.
- Create new research ideas and free, creative, inductive thinking

HSC 558 Textile auxilliaries and their application

HSC 558L Textile Auxilliaries and Their Application Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand various textiles auxiliaries used in textile processing and finishing with eco-friendly auxiliaries

HSC 531 Textile Finishes

HSC 531L Textile Finishes Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- Know importance and objectives of textile finishes
- Understand various finishes for different fabrics
- Classify synthetic resins and understand their chemical structure and application
- Discriminate microscopic structure and determination of gelatinization temperature of different starches
- Understand and apply special purpose finishes

- Determine crease recovery, stiffness of fabrics treated with different finishes

HSC 548 Knitting Technology

HSC 548L Knitting Technology Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to:

- gain experience in hand knitting and machine knitting
- have knowledge about Indian knitting industry
- understand the various knitting structure

Fourth Semester

HSC 507 CAD in Textile and Garment Designing

HSC 507L CAD in Textile and Garment Designing Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Make use of computer technologies in garment and textile designing
- Utilize each aspect of ‘Computer Added Designing’ (CAD) thoroughly
- Apply appropriate CAD systems in ‘fashion designing units’
- Understand the use of CAD in different sections of textile industry, especially in the field of fashion designing, textile merchandising, textile designing and pattern making

HSC 510 Commercial Clothing

HSC 510L Commercial Clothing Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to:

- Gain an understanding of process and procedure for establishing an enterprise
- Learn about govt. support and scheme of assistance for entrepreneur
- Acquire knowledge of management skills needed to run an enterprise
- Gain experiential learning to run micro commercial unit

READING ELECTIVES

Pattern: Each course will be of two credits. There will be end semester exam only. These courses will not be alternative to regular course. Every M.Sc.(Home Science) student has to opt for at least two reading electives

HSC 556R Safe and Healthy Environments for Young Children

Total Marks : 100	L	T	P	C
(ESA : 100)	0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to:

- Evaluate strategies for the promotion of good health for families, teachers and children in culturally, linguistically, and developmentally appropriate ways
- Identify health, safety, and environmental risks in children's programs
- Analyze the nutritional needs of children at various ages and evaluate the relationship between healthy development and nutrition

HSC 551R Nanotechnology in Textile

Total Marks : 100	L	T	P	C
(ESA : 100)	0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand application of nano-technology in textile field
- Develop awareness about social, economic, and ethical issues of nanotechnologies

HSC 559R Textile Conservation

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Assess causes of damage of textiles
- Learn different methods of repair and stabilization of textiles

HSC 553R Onconutrition

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

HSC 539R Colour Science and Instrumentation

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Explain scientific aspects of color
- Analyze color formulation, assess color differences, color sorting techniques and color perception
- Describe theory of color measurements in solution and on textiles and the instruments used for color measurement

HSC 546R Inclusive Education

Total Marks : 100	**L**	**T**	**P**	**C**

(ESA : 100) **0 0 0 2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand inclusive education, different national and international Policies and Frameworks, and the concept of diversity and learning strategies to address diverse learners.

HSC 543R Food Biotechnology

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

HSC 542R Ergonomic Applications in Interior Design

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand the importance of Ergonomics in contemporary work setup and design
- Analyse the applications of Ergonomics in improving work and life conditions

HSC 545R Functional Clothing

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Recognize the importance of portable clothing in textile industry
- Develop and design functional clothing for different applications

HSC 540R Content Development and Food Labelling

Total Marks : 100 **L T P C**

(ESA : 100)	**0**	**0**	**0**	**2**

HSC 541R Emerging Technologies for Personalized Nutrition

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

HSC 557R Sports Nutrition

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand the role of ergogenic aids, their dose, safety and efficiency to enhance sports performance.
- Plan diet for sports person

HSC 430R Introduction to Nutrigenomics

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Understand interaction between nutrients and bioactive food components with the genome
- Understand use of nutrigenomics to prevent diseases and improve quality of life
- Create diets specifically designed for individuals or groups of individuals with a genetically identified dietary need or restriction to treat disease

HSC 431R Novel Technologies for Food Processing and Shelf Life Extension

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Quality and safety aspects of food
- Factors affecting quality during processing and storage
- Role of water in food and its shelf Life

HSC 432R Science of Clothing Comfort

Total Marks : 100	**L**	**T**	**P**	**C**
(ESA : 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to:

- Develop understanding of factors affecting clothing comfort
- Design comfortable clothing

BANASTHALI VIDYAPITH

Master of Science (Physics)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Among various science subjects, Physics is a natural science which deals with the behavior of matter, energy and the natural laws. The core theories of Physics are: Classical Mechanics, Electromagnetism, Thermodynamics and Statistical Mechanics, Quantum Mechanics and Relativity. There are many more branches of Physics like including astronomy, biophysics, atmospheric physics, nuclear physics etc. Therefore, Physics plays a key role in the future progress of humankind either in education or research in the world because of its characteristics features.

Keeping in views the entire scientific development of the student through covering almost all the courses, the M.Sc. (Physics) programme has been designed. The present programme aims to train the students to acquire high level theoretical and experimental knowledge in Physics through learning the designed studies with high quality and significance. However, the main objectives of the programmes are as follows:

- To provide the fundamental concepts of nature in terms of physics with their utilizations
- To produce M.Sc. students who are very knowledgeable and theoretically sound and are able to apply these for the analysis and solution of problems where these leads to new or substantially improved insights and performances.
- To provide the knowledge of various new techniques by which the students can lead the cutting edge technologies
- To encourage research and development activities
- To prepare the competent physicists at national and international level
- To produce M.Sc. students with high integrity having social values and who are ethically professional
- To produce M.Sc. students who can think critically and creatively thus capable of generating and developing new knowledge, products, materials or methods for the benefits of mankind.
- To produce M.Sc. students with excellent communication skills, capable of communicating effectively in various context, thus sharing new knowledge with other researchers from other institutions, universities and also industrialists
- To develop gender –neutral attitudes and practices; respect for all races, nations, religions, culture, languages and traditions
- To produce M.Sc. students who can adapt to changes in environment and practice lifelong learning

- To provide the ideas about pollution control and environment sustainability through exemplary education

Programme Outcomes

PO1 : **Physics Knowledge:** Possess fundamental knowledge of various core courses of physics to solve complex scientific problems of the society. Also, the students will be able to apply theoretical knowledge of principles and concepts of Physics to practical problems

PO2 : **Planning Abilities-**Ability to demonstrate efficient planning including time management, resource management and organization skills.

PO3 : **Expert of Advanced Tool:** Expertise in new and advanced techniques like photo-sepectrometer, XRD, FESEM, Raman, DSC etc. through project component of the programme.

PO4 : **Problem analysis ability-**Ability to apply physics principles alongwith other scientific conceptual attitude to analyze the problems related to society and to show the caliber for finding the solution.

PO5 : **Leadership Skills-** ability to have leadership skills with high regard for ethical values and social responsibilities through learning of time management and team work skill.

PO6 : **Professional Identity-** Possess ability to prove professional identity in any institution and industry at national and international level

PO7: Physics and society-Ability to explain the understanding of impact of physics study on the society including pollution, environment, health and ecosystem. In addition, the students will be able to propagate their knowledge to address problems of social relevance such as energy, and environment through their specific electives.

PO8 : Communication-Possess effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate the role of physics to address environmental issues.

PO9 : environment and sustainability- Understanding about environment sustainability and pollution control through project and laboratory practices

PO10 : Life-long learning- Possess the knowledge of current issues and ability to engage in life-long learning

First Semester

PHY 403 Classical Mechanics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successfully completed course, Student will be able to :

- Have a deep understanding of Newtonian mechanics and able to solve the Newton equations for simple configurations using various methods
- Define and understand basic mechanical concepts related to discrete and continuous mechanical systems.
- Describe and understand the vibrations of discrete and continuous mechanical systems
- Describe and understand planar and spatial motion of a rigid body
- Describe and understand the motion of a mechanical system using Lagrange-Hamilton formalism.

PHY 404 Mathematical Physics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completed this course, Student will be able to :

- have a good grasp of the basic elements of complex analysis, including the important integral theorems.
- Student will be able to determine the residues of a complex function and use the residue theorem to compute certain types of integrals.
- be able to solve ordinary second order differential equations important in the physical sciences; solve physically relevant partial differential equations using standard methods like separation of variables, series expansion (Fourier-type series) and integral transforms.

- have learned how to expand a function in a Fourier series, and under what conditions such an expansion is valid. Student will be aware of the connection between this and integral transforms (Fourier and Laplace) and be able to use the latter to solve mathematical problems relevant to the physical sciences.

PHY 406 Quantum Mechanics – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Students who complete this course should

- Have a deep understanding of the mathematical foundations of quantum mechanics
- Be able to solve the Schrodinger equation for simple configurations
- Understand the effect of symmetries in quantum mechanics

ELE 406 Principles of Digital Electronics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successfully completed course, Student will be able to :

- Understand the fundamentals of the digital electronics
- Understand the Boolean algebra and number system that forms the basics of any electronic device.
- Sequential logic circuits and their operations

ELE 406L Principles of Digital Electronics Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

After successfully completed course, Student will be able to :

- Have hand on experience of electronic circuits on bread board

- Design complex electronic circuits on bread board using different ICs

CS 416 Computer Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course the student will be able to :

- Learn fundamental of computers and operating systems
- Learn basic languages and their coding
- Develop good programming skills using algorithms and flowcharts.
- Coding programs in 'C' using data types, control structures, functions arrays and pointers.
- Demonstrate the ability to run, test, and debug 'C' programs.

CS 416L Computer Programming Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After completion of this course the student will be able to :

- Learn various commands
- Learn basic languages and their coding
- Develop good programming skills using algorithms and flowcharts.

Second Semester

PHY 401 Atomic and Molecular Physics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course the student will be able to :

- Be able to understand about the transitions occur in the materials.
- Understand the basic principles of spectroscopy where electromagnetic radiation interacts with matter and their results.

PHY 402 Classical Electrodynamics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course the student will be able to :

- Have deep understanding about the scientific, mathematical and engineering principles that enable them to understand forces, fields, and waves.
- Learn the functioning of the devices that work on those principles and phenomena.

PHY 405L Physics Lab - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After completing of this course, Student will:

- Be able to demonstrate spectra of some specific elements
- Be able to understand and demonstrate the effect of external field on the spectral lines
- Be able to handle useful equipments related to spectroscopy

PHY 407 Quantum Mechanics – II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completing of this course, Student will:

- Have a deep understanding of the various approximate methods of quantum mechanics

- Be able to solve the scattering problem through quantum mechanical consideration.

PHY 408 Statistical Mechanics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completing of this course, Student will:

- Have a deep understanding of physical statistics and its relation to information theory
- Be able to solve statistical mechanics problems for simple non-interacting systems
- Have a basic understanding of the phase transitions,
- Be able to use linear response theory and kinetic equation approach

TSKL 404 Communication Skills

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**2**	**0**	**0**	**2**

Learning Outcomes:

After completing of this course, Student will:

- Develop communicative competence and critical thinking abilities.
- Appraise the importance of effective communication in their respective professions.
- Improve interpersonal skills which will enhance their presentation skills.
- Learn and apply the knowledge of report writing in formal situations.
- Prepare CV/Resume so as to highlight accomplishments while applying for jobs.
- Develop effective writing process to compose different types of formal communication.

CS 414 Computer Oriented Numerical and Statistical Methods

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Apply numerical methods to obtain approximate solutions to mathematical problems.
- Using appropriate numerical methods, determine the solutions to given non-linear equations, systems of linear equations, interpolation, numerical differentiation and integration and numerical solution of ordinary differential equations.
- Analyze the errors obtained in the numerical solution of problems.
- Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.
- Compare different algorithms with respect to accuracy and efficiency of solution.
- Implement numerical methods algorithm using programming language.

CS 414L Computer Oriented Numerical and Statistical Methods Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Apply numerical methods to obtain approximate solutions to mathematical problems related to physics
- Use appropriate numerical methods, determine the solutions to given non-linear equations, systems of linear equations, interpolation, numerical differentiation and integration and numerical solution of ordinary differential equations.
- Analyze the errors obtained in the numerical solution of problems.
- Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.
- Compare different algorithms with respect to accuracy and efficiency of solution.

Third Semester

PHY 504 Classical Electrodynamics-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course the students will be able to:

- Understand the fundamentals of electromagnetic phenomena whenever the relevant length scales and field strengths are large enough that quantum mechanical effects are negligible.
- Have deep understanding about the scientific, mathematical and engineering principles that enable them to understand forces, fields, and waves.

PHY 516 Nuclear Physics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course the student will be able to:

- Understand the concept of nuclear physics.
- Understand the structure of matter at the atomic level.
- Understand the interactions of the atom molecules and the building blocks.
- Understand the nuclear power generation and nuclear weapons technology.

PHY 538 Physics of Lasers and Laser Applications

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course the student will be able to:

- Understand the mechanism of the laser
- Apply lasing phenomena in opto-devices

- Understand the applications of laser in various fields

PHY 530 Solid State Physics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand how the large-scale properties of solid materials result from their atomic-scale properties.
- Seek various applications of solid state physics in technology of semiconductors and semiconductors based devices.

PHY 537L Physics Lab - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Assess the validity of physical theories through the design and execution of an experiment, the analysis of uncertainties associated with the measurement of data and the interpretation of the data to draw valid scientific conclusions (lab skills).
- Connect a digital oscilloscope to a computer and record a signal with an appropriate sampling rate;
- Generate and interpret the power spectrum of the recorded data,
- Use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanations

PHY 527S Seminar

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

Learning Outcomes:

- learn through self study
- present the work of their dissertation

Fourth Semester

ELE 307 Microwave Electronics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- understand fundamentals of microwaves
- have the knowledge of transmission lines and their properties
- have the knowledge of microwave tube devices

PHY 517 Nuclear Physics - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the concept of nuclear physics.
- Understand the structure of matter at the atomic level.
- Understand the interactions of the atom molecules and the building blocks.
- Understand the nuclear power generation and nuclear weapons technology.

PHY 529 Solid State Electronics Devices

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of this course the students will be able to –

- Understand the mechanism of semiconductor devices
- Understand the applications of semiconductor devices in routine life
- Make advancement in these devices

PHY 519L Physics Lab - III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Assess the validity of physical theories through the design and execution of an experiment, the analysis of uncertainties associated with the measurement of data and the interpretation of the data to draw valid scientific conclusions (lab skills).
- Connect a digital oscilloscope to a computer and record a signal with an appropriate sampling rate;
- Generate and interpret the power spectrum of the recorded data,
- Use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanations

PHY 525P Project

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

- Learn through self study
- Learning of writing the dissertation
- Present the work of their dissertation

Discipline Elective

PHY 534 Condensed Matter Physics - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Explain the significance and value of condensed matter physics, both scientifically and in the wider community

- Critically analyse and evaluate experimental strategies, and decide which is most appropriate for answering specific questions
- Research and communicate scientific knowledge in the context of a topic related to condensed matter physics, in either a technical or non-specialist format

PHY 507 Fiber Optics Communication

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the use of fiber optics in communication
- Understand the capacity and internet services, with fiber.
- Understand the advances in technology

PHY 509 High Energy Physics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- have knowledge of fundamental particles,
- have knowledge about fundamental interactions and the range and strength of these interactions with the concept of particle antiparticle or matter antimatter.

PHY 514 Nonlinear Physics – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Have an advanced knowledge of nonlinear dynamics.

- Understand the connection between nonlinear systems and their physical realization
- Understand the qualitative features of nonlinear dynamical systems.

PHY 521 Physics of Nano-structures and Nanotechnology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the fundamental of nano-science & technology
- Able to apply the knowledge in material science, molecular electronics, synthetic biomolecular motors, DNA-based self-assembly, and manipulation of individual atoms via a scanning tunneling microscope

PHY 523 Plasma Physics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the fourth state of matter
- Have technological innovations stemming from plasma science

PHY 526 Science and Technology of Solar Hydrogen and other Renewable Energies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the role of solar energy
- Understand about energy, production and storage

PHY 532 Biophysics-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the concepts of physical principles in the biomolecular systems.
- Know Properties and
- conformations of biomolecules
- Understand the interaction between physics and biology

PHY 503 Analog and Digital Communication

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understanding the communication using electronic media
- Understanding the usage of electronic devices in telecommunications

PHY 535 Condensed Matter Physics - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Explain the significance and value of condensed matter physics, both scientifically and in the wider community

- Critically analyse and evaluate experimental strategies, and decide which is most appropriate for answering specific questions in research and communicate scientific knowledge in the context of a topic related to condensed matter physics, in either a technical or non-specialist format

PHY 510 High Energy Physics - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Possess knowledge of fundamental particles, fundamental interactions and the range and strength of these interactions with the concept of particle antiparticle or matter antimatter.

PHY 515 Nonlinear Physics- II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Have an advanced knowledge of nonlinear dynamics.
- Understand the connection between nonlinear systems and their physical realization
- Understand the qualitative features of nonlinear dynamical systems.

PHY 522 Physics of Nano-structures and Nanotechnology II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the fundamental of nano-science & technology
- Able to apply the knowledge in material science, molecular electronics, synthetic biomolecular motors, DNA-based self-assembly, and manipulation of individual atoms via a scanning tunneling microscope

PHY 524 Plasma Physics - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the fourth state of matter
- Have technological innovations stemming from plasma science
- Understand the practical applications of plasma

PHY 528 Solar Energy: Principles of Solar Thermal Devices

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand principles of solar thermal devices and their applications
- Have knowledge of solar thermal power (electricity) generation systems

PHY 533 Biophysics-II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the concepts of physical principles in the biomolecular systems.
- Know Properties and conformations of biomolecules
- Understand the interaction between physics and biology

Reading Elective

PHY 536R Optical Materials and Devices

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Understand the fundamental operating principles of photodevices
- Have the knowledge about LED and heterojunction laser materials selection and design
- Have the knowledge about fundamentals of organic electronics and liquid crystal displays

PHY 539R Solar Energy: photovoltaic systems

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Learn the principles behind the potential loss mechanisms in photovoltaic devices
- Learn the semiconductor physics necessary to understand solar cell performance and engineering
- Have the knowledge about optics and light management tools necessary for optimal solar cell design
- Model all aspects of a working solar cell, understanding the efficiency limits and design rules

ELE 414R Introduction to Photonics

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course, Student will be able to:

- Learn the fundamental principles of photonics and light-matter interactions.

- Develop the ability to formulate problems related to photonic structures/processes and analyze them.
- Understand processes that help to manipulate the fundamental properties of light.

BANASTHALI VIDYAPITH

Master of Social Work

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019 **140**

Programme Educational Objectives

As Banasthali Vidyapith upholds nation-building and social service as one of its goals of utmost importance, the **Master of Social Work (MSW)** Programme strives to fulfill these institutional objectives by preparing students of technical skills, professional ethics and values for sustainable practices of Social Work. The young social work professionals passing out of this institution are well equipped with theoretical knowledge, innovative ideas and field-based training to apply them in real life situations based on their job profiles and requirements, besides having a sense of moral obligation towards society.

- To develop knowledge, skills and aptitudes for practical intervention of social work profession.
- To facilitate and enable students in developing critical thinking and ability to apply theoretical knowledge in practice of social work.
- To promote interdisciplinary approach for better understanding of social phenomenon, problems, situations and issues of development.
- To inculcate human and ethical values among students for competent and effective practice of professional social work.
- To provide opportunities through intensive field work practicum to work with diverse population of the society for capacity building and enabling them to access to their rights.
- To impart education and training in the field of social work for promoting adequate manpower at micro, mezzo and macro levels.
- To help the students to develop an appreciation of the value and approach in social work research in addressing problems in the field of professional practice.
- To develop social work research skills and attitudes for understanding and investigating people’s behaviour within the society.
- To foster the student's social work identity including professional use of supervision and consultation, self-awareness, and an appreciation for the profession's history and values.
- To develop students’ knowledge and skills with their professionalism in social work practice for better personality enhancement.

- To inculcate students with the application of social work learning and rendering their services for rural, tribal and urban reconstruction.

Programme Outcomes

PO1: Knowledge of Social work: Creating knowledge on the basic understanding associated with social work profession including theories, methods, principles, skills, tools and techniques.

PO2: Planning abilities: Demonstrate effective planning abilities namely through NGO management, resource management and organizational skills; develop and implement plans as well as render services to meet objectives in different settings.

PO3: Problem analysis: Developing an appreciation of the value and approach in social work research in addressing problems in the field of professional practice and to develop attitudes and skills appropriate for social work research.

PO4: Modern Tool Usage: Identification and application of appropriate methods, tools and techniques of Social work profession while working with individuals, groups and community in different settings.

PO5: Leadership skills: Equip students with roles of appropriate participation and imbibe leadership qualities for developing strategies of advocacy and social change through an holistic approach.

PO6: Professional Identity: Identify and communicate ethical values of Social work profession in the society through varied roles of Social Welfare officer, Labour Commissioner, HR Executive, Counselor Programme, Project Coordinator, Young Professional etc.

PO7: Human values and professional Ethics: Demonstrate ethical and professional values and augmenting their roles as competent professionals in intervening social work practice with diverse systems.

PO8: Communication: Promote effective communication skills, written and verbal, among social work practitioners for appropriate and effective professional advocacy to overcome crisis situations.

PO9: The Social Worker and Society: Demonstrate professional demeanor in behavior and communication through application of social work approaches, principles, skills & theories for substantively and affectively preparing for action individual, groups, community and

Society.

PO10: Sustainable and ecological development: Ability to utilize social work practice theories and methods for rendering services to various sections of the society and promoting their capacity thus resulting in enhancing their potential for future sustainable and ecological development.

PO11: Life- long learning: Promote enhancement of knowledge and practice of skills, methods, tools and techniques as Professional social workers for effective life-long changes in the society.

First Semester

SW 402 Family: Issues and Concerns (Women, Child and Elderly)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this Course student will be able to

- Understand the status of Women, Child and Elderly in the contemporary society.
- Develop an insight on dynamics of gender relationship and an understanding on changing perspective of women.
- Apply their skills in intervening social work practice.

SW 406 Marginalized Groups: Issues and Concerns

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this course students will be able to

- Develop understanding on concepts and status of marginalized groups, their problems and rehabilitation process.
- Get acquainted with constitutional provisions related to scheduled castes and tribes, minorities for further practical interventions.
- Develop proficiency regarding various government programmes and role of government and NGOs in promoting their overall status.
- Take responsibilities as social work professionals in inculcating status of minorities and other backward classes.

SW 411 Social Work Profession: Philosophy and Concept

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this course students will be able to

- Acquaint with concept of Social Work, Social Services, Social Welfare, Social Reform, Social Development, Charity, and Philanthropy – various aspects of Social Work.
- Develop understanding on Social work profession as well as its existing and emerging role of social work in contemporary society.
- Recognize the need and importance of Social Work Education, Training and Practice.

SW 412 Theoretical Foundation of Social Work

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this Course, students will be able to

- Develop capability on concepts of Social Structure, Norms, Values, Religion, Education, personality, attitude, social perceptions and social prejudices.
- Understanding on Basic Economic Problems, National Income and Economic Welfare.
- Develop proficiency and ability to adopt a multi-dimensional approach in assessment and interventions.

SW 414L Field Work Practicum -1

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcomes: After completion of this course, students will be able to

- Become aware of the functioning of various settings non Governmental Organizations, Government Departments and Institutions, Health Functionaries etc.
- Competent in acquainting with knowledge of theory into practical situation for problem solving.
- Comprehend role of Social work profession in facilitating social change, human rights and social justice .

Second Semester

SW 401 Community Work and Social Action

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Be acquainted with Community work as a primary method of social work as well as the process of social action.
- Learn skills on application of community work, Community profile, Need assessment, Resource mapping.
- Apply Gandhian Perspective of social action, Paulo Friere's techniques of Conscientisation in field work practicum.
- Be proficient in understanding model of Community work.

SW 407 Methods of Social Work - I: Working with Individuals

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Develop theoretical knowledge for practical implications.
- Application of Social Case Work process, its tools and techniques and skills as well as its theories.
- Play an effective role as trainee social worker in different settings.

SW 408 Methods of Social Work - II: Working with Groups

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this course students will be able to

- Proficiently apply Social Group Work method in field work intervention.
- Understand group work process, tools and techniques, skills as well as various roles of a social group worker.
- Understand the applicability of group work theories in working proficiently with different groups namely children, youth, elderly.

SW 413 Quantitative Research Methods in Social Work

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this Course students will be able to

- Practically apply quantitative Research method in social work research.
- Develop analytical capability in practical application of Quantitative Research Design.
- Develop proficiency in preparing reports as well as application of SPSS for data analysis.

SW 415L Field Work Practicum – II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcomes: After the completion of this course, students will be able to

- Competent in acquainting with knowledge of theory into practical application.
- Capable to understand social work intervention through methods of social work in various field work settings.
- Develop skills and professional qualities for social work.
- Become aware of problems and Recent Administrative Reform of government and non Governmental Organization.

SW 405L Field Work Practicum – Summer Placement

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes: After the completion of this course, students will be able to

- Competent in acquainting with knowledge of theory into practical situation for problem solving and social work intervention through methods of social work in various field work settings and Apply social work Research techniques in practice.
- Comprehend role of Social work profession in facilitating social change , human rights and social justice .
- Develop skills and professional qualities for social work.
- Become aware of problems and Recent Administrative Reform of government and non Governmental Organization

Third Semester

SW 506 NGOs, Social Advocacy and Networking

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this Course student will be able to

- Be competent in understanding varied roles of NGOs, Civil Society, and Cooperatives etc. in promoting status of different sections of the society.
- Understand the mechanism of social advocacy and legal support while working on various social issues.
- Develop knowledge on the importance of lobbying, propaganda, public opinion and Mass communication while working with NGOs.

SW 507 Qualitative Research Methods in Social Work

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Acquaint and develop their skill on Qualitative Research method of social work.
- Develop understanding on application of Qualitative Research Design in social work research.
- Proficiently prepare reports and also develop skill in using Atlas – ti Software for Qualitative Data Analysis.

SW 509 Social Policies and Social Legislations

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Understand social policies and social legislations in the Indian context and role of a Welfare State.

- Competent on effective implementation of various social policies and legislations for the holistic development of different sections of the society.
- Analyze the role of social legislation as an instrument of social change.

SW 517L Field Work Practicum –III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes: After the completion of this course, the students will be able to

- Competent in acquainting with knowledge of theory into practical situation for problem solving.
- Capable to understand social work intervention through methods of social work in various field work settings.
- Comprehend role of Social work profession in facilitating social change, human rights and social justice.
- Develop skills and professional qualities for social work.

Fourth Semester

SW 510 Social Welfare Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Develop their competency on management of Social Welfare agencies.
- Understand the applicability of planning, formulating, operating and monitoring projects for an effective impact among target beneficiaries.
- Apply varied techniques in developing project proposals for effective monitoring and evaluation.
- Understand the importance in fund raising and resource utilization in a project.

SW 501L Block Placement

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes: After the completion of this course, students will be able to

- Competent in acquainting with knowledge of theory into practical situation for problem solving.
- Capable to understand social work intervention through methods of social work in various field work settings and Develop skills and professional qualities for social work.
- Comprehend role of Social work profession in facilitating social change , human rights and social justice
- Become aware of problems and Recent Administrative Reform of government and non Governmental Organization

SW 518L Field Work Practicum -IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes: After the completion of this course, students will be able to

- Competent in acquainting with knowledge of theory into practical situation for problem solving.
- Capable to understand social work intervention through methods of social work in various field work settings.
- Develop skills and professional qualities for social work.

Specialization Elective
A -Women Empowerment

SOC 502 Feminist Theory and Feminist Thought

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Be acquainted with issues related to feminism.
- Understand the concept of WID, WAD and GAD.
- Imbibe knowledge on Foundations of Feminist Theories.

SOC 516 Women and Health

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Be competent to acquaint with concept of Health status of women.
- Develop understanding on the functioning of modern health care system, policies and programmes in promoting better health status of women in India.
- Apply their analytical skills in to identify means to combat critical health status of women globally, as well as of sex workers and marginalized groups**.**

SOC 517 Women and Law

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Develop capacity to understand constitutional provisions related to women.
- Comprehend Criminal Procedure Code Arrest and Examination, IPC, Eve Teasing, Molestation, Adultery, Abduction, Kidnapping, Rape.
- Analyze important judgments, international convention, and emancipation of women – a socio- legal perspective.

Specialization-B Human Resource Management

MGMT 511 Industrial Relations and Legal Environment

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Comprehend concepts of Industrial relations, grievance Handling, collective bargaining, role of Trade Union and welfare officer.
- Understand Industrial legislations, process of Industrial relations, collective.
- Proficiently perform their role as Industrial Relation Officer.

MGMT 513 Introduction to Human Resource Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this Course students will be able to

- Acquaint with concepts of Human Resource Management (HRM), Human Resource Development (HRD) and Personnel Management (PM).
- Understand the Function of Human Resource Manager
- Manage Disciplinary Action related to HRM as well as Employee Counseling.

MGMT 515 Organizational Behavior at Work

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Competent in organizational Behaviour and Human Relation in an Organization.
- Understand and manage behavioural pattern in an organization.
- Proficient in solving and managing malfunctions in Organization.

Specialization-C Community Development

SW 508 Rural Community Development

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this course students will be able to

- Sensitively understand the challenges in rural settings.
- Understand the functioning of various rural community development programme in India.
- Proficiently apply their knowledge and social work competencies in field work intervention while working in a rural setting.

SW 511 Tribal Community Development

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this course students will be able to

- Competent in comprehending the nature and characteristics of tribal community.
- Develop understanding on various constitutional provisions and government initiated programmes for promoting the conditions of tribal communities.
- Apply their proficiency as a professional social worker while rendering quality services for the well being of tribal society.

SW 512 Urban Community Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Be competent in understanding the effect of urbanization on the changing status of society.
- Understand the functions and roles of Urban Local Bodies in Urban Community Development.
- Apply their learning and skills for field work intervention while working with Urban community.

Discipline Elective

SW 502 Community Development

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this course students will be able to

- Develop knowledge on concepts, types and elements of community.
- Be competent in identifying various social and community problems and understanding application of various community development programmes in working with various sections of the society.
- Develop an understanding the functioning three tier system of panchayati raj institution.
- Enhance their skills and ability to utilize Organisation and Administration of Community Development at various levels.

SW 513 Community Medicine and Social Work

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this Course students will be able to

- Develop understanding on lifestyle and varied health problems in the society.
- Understand the role of health care system and functionaries in promoting a healthy society.
- Understanding government's initiatives to promote better socio-economic status in India through various health care programmes.
- Proficiently perform the role of a Professional social worker through preventive, promotion, curative and rehabilitative approach.

SW 514 Conflict Management and Peace Building

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this Course students will be able to

- Understand the nature of conflict and violence prevalent in the present era.
- Understand initiatives of peace in global perspective.

SW 515 Corporate Social Responsibility

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes: After the completion of this Course students will be able to

- Develop understanding on CSR policy and its role in India.
- Develop practical applicability of theoretical learning of CSR.

SW 516 Ecology and Social Work

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this Course students will be able to

- Develop understanding on concept of. Ecology, environment, its sustainability and its relation in community well being.
- Enhance knowledge on environmental problems and challenges in the global and national context.
- Understand various approaches on environmental conservation.
- Narrate understanding of constitutional and legislatives provisions, policies and programmes for environmental conservation

SW 519 Social Work and Disaster Management

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes: After the completion of this Course students will be able to

- Understand about disaster management and ways and means to mitigate such conditions.
- Critically analyze the effective implementation institutional structures and programmes for disaster management in India.
- Understand the process and techniques of empowering communities in disaster preparedness and mitigation.
- Learn the nature and scope of psychosocial care in disaster management.

BANASTHALI VIDYAPITH

Master of Philosophy (Vocal Music)
Master of Philosophy (Instrumental Music)
Master of Philosophy (Drawing and Painting)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Master of Philosophy Music (Vocal/Instrumental)

Programme Educational Objectives

A complete musician is the sum total of all aspects of arts; be it performance as a Vocalist, an Instrumentalist, or a Dancer; be it as a music critic, a researcher, or a sound system expert; a basic knowledge of all and specialization in any of these later, helps in identifying the student as a presenter/performer, a teacher, a student, a researcher or a connoisseur.

Apart from all the basic education required in this field, M.Phil syllabi and mostly focuses on the vocational aspect of music. Be it in the field of performance, in recording or editing, in writing as a critic, or as a composer.

Hence, this curriculum has identified all the essential competencies in the respective areas, for which practical & professional training will be provided to the students thus, specializing in any of the above said.

The programme has been initiated with the Objective to enable the students–

- To acquire the basics of Technical skills of Audio Production.
- To understand the basics of sessional and practical teaching.
- To understand Frequency modulation, through microphone and other tools of recording.
- To differentiate the frequency spectrum of all the musical instruments.
- To enhance their knowledge regarding editing and mixing.
- To perform with full enthusiasm.
- To understand the techniques of research.
- To gain professional and practical education in the required field, regarding pedagogy, performances, research work and recording.

Programme Outcomes

- **P.O1: Music Knowledge -** Enhance knowledge regarding Prachalit and Aprachalit Ragas, thus helping & encouraging the students to perform and introduce them with Techniques of Research Formulation, Data Collection, Sampling, Analysis and Data Presentation.
- **P.O2: Planning a syllabus and pedagogical techniques -** Demonstrate effective planning abilities including new techniques in the field of Teaching, Training, Appreciation and Guided Listening as well as time management, resource management and organizational skills.
- **P.O3: Modern Tool Usage -** Learn, select and apply appropriate methods and procedures to understand the Basics of Technical skills for Audio Production including Frequency modulation, skills of recording, frequency spectrum of all the musical instruments along with Editing & Mixing.
- **P.O4: Professional Identity** - Understand and analyze the value of their professional roles in society as a teacher, a performer, a writer, a researcher or a sound system specialist, to accomplish which, learning professional presentation techniques is a must .
- **P.O5: Ethics and Values -** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural & personal variability in values, communication & lifestyles. Use ethical frameworks, apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
- **P.O6: Life-long learning -** Recognize the need for and have preparation & ability to engage in independent and life–long learning in the broadest context of Riyaz and performance as well as technological changes. Self access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

LEARNING OUTCOME

- ELECTIVE Paper was initially started for the benefit of the students with physical issues, but, with the heavy demand in job/professional sector, this has been included to enhance students' skills with elementary knowledge of playing instruments like Harmonium, Tabla, Sitar etc. for VOCAL STUDENTS and knowledge of singing styles and other instruments for INSTRUMENTAL STUDENTS.

Master of Philosophy (Drawing and Painting)

Programme Educational Objectives

Visual Art courses stimulate creativity and imagination. It provides visual aesthetic and sensory experiences and a special way of understanding and responding to the world. It enables students to communicate what they see, feel and think through the use of colour, texture, form, pattern and different materials and processes. They learn to make aesthetic and practical decisions. They explore ideas and meanings through the work of artists and self practice. The appreciation and enjoyment of the visual arts enriches all our lives.

The M.Phil. course of the department maintains a balance of theoretical and practical contexts with skill based content. Analysis and actualization of the pleasure and beauty of painting in all its complexity is the core of this subject. Discussion and debate sharpen the students critical awareness of the nature of painting within a contemporary art context as well as their ability to Demonstration of attitudes and dispositions appropriate to the profession of teaching as evidenced by professional integrity and commitment to teaching. Demonstration of leadership as evidenced by participation in extra-curricular activities, student mentoring, and community service.

The curriculum has identified essential competencies in the respective areas for which practical and theoretical knowledge are provided to the students specializing in academic and professional fields respectively.

The main objectives of the M.Phil. Drawing and Painting programme are:

- To foster an enjoyment and appreciation of the visual arts and a knowledge of artists, art movements.
- To provide exemplary education in a stimulating environment with aesthetic sensibility.
- To develop and refine artistic techniques and methods to interpret, analyze and conceptualize art work.
- To prepare competent educationists and professional artists of various levels.
- To prepare globally recognized art educationists and artists.
- To emphasize innovative practices and profound changes in the development of Visual Art.
- To develop writing and speaking skills effectively regarding art criticism, art appreciation and aesthetics.
- To develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions through art creation.

Programme Outcomes

Upon successful completion of this course, students will be able to meet the following outcomes:

- **PO1**: **Knowledge of Visual Art:** Demonstrate perceptual skills that include the facility to see more clearly and comprehensively also they will demonstrate conceptual skills by assimilating the elements and principles of visual art and applying creative, critical and philosophical thinking to their work.
- **PO2**: **Planning abilities**: Demonstrate effective planning abilities including time management, resource management and organizational skills also they will use application of research-based subject matter content in lesson planning, instructional materials design and the ability to critically assess and refine these materials based on the learning outcomes.
- **PO3**: **Problem analysis:** Utilize the principles of artistic enquiry, thinking analytically, clearly and critically, while solving problems and making decision during daily practice. Analyze, evaluate and apply information systematically.
- **PO** : **Modern tool usages**: Demonstrate knowledge of art forms and art works from diverse historical and contemporary contexts. Learn, select, and apply appropriate methods and procedures, resources, and modern art-related computing tools with an understanding of the limitations.
- **PO5**: **Leadership skills:** Understand and consider motivation issues, leadership and team building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizen or leadership roles when appropriate to facilitate improvement in aesthetic environment.
- **PO6**: **Professional Identity:** Demonstrate an understanding of professional needs, responsibilities, and requirements as an art professional (e.g. Art educators, free lance artists, Art therapist, Art Critic, Art conservators, Art historians and Art directors etc.).

- **PO7**: **Ethics of Visual Arts:** Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
- **PO8**: **Communication:** Communicate effectively with the artist community and with society at large, such as, being able to comprehend and write effective, make effective presentations and documentation.
- **PO9**: **Visual Art and society:** Recognize and understand major art works, artists, methods and theories and be able to asses the qualities of works of art in their historical and cultural background apply reasoning informed by the contextual knowledge to environmental and the consequent responsibilities relevant to the professional art practice. Sensible and balanced approach between social values and creative expression.
- **PO10**: **Environment and sustainability:** Understand the impact of the professional artistic societal and environmental contexts, and demonstrate the knowledge. Understand the social environmental, cultural and historical contributions and dimensions of the art.
- **PO11**: **Life- long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological and day-to-day changes in society.

M.Phil Music (Vocal/Instrumental)

SEMESTER – I

COURSE OBJECTIVES AND OUTCOME-

The course has been designed to enable the students to –

- Understand the basics of sessional and practical teaching.
- Enhance their knowledge regarding Gambhir Gayaki of Dhrupad/ Dhamar and popular vocal and instrumental styles like Tarana, Thumri, Dadra and Folk Dhun.
- Encourage the students to perform and learn professional presentation techniques.
- Encourage logical and refined thinking for research work.
- Encourage and guide the students with techniques of research, in the form of dissertation, along with publication of research papers in concerned journals.

At the completion of the course, the students will be able to -

- Understand the basics of sessional and practical teaching.
- Perform and learn professional presentation techniques.
- Enhance their knowledge regarding Gambhir Gayaki of Dhrupad/ Dhamar and popular vocal and instrumental styles like Tarana, Thumri, Dadra and Folk Dhun.
- Demonstrate logical and refined thinking for research work.

Research Methodology

MUS 606 Research Methodology in Music

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

The designed course will enable the students to -

- Encourage logical and refined thinking for Research work.
- Encourage & guide the students with Techniques of Research Thesis or Dissertation along with publishing of Research Papers in concerned and reputed journals.
- Understand and demonstrate techniques of Research Formulation, Data Collection, Sampling, Analysis and Data Presentation.
- Understand new techniques in the field of Teaching, Training, Appreciation and Guided Listening.

At the completion of the Course, the students will be able to -

- Demonstrate logical and refined thinking for Research work.
- Use and present Skillfull Techniques for Research Thesis or Dissertation along with publishing of Research Papers in concerned journals.
- Learn professional presentation techniques.
- Understand and demonstrate the Techniques of Research Thesis or Dissertation along with publishing of Research Papers in concerned journals.

Teaching Pedagogy

MUS 610 Teacher, Teaching and Higher Education

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

The designed course will enable the students to -

- Encourage logical and refined class teaching methods for better understanding of the students as well as improving rapport between teachers and the students.
- Bring more clarity in concepts after practical implementation of theories, practical demonstration and interactive sessions with the students.

At the completion of the Course, the students will be able to -

- Demonstrate logical and refined classroom teaching methods for better understanding of students as well as a better rapport between teacher and students.
- Have more clarity in concepts after practical implementation of theories, practical demonstration and interactive session with the students.

Core Paper – I

MUS 611P Comparative Study of Raagangs–I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcome:

The designed course will enable the students to -

- Enhance their knowledge regarding comparative study of Prachalit and Aprachalit Ragas.
- Learn professional presentation techniques of the above.
- Understand new techniques in the field of Teaching, Training, Appreciation and Guided Listening.

At the completion of the Course the students will be able to-

- Learn professional presentation techniques of the Prachalit and Aprachalit Raagas.
- Enhance their skills through **elective paper** with elementary knowledge of playing instruments like Harmonium, Tabla, Sitar etc. for **voval students** and knowledge of singing styles and other instruments for **instrumental students.**

- Enhance their preliminary knowledge regarding Gambhir Gayaki & Chanchal Ras Pradhan Gayaki and other contemporary Vocal and Instrumental styles.

Core Paper – II

MUS 303L Basic Technical Skills for Audio Production

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning outcome:

The designed course will enable the students to-

- Understand and demonstrate the Basics of Technical Skills for Audio Production including Frequency modulation, skills of recording, frequency spectrum of all the musical instruments & Editing & Mixing.
- Understand new techniques in the field of Teaching, Training, Appreciation and Guided Listening.

At the completion of the Course the students will be able to-

- Learn professional presentation techniques and demonstrate the Basics of Technical skills for Audio Production including Frequency modulation, skills of recording, frequency spectrum of all the musical instruments along with Editing & Mixing.
- Understand new techniques in the field of Teaching, Training, Appreciation and Guided Listening.

MUS 618P Term Paper

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning outcome:

The course has been designed to enable the students to-

- Encourage logical and refined thinking for Research work.

- Encourage & guide the students with Techniques of Research Thesis or Dissertation along with publication of Research Papers in concerned journals.

At the completion of the Course, the students will be able to-

- Demonstrate logical and refined thinking for Research work.
- Use and present Skillfull Techniques for Research Thesis or Dissertation along with publication of Research Papers in index journals.

SEMESTER – II

COURSE OBJECTIVES AND OUTCOME-

The course has been designed to enable the students to –

- Enhance their knowledge regarding Gambhir Gayaki of Dhrupad/Dhamar and popular vocal and instrumental styles like Tarana, Thumri, Dadra and Folk Dhun.
- Encourage the students to perform onstage and learn professional presentation techniques.
- Introduce the students with techniques of research in the form of dissertation along with publication of research papers in concerned journals.
- Elective paper for the students with physical issues and therefore to enhance their skills with elementry knowledge of playing instruments like Harmonium, Tabla, Sitar etc. for vocal students and knowledge of singing styles and other instruments for instrumental students.

At the completion of the course, the students will be able to :

- Perform onstage and learn professional presentation techniques.
- Understand and demonstrate the techniques of research thesis or dissertation along with publishing of research papers in concerned journals.

- Enhance their skills through elective paper with elementry knowledge of playing instruments like Harmonium, Tabla, Sitar etc. for vocal students and knowledge of singing styles and other instruments for instrumental students.
- Enhance their knowledge regarding Gambhir Gayaki of Dhrupad/Dhamar and popular vocal and instrumental styles like Tarana, Thumri, Dadra and Folk Dhun.
- Use and present skillfull techniques for dissertation along with publication of research papers and term papers in concerned journals.

MUS 612D Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**36**	**18**

Core Paper – I

MUS 616L Performance of Raagangs–II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcome:

The designed course will enable the students to -

- Enhance their knowledge regarding comaparitive study of Prachalit and Aprachalit Raagas.
- Perform Onstage and learn professional presentation techniques.
- Understand new techniques in the field of Teaching, Training, Appreciation and Guided Listening.

At the completion of the Course the students will be able to-

- Learn professional presentation techniques.

- Enhance their skills through ELECTIVE PAPER with elementary knowledge of playing instruments like Harmonium, Tabla, Sitar etc. for VOCAL STUDENTS and knowledge of singing styles and other instruments for INSTRUMENTAL STUDENTS.
- Enhance their preliminary knowledge regarding Gambhir Gayaki and other contemporary Vocal and Instrumental styles.

Reading Elective

CS 607R Computer Fundamentals

Max. Marks : 100	**L**	**T**	**P**	**C**
ESA : 100	**0**	**0**	**0**	**2**

Learning Outcome:

After the accomplishment of the course students will be able to:

- Bridge the fundamental concepts of computers with the present level of knowledge
- Familiarise operating systems, programming languages, peripheral devices, networking, multimedia and internet.
- Demonstrate the building up of Sequential and combinational logic from basic gates.

MUS 614R Performance of Indian Classical Music (Tabla)

Max. Marks : 100	**L**	**T**	**P**	**C**
ESA : 100	**0**	**0**	**0**	**2**

Learning Outcome:

- Definition of terminology such as sam, kaal, khanda, maatra, laya etc.
- General information about the origin of tabla.
- Definition of terminology such as kayada, palta, mukhra, tukra,etc.
- Basic knowledge of Bhatkhande notation system.

MUS 615R Performance of Indian Classical Music (Vocal)

	L	T	P	C
Max. Marks : 100				
ESA : 100	**0**	**0**	**0**	**2**

Learning Outcome:

The course will enable students to-

- Achieve a formal training about basic terms like types of notes, different patterns of notes (Alankaars), rhythm and its components with an initial start of learning ragas.
- To play sing with zeal & improve.
- Handle the instruments carefully and maintain them.

MUS 613R Performance of Indian Classical Music (Harmonium)

	L	T	P	C
Max. Marks : 100				
ESA : 100	**0**	**0**	**0**	**2**

Learning Outcomes:

The course will enable students to-

- Achieve a formal training about basic terms like types of notes, different patterns of notes (Alankaars), rhythm and its components with an initial start of learning ragas.
- To play/sing with zeal to improve.
- Handle the instruments carefully and maintain them on their own.

(Drawing and Painting)

First Semester

DNP 614 Research Methodology

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the accomplishment of the course, students will be able to:

- Know basic concepts of research and its methodology in visual art.
- Develop eclectic information to enrich knowledge about issues related to formulation of research problem, objectives, hypothesis and ethical issues.
- Apply knowledge about scope, limitation, literature review, sampling, questionnaires and interviewing.
- Know concept of data analysis.
- Write good research report with the help of latest citation format.

DNP 607 Teaching of Art

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcome:

After the accomplishment of the course students will be able to:

- Know the uses of teaching and learning aids promptly.
- Synthesis their previous knowledge of art with teaching of art.
- Develop knowledge about different subjects through art teaching.
- Explore the aesthetics of art teaching.
- Inspire to evaluate the whole process of teaching and learning.

DNP 609L Advance Composition (Practical) – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcome:

After the accomplishment of the course students will be able to:

- Explore aesthetic and artistic experiences.
- Enrich their Aesthetic and Artistic experiences.
- Develop, synthesis and apply aesthetic and artistic experiences in creative compositions.

DNP 611 Art Appreciation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcome:

After the accomplishment of the course students will be able to:

- Understand psychological differences of different art.
- Differentiate real and imaginary values of art through art appreciation.
- Enrich knowledge regarding critical theories through art appreciation.

DNP 615P Term Paper

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcome:

After the accomplishment of the course students will be able to:

- Demonstrate the ability to apply basic research methods in Term paper including research design, data analysis and interpretation.
- Identify theoretical and practical problems, evaluate problem solving strategies and develop logical solutions.
- Demonstrate the ability to evaluate, integrate and apply appropriate information from various sources to create good Term paper.

Second Semester

DNP 613D Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	36	18

Learning Outcome:

After the accomplishment of the course students will be able to:

- Recognise the importance of planning and preparation required to undertake a research project.
- Develop a through understanding of the chosen subject area.
- Demonstrate the ability to collate and critically assess/interpret data.
- Develop an ability to effectively communicate knowledge in a scientific manner.

DNP 610L Advance Composition (Practical) - II

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcome:

After the accomplishment of the course students will be able to:

- Explore aesthetic and artistic experiences.
- Enrich their Aesthetic and Artistic experiences.
- Develop, synthesie and apply aesthetic and artistic experiences in creative compositions.

Reading Elective

DNP 612R Art Therapy

	L	T	P	C
Max. Marks : 100				
ESA : 100	**0**	**0**	**0**	**2**

Learning Outcome:

After the accomplishment of the course students will be able to:

- acquire broad art therapy knowledge, skills, and values based on psychotherapy,
- Engage in studio work with insight, self-awareness, and a high level of professional, ethical, multicultural, and relational expertise with diverse local and international communities.
- Synthesize the latest theories and clinical skills of art therapy.

CS 607R Computer Fundamentals

	L	T	P	C
Max. Marks : 100				
ESA : 100	**0**	**0**	**0**	**2**

Learning Outcome:

After the accomplishment of the course students will be able to:

- Bridge the fundamental concepts of computers with the present level of knowledge

- Familiarise operating systems, programming languages, peripheral devices, networking, multimedia and internet.
- Demonstrate the building up of sequential and combinational logic from basic gates.

BANASTHALI VIDYAPITH

Master of Philosophy (Geography)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Banasthali Vidyapith is an epitome of tradition and modernity. Vidyapith aims to preserve and inculcate the essential values and ideals of Indian culture. It believes in simple living and high thinking. Our educational ideology is based on the concept of fivefold education focusing on physical, practical, aesthetic, moral and intellectual aspects in order to develop a balanced personality.

Geography is concerned with human and physical environmental systems and their interaction, mapping and measuring natural and man-made resources, designing ways of using them, analyzing the distribution of welfare, recognizing and averting hazards and reviewing social institutions. Man's lifestyle is influenced by physical aspects in its immediate surroundings and Geography act as a bridge between man and its environment. Geography is also related to human dimension wherein man using the resources and creates its economic dimension. Various arenas of human aspects such as business, trade, commerce, agriculture, industry, navigation, military operations, spacecraft and administration needs Geography as a foundation.

Students will gain profound knowledge of current research problems, approaches, and insights regarding the interactions between the environment and society in the context of global change. Students learn to integrate scientific theories, findings, and procedures in order to analyze and model human-environmental systems.

The main objectives of the Master of Philosophy Geography programme are:

- To develop skills of assessing contrasting theories, explanations and policies; collecting, critically judging, evaluating and interpreting varied forms of evidence; preparing maps and diagrams; employing various methods of collecting and analyzing spatial and environmental information; combining and interpreting different types of evidence to tackle specific problems; and recognizing the ethical and moral dimensions of study.

- To develop oral presentation and report writing skills; and make meaningful contributions to improving legal/administrative structures and procedures relevant to the environment and sustainable development.
- To conduct independent research of a professional quality and describe specific research techniques and explain the literature and concepts in the conduction of original research.
- To communicate the results of research in both oral and written forms; entails demonstrating skills in oral presentation and the writing of formal papers during coursework, and ultimately, a dissertation.
- The opportunity to develop large-scale research management skills by completing a research thesis under academic supervision and guidance.
- To raise sensitivity for ethical codes of conduct, social values with help of eco-feminism, gender equality, social balance and respect for each strata of the society.

Programme Outcomes

- **PO1: Geography Knowledge:** The outcomes of the course are achieved both through focused study of selected specialized aspects of geographical research and through development of more general research skills and methods. Develop in-depth knowledge of some substantive area(s) of geography and geographical research; develop their capacity to frame research questions, to derive appropriate research designs, and develop awareness of alternative approaches.

- **PO2: Planning abilities:** A comprehensive understanding of techniques and a thorough knowledge of the literature, applicable to their own research; demonstrated some self-direction and originality in tackling and solving problems, and acted autonomously in the planning and implementation of research.

- **PO3: Design/development of solution for problems:** The research skills strengthen them to formulate hypothesis about any form of social, economic and environmental problems and collect facts to prove it.

- **PO4: Problem analysis:** Analyses the research problems occurring in our social and physical environment and develop methodology to depict and solve them. Demonstrate originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field; shown abilities in the critical evaluation of current research problems and research techniques and methodologies.

- **PO5: Modern tool usage:** Use remote sensing and GIS techniques in medical, urban & rural settlements, environment, agriculture, resource, tourism and several other aspects from a geographical perspective. The applications can further enhance research in the discipline and contribute towards a better living environment. Acquired the skills to use library and internet resources independently and become critical and skilled readers of geographical and other research publications.

- **PO6: Leadership skills:** Develop a capability to manage research, including data management, conducting and disseminating research, working in a team, and understanding codes of research practice and research ethics.

- **PO7: Professional Identity:** Understand, analyze and contribute towards the discipline adopting professions as an educator, researcher and specialist in different arenas of geography; develop their capacity to frame research questions, to derive appropriate research designs, and develop awareness of alternative approaches; develop a competence and confidence in using a range of quantitative methods of gathering, analyzing and interpreting evidence.

- **PO8: Geographical Ethics:** Apply ethical principles in personal, professional and social levels. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

- **PO9: Communication:** Communicate effectively with the Earth Science community and with society at large, by discussing their research at several levels in the form of conferences, seminars and symposium. They are able to comprehend and write effective presentations, documentation, research publications and with writing communicate their ideas at regional, national and international levels.

- **PO10: The Geographer and society:** Students contribute as a researcher by identifying socio-economic and environment problems and suggest measures, solutions to overcome the problems. Nevertheless, geographical specialists play an important role in the national development. With the help of most talented geographers, geographical theories are as much as the solution of the great problems of the society and economy, for which they requires a synthetic geographical approach.

- **PO11: Environment and sustainability:** Employing various methods of collecting and analyzing spatial and environmental information; combining and interpreting different types of evidence to tackle environmental problems; and recognizing the ethical and moral responsibility towards sustainability.

- **PO12: Life- long learning:** Students develop lifelong learning towards major issues and develop an attitude to depict them through their publications and presentation. They also become critical and skilled readers of geographical and other research publications. The research provides them an essential strength to describe or solve problem associated to different zones of the discipline. Students are familiar with an appropriate range of intellectual and methodological traditions within geographical research and the social sciences.

First Semester

GEOG 616 Pedagogy in Geography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe higher education, its function and purpose.
- Learn about the different functions of regulatory bodies.
- Elucidate the prerequisites and methods of teaching.
- Learn about the evaluation process in teaching.

GEOG 607 Research Methodology and Statistical Analysis in Geography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Formulate research proposals, hypothesis, data analysis and referencing.
- Develop skill in data collection and sampling techniques.
- Develop skill in multi-variate analysis for the applications of statistical methods in research.
- Write abstract, report, articles and thesis.

GEOG 613L Digital Cartography and Geo informatics Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes-

After the completion of this course, students will be able to:

- Develop skill related to digital cartography – diagrammatic representation of data
- Develop skills in data generation, mapping for the implementation in planning.
- Develop skill of surveying using Global Positioning System.
- Enrich students about applications of geospatial technologies in various fields.

GEOG 619P Term paper

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**24**	**12**

Learning Outcomes:

After the completion of this course, students will be able to:

- Understand the aspects of research area and formulate research problem.
- Develop analytical skill.
- Analyze the data and write research articles.
- Develop presentation skill.

Second Semester

GEOG 614D Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	36	18

Learning Outcomes:

After the completion of this course, students will be able to:

- Formulate research proposals, hypothesis and collection of data.
- Develop skill in analysis of data and testing of hypothesis.
- Extract results and conclusions.
- Provide suggestions for the development of research area.

GEOG 702S Seminar

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes:

After the completion of this course, students will be able to:

- Identify and formulate research problem.
- Develop skills in data analysis.
- Develop presentation skills.
- Provide suggestions of related research problem.

Reading Electives

GEOG 611R Climate Change and Future Crisis

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to:

- Explain and analyze climate change.
- Predict consequences of climate change over several sectors of economy.
- Analyze effects of climate variability on domestic livestock.
- Describe current and past climate change policies in India.

GEOG 612R Contemporary Social Challenges in India

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to:

- Analyze the socio cultural environment in India with respect to parameters like sex ratio, fertility and mortality.
- Understand about the causes and consequences of Gender discrimination in Indian society.
- Status of women and domestic violence in Indian society and need of women empowerment.
- Aware about the government policies concerning them.

GEOG 615R Industrialization and Regional Development

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to:

- To describe and ascertain the concepts and theories to industrial location, industrial decentralization and agglomeration.
- To map and explain world industrial regions and associated factors of growth and problems.
- To assess the impact of growth of industries over environment.
- Suggests measures for the improvement of industrial growth.

GEOG 617R Resource: Challenges and Management

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to:

- Analyze the resources and their scarcity.
- Depict the problems arising from resource scarcity.
- Describe resource related problems.
- Suggest measures to conserve resources like water, forest, energy, biodiversity etc.

GEOG 618R Solid Waste Management for a Smart City in India

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to:

- Understand about the concept, characteristics, rules of solid waste management.
- Learn about biochemical processes and energy recovery from municipal solid waste.
- Learn about the collection, transportation, segregation, composting and disposal of Municipal solid Waste.
- Assess the issues and challenges of Solid Waste Management faced in India.

GEOG 620R Tourism and Heritage

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to:

- Describe tourism, its major concepts, development and trends associated with it.
- Able to identify major tourist sites, heritage sites.
- Understand policies and challenges of tourism in India and Rajasthan.
- Explain the role of tourist organizations, foreign capital and globalization on tourism.

BANASTHALI VIDYAPITH

Master of Philosophy (English Language Teaching)
Master of Philosophy (Hindi)
Master of Philosophy (Sanskrit)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
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July, 2019

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Master of Philosophy (English Language Teaching)

Programme Educational Objectives

A culture remains alive and eternal when some intellectual interventions are made. The intellectual interventions are the results of some new explorations in the world of epistemic realities and for these explorations one must engage oneself in the complex process of research. Master of Philosophy (M.Phil.) is such a programme that allows one to continue on the path of exploring the world of ideas afresh so that the intellectual texture of a culture can be ameliorated and aggrandized. The programme intends to develop a harmonious and holistic personality of students with a strong base of Indian culture, nationalism and ethos. It also seeks to inculcate linguistic, literary, and communicative competence so that they create an inclusive and sustainable society. In addition, it also seeks to familiarize students with different literary forms, critical theory and literary criticism that may enrich their intellectual and epistemological realities.

The main objectives of the programme are:

- To acquaint students with complex textures of Indian philosophical, intellectual and cultural tradition.
- To equip students with wide understanding of linguistic, literary and communicative competence so that they may be able to communicate effectively.
- To familiarize students with some major concepts of Indian and western linguistic and literary theory, classical and modern literatures so that they may develop critical thinking.
- To engage students in self-reflexivity and lifelong learning.
- To help integrate different aspects of physical, practical, aesthetic, moral and intellectual dimension of education to develop holistic personality of each student.
- To develop effective citizenship with strong value base and ethics.
- To familiarize students with environmental contexts, inclusivity and sustainable development.

Programme Outcomes

- **PO1**: **Enrichment of Intellectual and Epistemic Tradition**: It indents to enrich students' understanding on nature, form and function of language, Indian and Western linguistic and literary theory. It may also bring students to a wide knowledge of classical and contemporary literature with analytical capacity to place texts in theoretical, historical or social contexts.
- **PO2**: **Inculcation of Planning Abilities**: It demonstrates effective planning abilities including time management, resource management, delegation skills and organizational skills. It also focuses on the development and implementation of plans and the organization of works to meet deadlines.
- **PO3**: **Amelioration of Problem Solving Skills**: It utilizes the principles of scientific enquiry and critical thinking for solving problems and making decision in daily realities of life. It may help students in finding, analyzing, evaluating and applying information systematically so that students may make some judicious decision.
- **PO4**: **Appropriate Application of Modern Literary and Linguistic Tools**: The judicious application of modern literary and linguistic theories may develop critical and analytical faculty of scholars. These tools will help scholars in hermeneutic analysis of texts.
- **PO5**: **Development of Soft Skills:** It prepares students to understand and to consider human reaction to reality and motivates them for leadership and team building. It allows students to assume participatory roles as a responsible citizen so that they may take appropriate leadership roles that may facilitate societal responsibilities.
- **PO5**: **Formation of Professional Identity:** Understand, analyze and communicate the value of their professional role in society.
- **PO6: Nurturing Ethics and *Dharma*:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and taking responsibilities for the consequences of the decisions taken.
- **PO7**: **Development of Communicative Competence**: Communicate effectively in textual, personal and interpersonal contexts so that

the discursive practices may be enriched and the trajectory of knowledge may get strengthened.

- **PO8**: **Language, Literature and Society**: Develop both material and metaphysical dimensions of life where language, literature and society can be seen together.
- **PO9**: **Environment, Inclusivity and Sustainability**: Understand the impact of human behavior and action on environment and social relationship. It includes the exploration of inclusivity and sustainability.
- **PO10**:**Lifelong Learning**: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broader context of social, economic, technological and cultural changes. The identification of some thrust areas on the basis of self-criticality and reflexivity may keep the process of lifelong learning in continuum.

Master of Philosophy (Sanskrit)

Programme Educational Objectives

¼'k{kf.kd mís';½

lLdr ok³e; dk Hkkjrh; lkLdfrd bfrgkl d ikekf.kd iy[k d :i e n[kk tkrk gA ble on] 0;kdj.k] Hkk"kk'kkL=] n'ku'kkL=] dk0;'kkL= ,o dk0;kfn fo"k;k/kkfjr ,lh vud foe'kkRed ,o fo'y"k.kkRed i)fr;k g] ftudk lEcU/k ekuoh; thou 'kyh ,o 0;fDrRo&fodkl l gA blfy, ;g vko';d g fd Hkkjrh; Kku ijEijk ,o lkLdfrd fojklrh; rRok l fo|kfFk;k dk voxr djk;k tk,] ftll o Hkfo"; e ikIr voljk dk vkRekul/kkuiod Lo; d thou e mi;kx dj ldA

blh mnn'; dk /;ku e j[kr g, vUrfvu'kklukRed i)fr ,o cgvk;keh mikxek d lkFk lLdr ikB;de dk fuek.k fd;k x;k gA

- 'kk/kkRed nf"V ,o vfHk#fp tkxr djukA
- lL—r 'kk/kifof/k ,o 'kk/k lo{k.k dk'ky dk fodflr djukA
- lL—r ok³e; e uokpkj eyd uohu 'kk/kkRed iofr;k ,o i)fr;k l ifjfpr djkukA
- lkmnfHkd vFkxg.k ,o ekfyd fpUru dk vfHk0;Dr dju dh {kerk mRiUu djukA
- vui;kxkRed fpUru ,o Lok/;k; dk'ky fodflr djukA

Programme Outcomes (dk;Øe fuxse)

- **PO1:** lLdr Kku ijEijk & on] n'ku] ijk.k] /ke'kkL=] dk0;] dFkk&lkfgR; ,o dyk'kkL=h; fpru d vk/kkj ij Hkkjrh; Kku ijijk ,o lLdfr fo"k;d le> dk fodkl A

- **PO2:** ;ktukijd nf"Vdks.k & Hkk"kk lEcU/kh leL;kvk d fo'y"k.k dh {kerk dk fodkl] nk'kfud] lkfgfR;d ,o 0;kogkfjd fo"k;k ij ehek lkRed ,o lEi"k.kRed {kerk dk fodkl A

- **PO3:** leL;k&fo'y"k.k & ikekf.kd ,o 'kk/ki.k KkukUe[k iofRr] l=] 0;k[;k] Hkk";] leh{kk] ioi{k] mRrji{k ,o ehek lk vkfn i)fr;k l dk0;] n'ku ,o lLdfr lEcU/kh fl)kUrk dh 0;k[;kRed] fo'y"k.kRed {kerk dk fodkl ,o foe'kkRed l'y"k.k l fu"d"kkRed nf"V dk fodkl A

  0;RifRr] fuopu] rd] fo"k;iorueyd i)fr;k }kjk lkfgR;] n'ku ,o lekt lEcU/kh leL;kvk d lek/kku dju dh {kerk dk fodkl A

- **PO4:** uokpkjeyd nf"V & lLdr dh vk/kfud fo/kkvk ¼y?kdFkk] miU;kl] Mk;jh] xty] xhr] ixhr vkfn½ ,o mRrj vk/kfudrkoknh] ljpuk ,o mRrj ljpukoknh 0;k[;k i)fr;k d vui;kx dh {kerk dk fodkl A lLdr ok³e; e of.kr uokpkjeyd uohu 'kk/kkRed iofÙk;k ,o i)fr;k l ifjp;A lLdr lo{k.kRed i)fr dk fodkl A

- **PO5:** urRo&dk'ky & f'k{kk d lHkh llk/kuk d v/;;u] fo'y"k.k] foopukijkUr Nk=kvk e dk'ky fodflr djd urRo {kerk dk fodkl A

- **PO6:** 0;kolkf;d igpku & lLdr ok³e; d vUrxr on onkx] n'ku'kkL=] lkfgR; vkfn d v/;;u l mPp i'kklfud lokvk] v/;kid] 0;oLFkkfidk] vuoknd]leh{kd] lEiknd vkfn l lcf/kr vkthfodk dh ikfIrA

- **PO7 :** **lLdr ,o ufrdrk** &f'k{kk **d pkj lkikuk ¼vkxe] Lok/;k;] ifjppk ,o 0;ogkj½ d ek/;e l lkekftd] ufrd o 0;kogkfjd eY;k d ifr tkx:drk ,o ykdki;kxh –f"Vdk.k dk fodkl A fofo/k lLdr xUFkk ¼lkfgR;] dFkk lkfgR;] ukV;'kkL=] dk0; xUFk½ d v/;kiu }kjk lkekftd lkLdfrd jktuhfr lEcU/kh fofo/k eY;k dk fodkl**

- **PO8:** **lEi'k.k dk'ky & lLdr Hkk"kk;h dk'kyk dk fodkl djd] lLdr okX0;ogkj dh {kerk d lkFk ekfyd vfHk0;fDr dh ;kX;rk dk fodkl A**

- **PO9 :** **lLdr vkj lekt & lLdr xUFkk e fufgr eY;k dh f'k{kk d ek/;e l lekt e Nk=kvk }kjk mudk ipkj&ikjkjA lLdr f'k{kk d ek/;e l fofo/k ink ij vklhu gkdj lekt e lLdrfu"B eY;k dh LFkkiukA**

- **PO10: i;koj.k tkx:drk & _Xonkfn xUFkk e of.kr i;koj.k lj{k.k vkfn fo"k;k d ifriknu l i;koj.k d ifr pruk dk fodkl A lLdr lkfgR; e mfYYkf[kr i;koj.kh; ,o ikfjfLFkfrdh; Hkkxkfyd lnHkk l Hkxky ,o i;koj.k l lEc) KkukRed ,o mipkjkRed iofÙk dk fodkl A**

- **PO11 : thoui;Ur f'k{kk & lL—r lkfgR; dh fofo/k fo/kkvk e lo= nf"Vxr vk/;kfRed] lekftd] ufrd] /kkfed] vkfFkd vkfn thou&eY;k dk vock/k dj vkj mUg vkpj.k e lefUor dj fo|kFkh viu thou e 0;kogkfjd vui;kx lEcU/kh d'kyrk e vfHkof) dj ldxkA**

Master of Philosophy (Hindi)

,e-fQy- dk;Øe ½

’k{kf.kd mnns’;

ouLFkyh fo|kihB dh f’k{kk i)fr e Nk=kvk d 0;fDrRo e ’k{kf.kd ,o lkLdfrd fodkl egRoi.k lkiku gA ftld rgr ikjfHkd l mPp f’k{kk rd Hkk"kk d fofHkUu ifji{; d vu:Ik Nk=kvk dk v/;;u djk;k tkrk gA fdlh Hkh fo"k; dk mRrjkRrj KkukRed fodkl lof/kr gku d mijkr foLrkj d LFkku ij xgurk dh vkj c<rk gA mPp f’k{kk e fo"k; d v/;;u] fo’y"k.k vkj foopu d mijkr fof’k"V v/;;u vkj uohu fu"d"kk d fy, ’kk/k iofRr fodflr dh tkrh gA

mPp f’k{kk e f’k{k.k dk ,d fof’k"V v/;;u ifof/k ,o ’kk/kijd nf"Vdk.k ij vk/kkfjr gkrk gA bld lkFk gh lkfgR; fujrj jktuhfrd ,o lkekftd ifjoruk dk vuHkr djrk g ,o mul iHkkfor gkrk g vkj ;xku:Ik viu fopkj] dF;] vfHk0;fDr vkj f’kYi e ifjoru Hkh djrk gA vk/kfud fgUnh lkfgR; foe’keyd v/;;u dh vkj c< jgk g] foe’k Hkh vc nfyr vkj L=h rd lhfer u jgdj vkfnokl h] fdUUkj] o)] lLdfr] bfrgkl vkj ehfM;k foe’k rd igp x;k gA iokl h lkfgR; dk ,d fo’kky i{k fgUnh l tMk g ftll of’od lkLdfrd lxe tlh vo/kkj.kk, fodflr gk jgh gA ftudk voykdu vkj v/;;u mPp f’k{kk dh Nk=kvk d fy, vko’;d gA

mPp f’k{kk e f’k{k.k d fy, 0;kdj.k] lkfgR; vkfn d v/;;u dh ub i)fr;k Hkh vc v/;kiu e lfEefyr gk xb gA bld lkFk gh d{kkj xfrfof/k;k] J0; ,o n’; ek/;ek dh c<rh Hkfedk vkfn Hkh oreku le; d vu:Ik v/;kiu dk ie[k vx curh tk jgh gA

LukrdkRrj Nk=kvk e Lor= fpru ,o Loy[ku dh iofRr fodflr djuk vko’;d gkrk gA bld fy, vky[k] ’kk/k i= y[ku] i= iLrfrdj.k vkfn dk vH;kl vko’;d gkrk gA mPp f’k{kk d bu l i.k iHkkxk dk lefdr dk;de ,e-fQy e fgUnh foHkkx }kjk lpkfyr fd;k tkrk gA

fgUnh foHkkx d ,e-fQy dk;de d ie[k mnn’; fuEufyf[kr g ¼&

- mPp f’k{kk d vu:Ik Hkk"kkb dk’ky] vFkxg.k ,o vfHk0;fDr d :ik l ifjfpr djkukA
- ’kk/k d l)kfrd ,o 0;kogkfjd i{kk] vk/kkjHkr r;kfj;k l voxr djkukA
- ikBkykpu ,o ikB liknu ,o iufuek.k dk vfHkKku djkukA
- lkfgfR;d ’kk/k dh vulxh fo/kkvk bfrgkl] n’ku] eukfoKku vkfn d :ik l voxr djkukA
- dFkrj x| fo/kkvk vkj foe’keyd uohu lkfgfR;d iofRr;k dk v/;;u djkukA
- vk/kfud le; d vu:Ik uohu dF; ,o f’kYi dh ifof/k;k l ifjfpr djkukA
- mPp f’k{kk e f’k{kd ,o fo|kFkh lc/kk d lkFk gh fo|kFkh d fodkl e f’k{kd ,o f’k{k.k dh Hkfedk l voxr djkukA
- uohu f’k{k.k ek/;ek ¼J0; ,o n’;½ vkfn dh f’k{k.k e Hkfedk] x| ,o i| f’k{k.k dh ifof/k;k dk v/;;u djkukA
- y[k] ’kk/k i= y[ku] iLrfrdj.k] i= okpu dh l{erkvk l voxr ,o vH;kl djkukA
- ifj;kt uk dk; d ek/;e l Nk=kvk e Lor= ,o ekfyd fpru dk fodkl djukA
- f’k{k.k vH;kl d ek/;e l 0;kogkfjd f’k{k.k l ifjfpr djkukA
- ih-,p-Mh- d fy, foLrr ’kk/k dh vk/kkjHkfe r;kj djukA

vif{kr ifj.kke

Ø **'kS{k ifof/k;ksa dk vfHkKku %** mPp f'k{kk e 'kS{k dk i{k egRoi.k gksrk gA iLrr dk;de l Nk=kvk e 'kS{k ifof/k;k d l)kfrd i{k dh tkudkjh gkxhA

Ø **lkfgR; dh vuqlxh fo/kkvksa dh mi;ksfxrk %** lkfgR; lekt dk ni.k gksrk g vkj lekt li.k Kku dk it] blfy, lkfgR; d v/;;u e vuqlxh fo/kkvk ;Fkk] bfrgkl] eukfoKku] n'ku vkfn d lc/k dh le> Nk=kvk e fodflr gkxhA

Ø **uohu foe'keyd lkfgR; :ik dk Kku %** ;xku:Ik lkfgfR;d ifjoru viu dF; ,o f'kYi dk Hkh uokdkj nrk gA iLrr ikB;de e Nk=k, uohu foe'kk d v/;;u ,o mudh vko';drkvk l ifjfpr gkxhA

Ø **f'k{k.k i)fr;ksa dk vfHkKku %** 0;kdj.k] dk0; ,o x| dh vyx&vyx f'k{k.k i)fr;k gksrh gA ftud fof'k"V Kku ,o eyHkr vrj l ifjp; gkxkA

Ø **f'k{k.k vH;kl %** Kku tc rd vkpj.k e u <y] rc rd ml dk vkfpR; ugh gksrkA blfy, f'k{k.k d lkFk gh iLrr ikB;de e Nk=kvk dk d{kkvk e f'k{k.k vH;kl Hkh djk;k tkrk g ftud ek/;e l og d{kk e v/;kiu d le; gku okyh leL;kvk l ifjfpr gk ldxhA

Ø **leL;k vkSkfjr fo"k;ksa dh p;u dh le> %** 'kS{k dk; lekt e uohu ekU;rkvk dk LFkkfir djr gA Nk=kvk e vk/kfud le; dh leL;kvk dh igpku vkj mud fujkdj.k d fy, lkfgR;d 'kS{k dh le> fodflr gkxhA

Ø **cgvk;keh 0;fDrRo %** ekfyd fpru ,o y[ku d ek/;e l Nk=kvk d 0;fDrRo e ifjoru vkrk gA iLrr ikB;de e 'kS{k i=k d y[ku] iLrrhdj.k ,o lfeukj d ek/;ek l Nk=kvk e ekfyd fpru dh iofRr c<xh vkj mudk 0;fDrRo cgvk;keh gkxkA

Ø **'kkl/kijd nf"V** % Kku dh mPprj Hkfe mld uohu nf"Vdk.k l lcf/kr gkrh gA iLrr dk;de d ek/;e l Nk=kvk e 'kk/kijd nf"Vdk.k fodflr gkxkA ftll o lkekftd 0;oLFkk e lkfgfR;d vonku e l{ke gkxhA

Ø **Lk'tukRedrk** % 'kk/k fof'k"V v/;;u dk okgd rk gkrk gh g] lkFk gh ;g ltu {kerk dk Hkh fodflr djrk gA dFkrj fo/kkvk vkj foe'keyd v/;;u d ek/;e l mue fofHkUu fo/kkvk e 'kk/kijd nf"V d lkFk gh ekfyd ltu dh {kerk Hkh fodflr gkxhA

Ø **Lok/;k; dh iofkr** % 0;kid v/;;u d ek/;e l Nk=kvk e L0kk/;k; dh iofkr fodflr gkxhA

Ø **lkfgfR;d vfHk:fp** % lkfgR; u doy lkekftd ifrfcEc gkrk g] vfir ;g ekuo eu d ifj"dj.k dk gr gkrk gA ikB;de e p;fur jpukvk d ek/;e l Nk=kvk dh lkfgfR;d vfHk:fp fodflr gkxhA

Ø **jktxkjkWe[krk** % fgUnh jk"VHkk"kk gku d lkFk gh vk/kfud le; e 'k{kf.kd] i'kklfud] tulpkj ek/;ek d vykok fofHkUu {k=k e jktxkj lftr dj jgh gA bld lkFk gh fofHkUu ifr;kxh ijh{kkvk e Hkh fgUnh ek/;e d ifr :fp dh of) gb gA ikB;de d v/;;u l Nk=kvk dk mijkDr {k=k e jktxkjkWe[krk dk ykHk feyxkA

M. Phil. (English Language Teaching)

Semester I

Core Paper

ENGL 614 Language and Text: Linguistic and Literary Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of the course, students will be able to:

- understand language as a complex system of material and metaphysical existence.
- know forms and interpretations of texts.
- explain different aspects of linguistic theory and its application for the analysis of linguistic phenomenon.
- develop self-reflectivity and critical understanding which may be instrumental in analyzing a text within its context, pretext, subtext, and inter-text.
- know the rich treasures of Indian literary theory so it be applied for unraveling different layers of a text.

Teaching Pedagogy

ENGL 619 Principles of Language Teaching, Testing and Practice

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of the course, students will be able to:

- analyze objectives of teaching English in India.
- apply fundamental and specific principles from the methods of English Language Teaching.

- classify and differentiate between different teaching methods and types of syllabi.
- apply the knowledge of syllabus designing for evaluating any university syllabus.
- explain the relevance of linguistics, role of media and audio-visual aids in the field of English language teaching.

ENGL 605 Research Methodology in Language and Literature

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of the course, students will be able to:

- understand basic research concepts and methodologies.
- select appropriate research topics/problems.
- prepare relevant research proposal by developing a critical awareness of and on the major aspects of a good research.
- understand conventions of MLA and APA style sheet.

ENGL 621P Term Paper

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**24**	**12**

Learning Outcomes:

After the completion of the course, students will be able to:

- prepare an outline of the paper that they have to present.
- develop critical awareness on the underlying principles of writing research paper.

Semester II

ENGL 612D Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**36**	**18**

Learning Outcomes:

After the completion of the course, students will be able to:

- explore a literary text through a suitable literary and linguistic theory.
- familiarize themselves with different aspects of documentation which are essential for writing a dissertation.
- write and submit a Dissertation based on the topic of their choice.

ENGL 620S Seminar

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

CA= Progress Report (20) + Mid-term Presentation(20)

ESA= Seminar before the faculty members of the Department

Learning Outcomes:

After the completion of the course, students will be able to:

- present their thoughts and ideas on the topic of their choice.
- cultivate their analytical and argumentative skills
- prepare them to undertake an independent research work.

Reading Electives

ENGL 615R Language in Contexts

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- develop communicative, literary competence along with self-reflexivity and self-criticality.
- synthesize major concepts of Psycholinguistics, Sociolinguistics, Applied Linguistics, Cognitive and Neuro-linguistics.

ENGL 618R Philosophy of Language

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- familiarize themselves with different aspects of Philosophy of Language
- explore Vedic and Pro-Vedic theories on the Philosophy of Language: *Nighantu* and *Nirukt*, *Nyaya* Philosophy, *Mimamsa* School of Thoughts, *Paninian* Grammar, Patanjali's *Mahabhashya*, Bhartrhari's Theory of Meaning, *Buddhist* and *Jainist* Philosophy of Language.

ENGL 617R Nature, Form and Functions of Language

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- know and understand the relationship between semiotics and Semiology.

- explore the philosophy of language and its role in Pragmatics and Communication.
- engage themselves with the rich area of English for specific Purposes, Error Analysis, Contrastive Analysis and Inter-language.

ENGL 613R Indian Philosophy

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After the completion of the course, students will be able to:

- familiarize themselves with major schools of Indian Philosophy.
- develop analytical and critical faculty.
- understand the complexity of an argument and a thesis.
- contextualize an anti-thesis.

ENGL 611R Discourse Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After the completion of the course, students will be able to:

- analyse discourse on different linguistic levels.
- understand phenomenon of grammatical, rhetorical textualities.

ENGL 622R Western Philosophy

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After the completion of the course, students will be able to:

- familiarize themselves with major schools of Western Philosophy.
- develop analytical and critical faculty.
- understand the complexity of an argument and a thesis.
- contextualize an anti-thesis.

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iFke lel=

SANS 604 lL—r 'kkL/k ifof/k ,oa 'kkL/k lo{k.k

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	4	0	0	4

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **lLÑr 'kkL/k lo{k.k dk'ky fodkl A**
- **lL—r 'kkL/k ifof/k dk vf/kxeA**

SANS 601 /ke] n'ku vkj lL—fr

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	4	0	0	4

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **fofHkUu /kek d Lo:i dk vocL/k**
- **/ke] n'ku ,o lL—fr d ifr leUo;kRed nf"Vdk.k dk fodkl A**

SANS 608 f'k{kd] f'k{k.k ,oa mPp f'k{kk

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	4	0	0	4

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **lL—r f'k{k.k dk vocL/kA**
- **ikphu ,o vk/kfud lL—r f'k{k.k lLFkkuk dh dk; i)fr dk KkuA**

SANS 611P l=kof/k i=

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	0	0	24	12

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **'kkL/kkRed nf"V dk fodkl A**
- **vfHk0;fDr dk'ky dk fodkl A**
- **fo'y"k.kRed {kerk dk fodkl A**

,e-fQy ¼lL—r½

f}rh; lel=

SANS 617P y?k 'kk/k icU/k

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	36	18

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **lkmfHkd vFkxg.k ,o lEi"k.kkRed {kerk dk fodkl A**
- **'kk/kkRed nf"V dk fodkl A**
- **fo'y"k.kkRed {kerk dk fodkl A**
- **lL—r lkfgR; dh uohu iofÝk;k d ifr fo|kFk;k e #fp dk fodkl A**
- **fo|kFk;k e lL—r uokpkjeyd iofÝk;k dk fodkl A**

SANS 606S lehukj

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **'kk/k i= y[ku dk'ky dk fodkl A**

Lok/;k;k/kfjr p;fur v/;;u

SANS 614R mifu"kn lkfgR; dk lkekU; v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **vk/;kfRed o 0;kogkfjd le> fodkl A**
- **thou eY;k dk KkuA**
- **b'kkokL;kifu"kn**
- **dukifu"kn**
- **e.Mdkfu"kn**
- **ek.MD;kifu"kn**
- **rfÙkjh;kifu"kn**
- **i'ukifu"kn**
- **NkUnkX;kifu"kn**
- **,rj;kifu"kn**
- **ognkj.;dkifu"kn**
- **'ork'orjkifu"kn**

SANS 612R lLdr dFkk lkfgR; dk lkekU; v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- **ikphu lLdr lkfgR; dk Kku**
- **dFkkvk d ek/;e l ekuoh; eY;k dk fodkl A**

- jk tufrd fo'y"k.k dh {kerk dk fodkl A
- dkneEcjh
- ipr U=
- crkyipfo'kfrdk
- Hkkt ic U/k
- tkrdekyk
- 'kdllrfr
- dFkk lfjRlkxj
- cgRdFkketjh

SANS 613R lkfgR;'kkL=h; xUFkk dk ifjp;kRed v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- Lok/;k; dk'ky dk fodkl A
- lkfnHkd vFkxg.k ,o vfHk0;Dr dju dh {kerk dk fodkl A
  - dk0;kydkj] dk0;kydkjl=ofÝk
  - vkfpR;fopkjppk] 0;fDrfood
  - 'kCn0;kikjfopkj] vfHk/kkofÝkekrdkVdifjHkk"kk] oÝkjRukdj
  - dk0;lR;kykd] dk0;kydkjdkfjdk

SANS 616R om] 0;kdj.k ,o n'kku'kkL=h; xUFkk dk ifjp;kRed v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- Lok/;k; dk'ky dk fodkl A
- lkmfHkd vFkxg.k ,o vfHk0;Dr dju dh {kerk dk fodkl A
  - fu#Dr] ognnork
  - ikjLdjxá l=] ;kKoYD; f'k{kk
  - ijey?ket"kk] okD;inh;e
  - cã l=] ;kxl=
  - ipn'kh] U;k lfl)kUreDrkoyh

SANS 610R ijk.k ,o /ke'kkL=h; xUFkk dk ifjp;kRed v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- vFkck/k dh lkeF; dk fodkl A
- iLrrhdj.k dh {kerk dk fodkl A

SANS 615R okKkfud ,o uhfr'kkL=h; xUFkk dk ifjp;kRed v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

fuxe & ikB;Øe d lQyrkiod v/;;u d i'pkr fo|kFkh fuEufyf[kr e leFk gkxA

- vFkck/k dh lkeF; dk fodkl A
- iLrrhdj.k dh {kerk dk fodkl A
  - pjd lfgrk] lJr lfgrk
  - vk;HkVVh;] yhykorh
  - dkfVyh; vFk'kkL=

- 'kØuhfr] pk.kD;uhfrni.kh
- dkeUndh;uhfr lkj] uhfrokD;kere] fonjuhfr

,e- fQy ¼fgUnh½

iFke lel=

HIND 609 f'k{kd] f'k{k.k ,oa mPp f'k{kk

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

vif{kr ifj.kke

- mPp d{kkvk d v/;kiu gr Nk=kvk d Hkk"kkb dk'ky dk fodkl gkxkA
- 0;kdj.k ,o lkfgR; v/;kiu dh fofHkUu i)fr;k dk Kku gk ldxkA
- vuokn d fofo/k idkjk d v/;;u l Nk=k, bl {k= e jktxkj dh lHkkoukvk l ifjfpr gk ldxhA
- d{kk e Nk=kvk d lkFk lc/kk d foLrkj vkj mfpr lg;kx e enn feyxhA
- J0; ,o n'; lk/kuk d mi;kx l ,d d'ky f'k{kd cu ldxhA

HIND 607 'kS{k&ifof/k

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

vif{kr ifj.kke -

- bl ikBîØe d }kjk Nk=kvk dk 'kS{kfo"k;d lokxh.k tkudkjh çkIr rk gkxh gh lkFk gh vkykpukRed –f"V Hkh ç[kj gkxhA
- 'kS{k çfofèk l lkfgR; dk vè;;u dju e leFk gkxhA
- Nk=kvk dh ryukRed –f"V dk fodkl gkxkA
- 'kS{k&i= y[ku o 'kS{k&çcèk y[ku dh i)fr l ifjfpr gk ldxhA

- fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gkxkA

HIND 604 lkfgR;d foe'k

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

vif{kr ifj.kke &

- lkfgR;d {k= e fofHkUu lkekftd vkadyuk dh Hkfedk ,o mud egRo dk le> ldxhA
- lkfgR; dh lkekftd] /kkfed] jktufrd ifjo'k e egÙkk l voxr gkxhA
- gkf'k; ij iM ykxk dh vkokt] mud i'uk dk e[;/kkjk e yku e lkfgR; dh Hkfedk l voxr gkxhA
- lkfgR; dk fofHkUu nf"Vdk.kk l le>u ,o ij[ku dh le> fodflr dj ldxhA
- 'kk/k d fy, uohu fo"k;k dk p;u dju e leFk gk ldxhA

HIND 614P Lk=kof/k i=

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**24**	**12**

vif{kr ifj.kke %

- Nk=kvk e fo"k;ijd fpru vkj ekfyd y[ku dh {kerk fodflr gkxhA
- 'kk/k i= y[ku d rduhdh i{k l ifjfpr gk ldxhA
- lnHk iLrdk d voykdu l v/;;u {kerk e foLrkj gk ldxkA
- uohu foe'k vk/kkfjr lkfgR;d fo"k;k dh le> c<xhA

f}rh; lel=

HIND 605S Lkekukj

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

vif{kr ifj.kke %

- Nk=k dh foe'k ijd v/;;u iofr o i= y[ku dh {kerk fodflr gkxhA
- Ik= iLrfr d ek/;e l Nk=kvk e okpu dk'ky dh {kerk c< ldxhA
- ekfyd v/;;u ,o ekfyd y[ku dh {kerk fodflr gk ldxhA
- lnHk iLrdk d ek/;e l v/;;u dh iofRr c<kb tk ldxhA

HIND 616P Yk?k 'kks/k&ifj/k

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	36	18

vif{kr ifj.kke

- Nk=kvk dk Hkkoh 'kks/k d fy, mfpr tkudkjh fey ldxhA
- Nk=k, 'kks/k &icU/k y[ku d vko';d rRok l ifjfpr gk ldxhA
- Nk=kvk e jpukvk d vkykpukRed eY;kdu dh iofRr fodflr gk ldxhA
- Nk=k, i= o vky[k y[ku rFkk iLrfrdj.k dh 'kyh l ifjfpr gk ldxhA

Lok/;k;k/kkfjr p;fur ikB;dze leg

HIND 611R fgUnh dgkuh dk v/;;u

Max. Marks : 100	L	T	P	C
	0	0	0	2

vif{kr ifj.kke&

- Hkkjrh; uotkxj.k ,o fgUnh dgkuh d mnHko l ifjfpr gk ldxhA
- fgUnh dgkuh d fujrj cnyr Lo:i dk le> ldxhA
- fofo/k dgkuh vknkyuk dh tkudkjh xg.k dj ldxhA
- fgUnh dgkuhdkjk dh fof'k"Vrkvk o dF;&'kyh d lUnHk e 0;kid –f"V fodflr dj ldxhA

- 'kk/k d fy, u, {k= dk p;u o foLrr le> fodfLr dj ik,xhA

HIND 613R fgUnh miU;kl dk v/;;u

Max. Marks : 100

L	T	P	C
0	0	0	2

vif{kr ifj.kke&

- Hkkjrh; uotkxj.k d lUnHk e fgUnh miU;kl d fodkl dk le> ldxhA
- Lok/khurk vkUnkyu d nkjku fy[k miU;kLk e vfHkO;ä ;x ifjo'k l miU;kl fo/kk d egRo l ifjfpr gkxhA
- Lok/khurk i'pkr d 0;kid lnHkk d ek/;e l Hkkjrh; miU;kl fo/kk d fof'k"V Lo:i dk le> ik;xhA
- 'kk/k d fy, 0;kid i"BHkfe o le> fodfLr dj ldxhA

HIND 615R vk/kfud dFkrj&x| fo/kk,

Max. Marks : 100

L	T	P	C
0	0	0	2

vif{kr ifj.kke -

- Nk=kvk dh vkykpukRed –f"V ç[kj gkxhA
- vkèkfud dFkrj x| fo/kkvk d vè;;u l lkfgR; dh le> fodfLr gkxhA
- Nk=kvk e ryukRed nf"V fodfLr gkxhA
- 'kk/k gr uohu fo"k;k dh tkudkjh ikIr gkxhA
- fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gkxkA

HIND 612R fgUnh fuc/k

Max. Marks : 100

L	T	P	C
0	0	0	2

vif{kr ifj.kke&

- Nk=k, lkfgR; dh fuc/k fo/kk l ifjfpr gk ldxhA
- fuc/k d mnHko ,o fodkl d lkFk fofHkUu ;xu ifjfLFkfr;k e fuc/k fo/kk d cnykok vkj ml dh fo'k"krkvk l ifjfpr gk ldxhA
- fuc/k fo/kk d v/;;u l Nk=kvk d fpru e oLrfu"Brk dh {kerk fodfl r gkxhA
- fo"k;fu"B y[ku vkj rF; fu:i.k dh {kerk fodfl r gk ldxhA

HIND 610R ;k=k lkfgR;

Max. Marks : 100

L	T	P	C
0	0	0	2

vif{kr ifj.kke&

- ;k=k lkfgR; d {k= e 'kkèk&–f"V fodfl r gkxhA
- ;k=k lkfgR; d vè;;u }kjk l tukRed ekufldrk dk fodkl gkxkA
- ;k=k lLej.k y[ku&dk'ky dk fodkl gkxkA
- ;k=k lkfgR;dkjk l ifjfpr gkdj lkfgR; o lekt d çfr lonu'khy gkxhA
- Hkkjrh; o ik'pkR; ;k=k vuHko }kjk ufrd o lkL–frd eY;k dk fodkl gkxkA

HIND 617R ykd lkfgR;

Max. Marks : 100

L	T	P	C
0	0	0	2

vif{kr ifj.kke &

- ykd o vfHkktkR; lL–fr d vrj dk le>u l ufrd fodkl gkxkA
- ykd lL–fr o lkfgR; d {k= e 'kkèk&dk; d çfr #fp tkxr gkxhA

- ykdlkfgR; lektfoKku dh vU; 'kk[kkvk l çHkkfor gkrk g vkj lkFk e djrk Hkh gj bldh Li"V le> Nk=k, cuk ik,xhA
- çkP; o ik'pkR; ykdlL—fr d ryukRed vè;;u e leFk gk ik,xhA
- ykdlkfgR; dh vè;;u i)fr;k o ldyu fofèk;k dh tkudkjh dju ij 'kkèk dk; lxe gkxkA

BANASTHALI VIDYAPITH

Master of Philosophy (Mathematical Sciences – Mathematics/Statistics/Operations Research)

Curriculum Structure

First Semester Examination, December, 2019

Second Semester Examination, April/May, 2020

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Progamme Educational Objectives

Banasthali's education ideology is to nurture women leaders in all walks of life with strong value base. Mathematical Sciences is the most important discipline in today's world which has applications in engineering, business, finance, computing, data science, health sciences and environmental sciences. The educational objective of the M.Phil. Mathematical Sciences programme is to motivate students to learn advanced and emerging research areas in various fields of mathematics and statistics in order to prepare students for professional careers in mathematical sciences and related fields.

The aim of the programme is to equip students with mathematical and statistical knowledge to develop research level thinking. It emphasizes on research skills and to develop the ability to critically analyze the undertaken research area to produce a piece of written work as dissertation.

The main objectives of the M.Phil. (Mathematical Sciences) programme are:

- To develop the ability to define, design and deliver a significant piece of research work that is clear and coherent.
- To impart necessary skills and knowledge of deeper understanding of chosen research area.
- To use mathematical and statistical techniques to solve well-defined real-world problems and understand the limitations.
- To develop communication and technical writing skills which enables students to present mathematical and statistical ideas clearly in oral and written forms using appropriate technical terms and deliver data analysis results.
- To nurture skills in effective multidisciplinary teamwork and adherence to principles of professional accountability and ethics.

Programme Outcomes

- **PO1: Knowledge Domain:** Demonstrate an understanding of research in mathematical sciences and ability to define, design and deliver a significance piece of research work that is clear and coherent.
- **PO2: Problem Analysis:** Analyze and solve the well-defined research problems in mathematics, statistics and operations research. Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- **PO3: Presentation and Interpretation of Data:** Demonstrate the ability to manipulate and visualize data and to compute standard statistical summaries.
- **PO4: Modern Tool Usage:** Learn, select and apply appropriate methods and procedures, resources and computing tools such as Excel, MATLAB, MATHEMATICA, SPSS, R etc. with an understanding of the limitations.
- **PO5: Technical Skills:** Understand tools of modeling, simulation and data analysis to bear on real-world problems, producing solutions with the power to predict and explain complex phenomena.
- **PO6: Ethics:** Analyze relevant academic, professional and research ethical problems and commit to professional ethics and responsibilities with applicable norms of the data analysis and research practices.
- **PO7: Communication:** Effectively communicate about their field of expertise on their activities, with their peer and society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations.
- **PO8: Project Management:** Apply knowledge and understanding of principles of mathematics and statistics effectively as an individual, and as a member or leader in diverse teams to manage projects in multidisciplinary environment.

- **PO9:** **Research Proposal:** Define, design and deliver a significant piece of research work that is clear and concise. Demonstrate the necessary skills and knowledge of deeper understanding of their chosen research area. Understand the philosophy of research in mathematical sciences and appreciate the value of its development.
- **PO10:** **Life-Long learning:** Demonstrate the ability to read and learn mathematical and statistical tools on their own that encourage independent exploration in the specific area of mathematics, statistics, operations research and theoretical computer science. Continue to acquire mathematical and statistical knowledge and skills appropriate to professional activities in the context of technological change.

MATH 602 Advanced Analysis

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After completion of the course, student will be able to:

- Tell what is Normed spaces
- Explain when Normed space become Banach space
- Define the Hilbert spaces
- Define multi linear mappings
- Check whether the function is bounded or not?
- Understand directional derivative.
- Explain the difference between partial derivative and directional derivative
- Tell about the fixed point
- Tell about the Lipschitz's constant and conditions
- Relate the analysis and differential equation

MATH 626 Research Methodology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the philosophy of research in mathematics and statistics.
- Develop and understand various mathematical concepts and modeling techniques required for successful application of mathematics.

- Understand and solve multidisciplinary application problems. use appropriate technology to solve problems applying techniques of mathematics.

MATH 504 Analytic and Algebraic Number Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Demonstrate the knowledge of arithmetic functions and their property.
- Know the prime number theorem and its analytic proof.
- Understand basic concepts of algebraic number theory such as conjugates, discriminants, algebraic integers, integral basis, norms and traces.
- Understand prime factorization of ideal and unique factorization.
- Know some important theorem in algebraic number theory.

MATH 507 Financial Mathematics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand financial analysis and planning.
- Know the cost of capital, capital structure and dividend policies.
- Apply technique of Goal Programming to profit planning and financial budgeting.

- Make financing decision onproblem of determining optimal capital structure
- Understand the concept of leasing, debt management, analysis of commitment of funds and risk of cash insolvency.

MATH 527 Tensor Analysis and Geometry of Manifolds

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Discuss different kinds of surfaces, connection and covariant derivatives.
- Understand the concepts of manifold and illustrate some examples of manifolds.
- Understand the Ricci identity and enable to use it in proving different theorems.
- Define and illustrate some examples of Lie group.

MATH 601 Advanced Graph Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand and apply the fundamental concepts in graph theory.
- Recognize and express the mathematical ideas graphically.
- Acquire ability to apply graph theory based tools in solving practical problems.

- Improve the proof writing skills.
- Develop mathematical maturity.
- Understand some applications of graph theory to practical problems and other areas.

MATH 614 Finsler Geometry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- use of purely metric methods in the investigation of various Finsler metrics that appear naturally in geometry, topology and convexity theory.

MATH 619 Mathematical Cryptography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the necessary concepts of number theory and complexity theory.
- Understand the need of cryptography and its impact on the society.
- Demonstrate the knowledge of one way functions and its concrete examples such as integer factorization and discrete logarithm.
- Understand the public key cryptosystems such as RSA and ElGamal.

- Know the concept of digital signature.

STAT 504 Clinical Trials

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Identify and classify different types of trial designs when reading a trial report.
- Understand the essential design issues of randomized clinical trials.
- Appreciate three possible sources of errors that could lead to erroneous trial results.
- Understand the basic statistical principles, concepts, and methods for clinical data analysis and reporting; and
- Understand some frequently used terms in clinical trials.
- Understand the relative contributions of clinical judgment and clinical trials in evaluating new medical therapies.

STAT 505 Decision Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand a decision theoretic approach to the problem, evaluate a utility function, propose a conjugate family of

prior distributions, evaluate Bayes and posterior risks and find the optimal solution.

- Solve Multilevel Decision Problems, Decision Process with sampling information
- Understand Basic Concept of the sampling time Markov decision process, telecommunication and queuing theory.

STAT 508 Distribution Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Formulate the statistical models for real data sets arising in various fields in order to analyze in respect of various useful characteristics of the populations
- Develop problem-solving techniques needed to accurately calculate probabilities.
- Identify the distribution of random variable under various discrete and continuous distributions.
- Calculate probabilities, moments and other related quantities based on given distributions.
- Determine the probability distribution after transformation.
- Understand how to use non-central distributions in real life problems.

STAT 522 Econometric Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Construct econometric models from economic models.
- Detect influential observations and perform robust regression.
- Estimate regression models when the dependent variable is nominal, ordinal or a quantile.
- Fit distributed lag model when the data is time series.
- Diagnose the identifiability of a simultaneous equation model.
- Estimate a simultaneous equation system.

STAT 511 Non-Parametric Inference and Sequential Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Solve hypothesis testing problems where the conditions for the traditional parametric inferential tools to be applied are not fulfilled.
- Build non-parametric density estimates.
- The application of sequential statistical techniques.
- Critically examining sequential procedures for appropriate statistical analyses.

STAT 513 Regression Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the concept of regression and the underlying assumptions.
- Estimate least squares estimate of regression coefficients.
- Perform testing of complete regression model and subset of regression model.
- Measure the goodness of the model.
- Check the validity of the assumptions for a real data.
- Find a suitable remedy to reduce the effect of violation of any assumption.
- Include a qualitative variable as regressors in a regression model using dummy variables.
- Check the model for specification errors and its testing.
- Understand the concept of outlier, leverages and influential observations.
- Understand the concept of a simple logistic regression and make interpretations.

STAT 603 Bayesian Inference

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Calculate simple likelihood function and use relative frequencies to estimate probabilities and conditional probabilities.
- Calculate posterior probabilities using Bayes' theorem

- Describe the role of the posterior distribution, the likelihood function and the posterior distribution in Bayesian inference about a parameter.
- Explain in detail the Bayesian framework for data analysis and its flexibility and be able to demonstrate when the Bayesian approach can be beneficial.
- Develop, analytically describe, and implement both single and multi parameter probability models in the Bayesian framework.
- Demonstrate the role of the prior distribution in Bayesian inference and be able to articulate the usage of non-informative priors and conjugate priors.
- Show high level Interpretation of Bayesian Analysis Results and be able to readily perform Bayesian model evaluation and assessment.

STAT 609 Population Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Identify principle sources of population data and assess their strengths and weaknesses.
- Able to evaluate of human development index.
- Construct and interpret life tables.
- Aware various population policies and programs.
- Calculation and interpretation of the principal demographic measures, and standardize these measures for comparison.

- Understand the significance of age- sex structures and their implications on population change, including the effects of changing birth, death and migration rates, and demonstrate their influences on age structure.
- Understand the concept of urbanization on the economic growth of the contrary.
- Estimate and project the population by different methods.

STAT 613 Time Series Modeling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Estimate and eliminate trend and seasonality in a time series
- Fit stationary and non-stationary time series model to a series
- Understand the concept of testing for parameter stability of a time series model
- Demonstrate fitting of multivariate ARMA model to series
- Understand the concept of cointegration analysis and procedure for two variable models.
- Understand the concept of Vector autoregression and causality.
- Understand the concept of volatility in a series and related models.

MATH 543 Fuzzy Logic and Belief Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- learn crips and fuzzy set theory.
- decide the difference between crips set and fuzzy set theory.
- make calculation on fuzy set theory.
- recognize fuzzy logic membership function.
- recognize fuzzy logic fuzzy inference systems
- make applications on Fuzzy logic membership function and fuzzy inference systems.
- utilize fuzzy logic approach to problems arising in the field of Operations Research, Computer Science and Engineering.
- be able to formulate logical expressions, fuzzy logic to solve a variety of problems related to real scenarios
- be able to apply defuzzification methods.

MATH 546 Inventory Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Comprehend the dynamics of inventory management's principles, concepts, and techniques as they relate to the entire supply chain (customer demand, distribution, and product transformation processes),
- Understand the methods used by organizations to obtain the right quantities of stock or inventory,
- Familiarize themselves with inventory management practices.
- Optimize different case studies requires efficient methods and practices to address inventory management problems.

- Understand the behavior of the inventory parameters after some time using simulation techniques.

MATH 555 Queueing Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the principles and objectives of model building based on Markov chains.
- Analyze the queueing situations.
- Understand the mathematical tools that are needed to solve queueing problems.
- Identify and develop queueing models from the verbal description of the real system.

STAT 524 Reliability and Renewal Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the importance of validity and reliability assessment and the link between the two.
- Estimate the reliability function and mean time to failure for different types of systems
- Analyze statistical experiments leading to reliability modeling.
- Estimate life length distributions, using complete or censored data.
- Identify reliability testing components.

- Apply reliability theory to assessment of reliability in engineering design.
- Analyze non-repairable systems of independent components, with and without redundancy
- First look at what a random process is and then explain what renewal processes are.
- Describe, derive, and prove important theorems and formulas for renewal theory
- Use renewal theory to solve problems where Poisson is not a realistic process

MATH 539 Fields and Galois Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the concepts of field extension and appreciate its importance.
- Understand different types of extensions.
- Find the Galois group for some extension fields.
- Know the link between field theory and group theory.
- Demonstrate the solvability of quadratic, cubic and quartic equations by radicals.

MATH 534 Coding Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the need of coding theory.
- Appreciate the applications of abstract and linear algebra in coding theory.
- Find the generator and parity check matrix of linear codes.
- Understand the main coding theory problem.
- Derive classical bounds of codes and the distance of the code.
- Understand cyclic codes and their decoding.

MATH 540 Fixed Point Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand various concepts in metric spaces such as completeness.
- Demonstrate standard examples of metric spaces and prove simple results related to them.
- Understand the proof of open mapping theorem and Closed graph theorem.
- Check the conditions for expansive and Nonexpansive Mappings, contractive and contraction mappings.
- Understand standard fixed-point theorems.
- To present the basic ideas of the theory, and illustrate them with a wealth of examples and applications in differential and integral equations.

MATH 545 Introduction to Dynamical Systems

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Describe the main features of dynamical systems and their realisation as systems of ordinary differential equations.
- Identify fixed points of simple dynamical systems, and study the local dynamics around these fixed points, in particular to discuss their stability.
- Use a range of specialised analytical techniques which are required in the study of dynamical systems.
- Describe dynamical systems geometrically and represent them graphically via phase plane analysis.
- Find fixed points and period orbits of discrete dynamical systems, and find their stability.
- Do graphical analysis of 1D discrete dynamical systems.
- Understand the basic properties of a chaotic dynamical system.

MATH 533 Bio Mathematics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- model the single species and two species systems.
- study the stability of these systems.
- Apply harvesting of the species.
- to model epidemics and analyse the dynamics

MATH 535 Combinatorial Optimization

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- define the concept of combinatorial (optimisation or satisfaction) problem
- recognize many types of combinatorial optimization problems;
- formulate linear and integer programs, and identify when a problem can be viewed in terms of various "standard" combinatorial optimization problems; understand the mathematical concepts underlying these problems and their solutions;
- solve combinatorial optimization problems using suitable algorithms
- analyze the performance of simple algorithms, understand and interpret computational complexity, and reduce one problem to another.

MATH 559 Transportation System Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Use optimal transportation decision-making schemes based on transportation data analysis by establishing, testing and solving transportation models.
- Perform simple statistical analysis on transportation field data, sample estimation and hypothesis testing in transportation system.
- Design suitable sampling and experimental methods for transportation system analysis and realize error sources.

STAT 527 Stochastic Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Acquire skills in handling situations involving more than one random variables.
- Understand to analyze the performance of reliability models.
- Learn how to analyze a network of queues with Poisson arrivals and exponential service requirements.
- Learn how to analyze a network of queues with Poisson arrivals and general service requirements.
- Understand the concept of switching in reliability modeling.

STAT 521 Demography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Identify principle sources of demographic data and assess their strengths and weaknesses.
- Discuss the demographic significance of age and sex structures and the implications of variations in age & sex structure.
- Construct and interpret life tables.
- Calculation and interpretation of the principal demographic measures, and standardize these measures for comparison.

- Understand the components of population change, including the effects of changing birth, death and migration rates, and demonstrate their influences on age structure.
- Understand the concept of urbanization on the economic growth of the contrary.
- Estimate and project the population by different methods.
- Understand the concept of stable and stationary population.

MATH 603R Advanced Cryptography

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand digital signatures in detail.
- Understand the concept of signcryption and its security requirements.
- Understand the identity based cryptography.

MATH 604R Advanced Queueing Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the principles and objectives of model building based on Markov chains.
- Analyze the queueing situations.

- Understand the mathematical tools that are needed to solve queueing problems.
- Identify and develop queueing models from the verbal description of the real system.
- Understand the various Non-Markovian queueing models.

MATH 605R Algebraic Aspects of Cryptography

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the finite field arithmetic and what are the efficient algorithms for theme
- Know the group law of elliptic curves and able to perform computation on the elliptic curves.
- Grasp the concepts of lattices and their applications in cryptography.

MATH 606R Algebraic Geometry

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- have knowledge of the basic affine and projective geometries.
- Be familiar with explicit examples including plane curves, quadrics, cubic surfaces, Segre and Veronese embedding.
- increased their knowledge of finitely generated commutative rings and their fields of fractions.

- learn how to formulate and prove basic statements about algebraic varieties. precise abstract algebraic language.

MATH 609R Decision and Game Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand and explain the framework of Decision Theory, its intrinsic limitations and broad goals, and how it leads to Game Theory.
- Demonstrate an understanding of games in pure and mixed strategies.
- Explain the game theoretic concepts of uncertainty, information and strategic moves.
- Explain the characteristics and application of repeated games and associated trigger strategies.
- Apply decision making models in interaction situations.
- Gain a proper understanding of game theoretic concepts and modeling: covering equilibrium in static and dynamic games, with varying information structures.

MATH 612R Finite Element Methods

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand global, local, and natural coordinates.
- Understand the significance of shape functions (linear, quadratic, cubic) in finite element formulations and can formulate one and

two-dimensional elements like triangular and rectangular elements.

- Understand the concepts behind variational methods and weighted residual methods in FEM
- be able to implement the Galerkin residual weak formulation into the Finite Element Method for the solution of Ordinary and Partial Differential Equations.

MATH 613R Finite Field Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand finite fields and their extension in detail.
- Find primitive polynomial, factorization of polynomials.
- Understand Gauss, Jacobi, and Kloosterman sums, character sums and their applications.

MATH 616R Intelligent Transport System

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- understand the sensor and communication technologies.
- differentiate different ITS user services
- define the significance of ITS under Indian conditions

- select appropriate ITS technology depending upon site specific conditions.
- design and implement ITS components

MATH 617R Inventory and Production Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Demonstrate what inventory is and where we find it within the supply chain.
- Demonstrate the types of demand patterns common in real inventory problems.
- Prepare appropriate inventory planning models for differing demand patterns.
- Recognize the importance of inventory management.
- Understand Production management basics and its history.
- Formulation of aggregate planning problems; their objectives, constraints and applicable solution techniques.
- Understand the terms Trade credit, Inflation, VMI etc. and learn how to use these policies in inventory modeling.

MATH 618R Marketing Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the concept of marketing and its role in business and public organization.
- Understand the need for scientific marketing analysis.
- To uses Mathematical models in Marketing and understand their limitations.

MATH 621R Numerical Solutions of Partial Differential Equations

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Solve mathematical models represented by initial or boundary value problems involving partial differential equations that cannot be solved directly using standard mathematical techniques but are amenable to a computational approach.
- Select appropriate numerical methods based on the characteristics of a PDE problem.
- Introduce the discretization methodologies, with particular emphasis on the finite difference method that allows the construction of accurate and stable numerical schemes.
- Discuss about the stability and convergence of the numerical methods.

MATH 622R Operator Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Tell what is operators
- Define several standard examples of linear operators, self-adjoint operators and prove simple results related to them.
- Spectral representation of compact self-adjoint operators in Hilbert spaces.
- Applications of spectral Theorem for compact operators.
- Some recent results and open problems in operator theory

MATH 624R Special Functions

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- understand various types of special functions, and their conditions of existence.
- carry out relations between different special functions, including some of the most useful special functions.
- demonstrate understanding of the concepts of recurrence relations, generating functions, series representations pertaining to different special functions and polynomials.
- determine some significant properties of special functions and their integral forms.
- discuss the nature of various special functions in different domains.

STAT 602R Advanced Reliability Theory

Max. Marks : 100	**L**	**T**	**P**	**C**

(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Estimate the reliability function and mean time to failure for different types of systems.
- Understand major concepts of reliability prediction.
- Analyze statistical experiments leading to reliability modeling.
- Estimate life length distributions, using complete or censored data.
- Identify reliability testing components.
- Apply reliability theory to assessment of reliability in engineering design.
- Know Bayesian reliability concept.
- Determine Life table and Kaplan- Meier approach.
- Understand MCMC technique for simulation.

STAT 604R Biostatistics

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand various measures in medical studies.
- Assess validity and reliability of a test.
- Find association and causal relations between the variables.

STAT 608R Generalized Linear Models

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the concept of logistic regression, its estimation and testing.
- Understand the procedure to regression analysis for dependent count variable using Poisson regression.
- Broaden their understanding of regression model to generalized linear models and their application.

STAT 610R Statistical Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Simulate and generate statistical data by different techniques.
- Estimate the unknown parameter of population via different methods.
- Understand the basic concepts of statistical theories besides developing their ability to handle real world problems with large scale data.

STAT 611R Supply Chain Management

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Understand the structure of supply chains and the different ways through which supply chains can become competitive in the realistic problems.
- Understand fundamental supply chain management concepts.
- Apply knowledge to evaluate and manage an effective supply chain.
- How to align the management of a supply chain with corporate goals and strategies.
- Analyze and improve supply chain processes.
- Identify the principles of customer and supplier relationship management in supply chains.

STAT 612R Survival Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, student will be able to:

- Identify characteristics of survival data and problems in their correct analysis
- Define and understand the relationship between the survival function, distribution function,
- Hazard function, relative hazard, and cumulative hazard
- Perform and interpret analyses of survival data using common statistical procedures
- Fit the proportional hazards regression model to survival data and assess the scientific
- significance, precision, and interpretation of regression coefficients
- Fit parametric regression model to survival data and assess the scientific significance,
- precision, and interpretation of regression coefficients
- Use graphical and other methods to assess the adequacy of fitted models and propose

- Alternate solutions when common assumptions are violated
- Use time-dependent covariates in the proportional hazards model and interpret the coefficients

BANASTHALI VIDYAPITH

Master of Philosophy (Economics)
Master of Philosophy (Political Science)
Master of Philosophy (History)
Master of Philosophy (Sociology)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Master of Philosophy (Economics)

Programme Educational Objectives

M.Phil. Programme at Banasthali aims to train research students to successfully take part in the exciting profession of Economics as Economists, Managers, Policy Makers, Bureaucrats, Researchers, Journalists, Academicians, Teachers and other forms of decision makers/practitioners. The profession of Economics requires multiple skills and capabilities related to observing the decision making by economic agents at a micro and/or macro level and analytically interpreting these acts in a larger theoretical framework. The observation part requires Economists to collect data and the interpretation part requires that data is analyzed and conclusions drawn within a theoretical framework.

Economic and Social Science research requires a broad outlook and sound training of theory as well as research methods. The M.Phil. Programme therefore focuses on providing advanced training of economic theory along with a robust introduction to research methods in Economics and Social Sciences. To keep up with the dynamic real world and the ever expanding theoretical world it is ensured that the Curriculum is reviewed and if necessary revised every year. Multiple reading electives are also incorporated to promote the development of ability of self learning amongst research students.

The broad Course objectives are to impart knowledge and develop understanding of the economy at national and global level, and at the same time provide necessary analytical tools and intellectual training to make meaningful observations and interpretations.

The main objectives of the M.Phil. programme in Economics are:

- To provide exemplary education in a stimulating environment where delivery of knowledge of theory and practice of Economics is integrated with nationally and internationally recognized research which enables students to undergo a transformative learning and research process.

- To prepare competent Social Science Researchers (particularly in the field of Economics) at various levels for India.
- To expose students to theoretical and research method approaches within the field of Economics and allied subjects and promote respect for all approaches.
- To develop gender-neutral attitudes and practices, respect for all races, nations, religions, culture, language and traditions.
- To promote scientific temper amongst the students in particular and the society in general.
- To nurture a temperament that would enable individuals to set and work towards self-driven performance goals, entrepreneurial and academic ventures and overall leadership.

Programme Outcomes

- **PO1: Knowledge of Economics:** Students will be able to develop understanding of economic concepts pertaining to the behavior of economic agent from micro and macro perspectives. Along with this they will be able to explain and analyze economic theories and models.

- **PO2: Knowledge of Social Science, Philosophy and Research:** Students will be able to understand the overall social science perspective and the comparative role of economics in this scheme, especially through the paper on Research Method which is delivered in an interdisciplinary manner.

- **PO3: Problematizing ability:** Students will be able to utilize, philosophical and scientific techniques to achieve clear, analytical and critical thinking process for raising original and genuine questions and finding research gaps to set a research agenda.

- **PO4: Designing Research:** Students will be able to carry out literature review, construct research hypothesis, formulate research questions and objectives and identify sources of data/material.

- **PO5: Undertaking Research:** Students will be able to carry out research by utilizing econometric, statistical and other economics research techniques in the process of preparing their term paper and M.Phil thesis.

- **PO6: Economic Communication:** Students will be able to develop critical thinking on current issues in the framework of economics and command the ability to effectively communicate economic ideas and their own research in form of presentations and written submissions, like term paper and thesis.

- **PO7: Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines, especially with respect to completing research and compiling thesis/report.

- **PO8: Modern Tool Usage:** Ability to understand, select and apply appropriate methods and procedures of modern computing tools to achieve efficiency in economics research, communication and teaching.

- **PO9: Theory and Practice of Teaching:** Students will be able to understand the nuisances of teaching economics in the higher education setting with the help of classroom sessions and practice teaching opportunity. This aspect of the M.Phil programme at Banathali Vidyapith is one of the its kind in the entire country.

- **PO10: Professional Ethics:** Have a deep sense of respect for all disciplines and theoretical approaches so that a well rounded, dogma free intellectual activity is feasible

- **PO11: Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning to the broadest context of economic, societal and technological change. Have the ability of Self assessment and use feedback effectively from others to identify learning gaps and work on these gaps on an ongoing basis.

Master of Philosophy (Political Science)

Programme Educational Objectives

Following the ethos of Banasthali Vidyapith which aims to materialize the ethos of nation building, women leadership through five fold education, this Programme develops ethical values through practical, moral and intellectual aspects of five fold education, the ability to understand & appreciate human diversity and to engage in community life as active citizens. This programme also enhances the knowledge and creates the research aptitude about political phenomena of local to global context.

The main objectives of the programme are:

- To acquaint students with contemporary political theory and issues in Indian political system.
- To develop insights of alternative moral and ethical frameworks for interpreting contemporary political discourse.
- To apply disciplinary or interdisciplinary learning across multiple contexts, integrating knowledge and practices.
- To develop an exciting and supportive learning environment that is conducive to high quality research and related learning activities including debates, seminars and lectures.
- To engage in a systematic study of both theoretical and practical aspects of Political Science equipped with strong methodological training.
- To acquaint with the qualitative and quantitative research techniques for conducting field based research studies including selection of research problems, sampling and preparation of research tools and adoption of statistical methodologies.
- To develop a set of core skills in students to work with efficiency in the areas of teacher education, technology of teaching, educational administration and supervision.
- To increase awareness of career options available in the public and private sectors with postgraduate degree in political science. Also to make aware about its value as entry in Politics, administrative services, teaching positions, legal education and various other fields.

Programme Outcomes

After completion to the M.Phil, Programme in Political Science, students will be able to:

- **PO1: Knowledge of Political Realm:** Understand the fundamentals theories, political process and issues of national and international politics, including the political process in India. Effectively apply comparative, critical and analytical skills in reading and writing to address significant issues of the political world.
- **PO2: Interdisciplinary Perspective:** Understand interdisciplinary and feminist perspective to the study of social sciences. Evaluate diverse point of views embedded within various frameworks which may include temporal, cultural, linguistic, socio-political or technological contexts.
- **PO3: Analytical Perspective:** Demonstrate critical thinking, including the ability to form an argument, detect fallacies and evidence about key issues of politics and thoughtful and well-articulated presentations on specific field.
- **PO4: Technical Skills:** Acquire the ability and the knowledge about use of electronic devices and traditional resources to study the key issues i.e. local, state, national and international policy. Use the applications of computer for data analysis and power point presentations to explain the research findings.
- **PO5: Problem Solving:** acquaint with the idea of rational and analytical thinking and Conduct research in political areas. Also able to apply political science knowledge and skills to avoid crisis situations and solving actual problems when occur.
- **PO6: Communication Skills:** Able to interact with diverse population of formal or informal arena; grasp their view point while dealing with socio-political issues and communicate effectively in both oral and written presentations and public speaking also.

- **PO7: Leadership and Management Abilities:** Demonstrate the quality to lead a team, country and format or an informal organization. The capacity to perform duties, effective planning and management, ability to interact effectively with people and also indentifying and setting achievable goals, developing necessary strategies and outlining the tasks and schedules on how to achieve the set goals.

- **PO8: Teaching Abilities:** acquaint with teaching skills for higher education. Also demonstrate their teaching skills through practice teaching.

- **PO9: Community Service:** Participate as a civically member of society and provide community service.

- **PO10: Ethical Understanding:** Develop and apply ethical considerations in professional, personal and social life and also recognize cultural and personal variability in lifestyle.

- **PO11: Professional Identity:** Understand and perform their professional roles in state and society, such as political leader, educationalist and political analysts, Social Worker, Public Relations Assistant and Campaign Staffer and so on.

- **PO12: Environment and Sustainability:** disseminate the knowledge and demonstrate the role for the promotion of environmental sustainability, Understand the comprehensive systemic analysis across both physical and behavioral dimensions society, the environment, and the economy.

- **PO13: Life-Long Learning:** Understand the theory and practice of politics. Engage in dialogue over political concerns and life-long learning to participate in political process. Also contribute towards positive change in the society.

Master of Pholosophy (History)

Programme Educational Objectives

In compatibility with Banasthali Vidyapith aim to materialize the ethos of nation-building, Indian Culture and *Panchmukhi Shiksha*, the M.Phil History Programme focuses on the enlightened and human value based education along with the academic, disciplinary and research pursuits of students. Through the application of core, interdisciplinary courses, reading electives and dissertation writing, the M.Phil. history programme intends to orient the students towards the ideas of history, research methods, historiographical trends and issues in the writing of history.

The main objectives of the M. Phil History programme are to:

- Provide exemplary education in a stimulating environment where delivery of historical knowledge is integrated with nationally and internationally recognized research to conduct and publish cutting-edge multidisciplinary research papers.
- Give the students a choice of reading electives which are diverse in nature that provides the students more focused and deeper perceptive on selected themes.
- Facilitate pursuit of knowledge that cuts across disciplinary boundaries.
- Introduce the students to debates from the different periods of Indian history to develop in an insight into the moving forces and dynamics of the discipline.
- Raise sensitivity to professional ethical codes of conduct, social values and respect for all.
- Demonstrate standards of writing field visit reports and digital literacy that would support professional needs.
- Develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions.
- Nurture a temperament that would enable learners to set and work towards self-driven performance-goals, entrepreneurial ventures and overall leadership.

Programme Outcomes

- **PO1: History Knowledge:** This programme enables the scholars to develop knowledge about the historiographical trends, prominent debates, and issues related to the historian's craft.

- **PO2: Research Abilities**: The specialized courses enhance the research abilities and recent dynamics in historical writing.

- **PO3: Problem Analysis:** Through the focus on critical analyze of sources, term paper. Dissertation writings, self-reading, seminar, the learners would be familiarized with the skill of writing.

- **PO4: Usage of Modern Historical Methodology:** The diverse themes in global historiography, history of ideas and discussion on environmental issues, cinema and its aesthetic and ontological importance introduces the students to apply modern methodology to understand the current social changes.

- **PO5: Leadership Skills:** The dissertation writing and field work develop skills of fast and accurate ways of working and instills the learners with qualities of time/resource management. The involvement in organization of seminars/ symposiums helps to nurture in them leadership skills and sharpens value of time and importance of networking.

- **PO6: Professional Identity:** The programme caters to enhance the researchers' capabilities and professional skills to enter the field of working as historians, teachers, academicians, corporate employees and bureaucrats.

- **PO7: Ethics of History:** A sound historical knowledge enables the scholars to develop and apply principles of ethics in societal and professional contexts. They will be able to recognize cultural and personal variability in values, communication and lifestyles.

- **PO8: Communication:** The scholars will be able to critically think and analyze and formulate sound historical arguments, write them in comprehensive manner and present them before the community of intellectuals, Indian and global.

- **PO9: The Historian, Society, Environment and Sustainability:** The programme enables the scholars to achieve an understanding of the past which will build the quality of responsible citizens who can provide rational solutions to social issues, sustainable development and environmental hazards.

- **PO10: Life-Long Learning:** The M. Phil programme is just the beginning of a life-long learning of the subject of history. The scholars with their knowledge about changes in different historical periods would understand the nature of transition of the discipline, society and would develop an on-going process of learning of the same.

Master of Philosophy (Sociology)

Programme Educational Objectives

Keeping in focus the significance of research in higher education, Banasthali Vidyapith aims to train young researchers. The Master of Philosophy (M.Phil.) in Sociology Programme is designed to guide young researchers from sociological and interdisciplinary perspectives to address critical socio-cultural issues and problems. The course stimulates the research scholars to learn advanced theoretical and sociological concepts and equips them with social research techniques and tools which help them in empirical and qualitative studies of various sociological concerns of our society so that their research works may contribute to the knowledge repertoire and policy formulation

The main objectives of M.Phil Programme are:

- To provide extensive sociological knowledge about society and culture that shape individual identity and behaviour.
- To develop an understanding of fact, concept and theory and their interrelations in sociological paradigm.
- To acquaint with classical, modern and post-modern sociological theories and their implications for research initiatives.
- To provide knowledge about cross-cutting issues and basic principles of interdisciplinary approach for holistic understanding of society.
- To promote sociological researches; qualitative and quantitative both, for policy recommendations, formulation and implementation in order to bring positive social change.
- To generate awareness about gender equality and social values and motivate to adapt in dynamic socio-cultural and political scenario.
- To provide practical training through dissertation keeping in view of preparing efficient researchers.

- To enhance the abilities of effective communication and reflective presentation of sociological knowledge enriched by the application of new technological innovations.
- To develop sociological knowledge and skills that will enable to think critically and creatively about society and social issues in local and global perspective and prepare globally recognized researchers and academicians in the field of sociology.
- To explain the role of sociologists in generating awareness; creating sociological literature and formulating policy documents related to environmental regulation and sustainable development.
- To create round personality development characterized by conflict resolving attitude, leadership and team spirit essential for social construction.

Programme Outcomes

- **PO1: Sociological Knowledge:** Develop and apply sociological imagination to critically understand relation between individual and society; possess knowledge about sociological theory and methods to be applied for conducting systematic social researches and suggest policy recommendations for positive social change.
- **PO2: Planning Abilities:** Exhibit effective planning abilities essential to carry out fruitful social research with efficient time and resource management.
- **PO3: Problem analysis:** Acquainted with idea of rational thinking, scientific enquiry and critical approach; possess strong decision making ability in everyday life.
- **PO4: Modern tool usage:** Acquire knowledge of softwares and technological devices of social science research and apply them wisely according to the need of the research.
- **PO5: Leadership skills:** Understand social concerns and cultural values; develop sensitivity towards complex human nature, social interaction and dynamic social reality; consider the importance of collective wellbeing and leadership while fulfilling professional and social responsibilities.
- **PO6: Professional Identity:** Identify roles of professional sociologist such as researcher, academicians and civil servant.
- **PO7: Sociological Ethics:** Understand ethical codes that govern the conduct of sociologists and how sociological knowledge may be applied to people and lives.
- **PO8: Communication:** Communicate effectively with people in different social settings i.e. family, neighbourhood, community and society at large and grasp their view point while dealing with social issues
- **PO9: The Sociologist and Society:** Disseminate knowledge about contextual reality of society and its major concerns; Create theories to explain changing nature of society.

- **PO10: Environment and sustainability:** Understand how human quest for development altered ecological balance i.e. man-nature relationship; show the caring and sensitive attitude and behaviour towards environment in daily lives; and suggest sustainable development practices to save environment through researches and policy formulations.
- **PO11: Life- long learning:** Learns the adapting nature of Indian tradition and recognize the need for adaptation with rapidly changing materialist aspect of culture (particularly technological change); engage in dialogue over social concerns and contribute towards social justice and social upliftment

SSC 602 Teaching, Learning and Higher Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the reciprocity of teaching and learning processes
- Make use of various aids to enhance their teaching skills.
- Familiarize themselves with Academic Bodies of Higher Education
- Analyze the current situation of higher education in India.
- Understanding Education and its role in Holistic development

SSC 601 Research Methodology in Social Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the conceptual aspects of research approaches and techniques in social sciences.
- Critically analyse the methods of data collection in social sciences.
- Identify, explain, and apply the various research techniques in conducting research.
- Prepare a coherent research proposal and report.

ECO 612 Selected Topics in Advanced Economic Theory

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, the student will be able to:

- Analyze the individual choice under risk and uncertainty.
- Examine various theories of firms.
- Examine various theories of unemployment.
- Analyze optimum monetary and fiscal policies.
- Describe different theories of consumption

ECO 615P Term Paper

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**24**	**12**

Learning Outcomes:

After completion of the course, the student will be able to:

- Acquaint the basic ideals of writing a research paper in area of subject.
- Analyze the primary and secondary sources of research area in Economics.
- Build capability in applying the knowledge of research techniques in writing the research papers.
- Review various research fields and sub fields of Economics.

ECO 608D Dissertation

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**36**	**18**

Learning Outcomes:

After completion of the course, the student will be able to:

- Acquaint the basic ideals of writing the dissertation in area of subject.
- Analyze the primary and secondary sources of research problem.
- Build capability in applying the knowledge of research techniques in writing the research report.

ECO 614S Seminar

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcome

After completion of the course, the student will be able to:

- Analyze different sources of data collection.
- Develop their presentation skills
- Prepare a research paper using research techniques and methodology

ECO 613R Selected Topics in Indian Agriculture and Rural Development

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Understand the dynamics of changes in the rural economy of India.
- Grasp emerging issues related to agriculture in India in the context of their development and barriers to transformation.
- Critically analyze problems of food security, agricultural pricing and marketing.

ECO 610R Gender and Development

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Understand the key concepts relating to gender.
- Know the evolution of approaches to gender and development.
- Critically analyse the relevance of gender in development, particularly in relation to key debates around the SDGs, power and empowerment.
- Apply a range of gender analysis frameworks and tools in development interventions.

ECO 609R Economics of Ethics

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Define and explain the concept of Ethics.
- Elucidate the philosophical basis of Economic reasoning.
- Explain the role of ethics in economic thinking.
- Appreciate the potential influence of economic thinking on the idea of ethics.
- Utilize the understanding of Ethics and Economics to analyze practical economic and policy issues.

ECO 607R Behavioural Economics

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Understand main areas of Behavioural Economics.

- Analyse difference between nature of Humans in real life and Econs mentioned in Neoclassical Economics.
- Discuss the concept of Judgments
- Analyse Cognitive Biases in Judgement

ECO 611R Institutional Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

ECO 616R Urbanisation and Public Policy

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand the process of urbanization and government policies.
- Explain the link between the urban growth and economic development.
- Analyze challenges in effective implementation of public policy for urban development vis-a- vis overall development of the country.

Political Science

POL 601 Modern Political Analysis

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After completion of the course, student will be able to:

- Develop a critical understanding of the dynamism and diversity of modern and contemporary political analysis.
- Familiarize analytical and research skills needed to understand and explain politics and government.
- Develop basic analytical skills to evaluate diverse approaches to the study of politics.

POL 613P Term Paper

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**24**	**12**

Learning Outcome:

After completion of the course, student will be able to:

- Acquaint the basic ideals of writing a research paper in area of subject.
- Analyze the primary and secondary sources of research area in Political Science.
- Build capability applying the knowledge of research techniques in writing the research papers.
- Review various research fields and sub fields of Political Science.

POL 606D Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**36**	**18**

Learning Outcome:

After completion of the course, student will be able to:

- Acquaint the basic ideals of writing the dissertation in area of subject.
- Analyze the primary and secondary sources of research problem.
- Build capability applying the knowledge of research techniques in writing the research report.

POL 612S Seminar

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcome:

After completion of the course, student will be able to:

- Analyze different sources of data collection.
- Develop their presentation skills
- Prepare a research paper using research techniques and methodology

POL 608R Plato's Political Philosophy

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the Main Features of Classical Greek Philosophy in general and Plato's Political Philosophy in particular.
- Comprehend the Plato's ideas on Justice, communism, education etc.
- Analyze and justify the relevance of Plato's Ideas in modern era.

POL 611R Political Philosophy of Mahatma Gandhi

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the key features of Gandhian political philosophy.

- Comprehend the Gandhi and Gandhism as critique of liberalism and capitalism.
- Analyze the impact and relevance of Gandhian thought in Indian and global politics
- Determine Gandhian greatest accomplishment for the Indian people using evidence to support arguments and assertion.

POL 609R Political Philosophy of Amartya Sen

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the Political Philosophy of Amartya Sen.
- Analyse the ideas of AmrtyaSen on Freedom, Justice , poverty, inequality and the concept of capability.
- Identify the difference between the views of AmrtyaSen and Rawls.
- Justify the relevance of the political thoughts of AmrtyaSen in present scenario.

POL 610R Political Philosophy of Dr. B.R. Ambedkar

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand B.R. Ambedkar's social and political thought as a great reformer of Indian society and a political thinker.
- Assess and disseminate the ideas of B.R. Ambedkar on nationalism, caste, state and democracy.

- Analyse the role of Ambedkar in Political thought and constitutional development in India.

POL 607R Kautilya: Politics and State Craft

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the Political Philosophy of Ancient Indian Political thinker Kautilya.
- Evaluate the ideas of Kautilya on state, Justice and administration etc.
- Analyze the Kautilya's thoughts on International Politics and foreign affairs.
- Make justify the relevance of political philosophy of Kautilya in present scenario.

POL 614R The Constitutional ideas of Subhash Kashyap

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the views of Subhash Kashyap on constitution and Indian parliamentary system.
- Analyze the Kashyap's ideas on democracy and good governance in present scenario.
- Know about the Kashyap's ideas on conflicts and controversies of Indian constitution.
- Identify the need of political reforms in present context.

History

HIST 602 Concepts in the Study of History

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After completion of the course, the student will be able to:

- Familiarize themselves with ancient, pre-modern, and modern historical traditions.
- Comprehend concepts of historicism, neo-Marxism, intellectual history and art history.
- Assess importance of oral history, cinema history, book history and connected histories.

HIST 615P Term Paper

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	24	12

Learning Outcomes:

After completion of the course, the student will be able to:

§ Relate to the basic ideals of writing a research paper in history

§ Analyze the primary and secondary sources in history

§ Frame sound arguments using the knowledge of research techniques and knowledge

§ Review topics related to history, and historiographical trends.

HIST 609D Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	36	18

Learning Outcomes:

After completion of the course, the student will be able to:

§ Develop skills for writing of history.

§ Analyze the available source materials and develop research related arguments.

HIST 613S Seminar

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After completion of the course, the student will be able to:

- Locate a research problem related to history writing
- Analyze different sources by which a narrative of history can be written
- Prepare a research paper using research techniques and methodology
- Develop their presentation skills

HIST 616R Textiles in Indian History

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand historical development of Indian Textile and clothing.
- Evaluate scope and importance of textile Industry.
- Learn the Fundamentals of Textile Design and techniques.

HIST 612R Science and Society

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Developing the capacity to engage in rational debate and communication about historical development of scientific knowledge.
- Offer an intellectual map for students to plan and craft their own individual program.
- Invite students to think synthetically, organically and creatively.

HIST 614R Sports in History

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Describe the history of sports through antiquity to modern times.
- Define the role of international politics in the history of society and sports
- Write about the social and cultural themes of sports, sociology of the body and aspects of gender and sexuality in relation to sports.
- Explore the possibilities of the profession of historian of sports and the historical methods of writings about sports.

HIST 611R Indian Diaspora

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the changes, continuity and development of the Indian diasopric community.
- Trace the root of cross-culturalism through the classical, colonial and contemporary wave of migration.
- Develop their analytical skill through the reading of literature on Diaspora.

HIST 608R Cliometrics and the New Economic History

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the relationship between history, statistics and economic theory.
- Analyze the past with counter factual argument and virtual history.
- Comprehend with interdisciplinary approach and the emerging trends in historical research.

HIST 610R Environmental History and Global Politics in Post-Cold War Era

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Comprehend the linkages between global politics and environmental issues.
- Understand the environmental policies discussed at various earth summits.
- Develop an insight to the interdisciplinary research from a range of fields including geography, economics, history, law and biology.

Sociology

SOC 603 Sociological Approaches

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of course the students will be able to

- Explain the various sociological approaches
- Critically analyze the major sociological approaches.
- Apply theoretical knowledge to interpret social reality.

SOC 614P Term Paper

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**24**	**12**

Learning Outcomes:

After the completion of the course, students will be able to:

- Relate to the basic ideals of writing a research paper.
- Analyze the primary and secondary sources.

- Frame sound arguments using the knowledge of research techniques and knowledge.

SOC 607D Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**36**	**18**

Learning Outcomes:

After the completion of this course, Students will be able to

- Develop skills for writing of Sociology
- Analyze the available source materials and develop research related arguments

SOC 610S Seminar

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

Through this course the students will be able to,

- Locate a research problem related to social issues.
- Identify basic methodological approaches of sociological research.
- Prepare a research paper using research techniques and methodology
- Develop their presentation skills

SOC 611R Sociology of Mass Communication and Advertising

Max. Marks : 100	**L**	**T**	**P**	**C**

	0	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students will be able to

- Understand the relationship between communication, advertising and social system.
- Explain the theoretical frameworks on mass communication.
- Critically analyze the role and impact of mass media.

SOC 613R Studies in Indian Society

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain various theoretical perspectives of Indian sociology.
- Apply theoretical knowledge for social research in Indian context
- Critically analyze the emerging concerns in Indian sociology

SOC 608R Gender Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After the completion of course, the students will be able to

- Explain the basic concepts of Gender Studies like feminism, gender, and patriarchy
- Describe interdisciplinary approaches of studying women's issues with regard to their social, cultural, economic and political positioning

- Deal with gender based concerns in feminist framework with critical thinking.

SOC 609R Rural and Urban studies

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of this course, students will be able to

- Develop a critical approach towards rural and urban issues
- Conduct researches in both the settings with knowledge of basic concepts and theoretical approaches
- Recommend for rural and urban reconstruction based on researches

SOC 615R Tribal Studies

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, the students will be able to:

- Understand the concept and profile of tribes.
- Explain about tribal culture and economy.
- Discuss the various problems encountered by tribal community in India.

SOC 612R Sociology of Sports

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, the students will be able to:

- Use sociological concepts, theories and research to raise critical questions about sports
- Identify how race, caste, class, age, and gender are intertwined with current understandings of sport
- Understand the relationship between sports and major social institutions.
- Examine controversies in sports and sports related programs using a sociological perspective

BANASTHALI VIDYAPITH

Master of Technology (Computer Science)
Master of Technology (Information Technology)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Master of Technology (Computer Science)
Programme Educational Objectives

The main objectives of the programme are:

- Practice with an expertise in academics, entrepreneurship, design and development in computing technology, or research in a specialized area of computer science and Engineering to pursue higher studies.
- Exhibit analytical, decision making and problem solving skills by applying research principles for handling real life problems with realistic constraints.
- Communicate the findings or express innovative ideas in an effective manner with an awareness of professional, social and ethical responsibilities.
- Practice and promote computing technologies for societal needs.
- Contribute to advancement of computer technology by means of research and lifelong learning.

Programme Outcomes

After completion of the course, the student will achieve the following:

- **PO1.** Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to evaluate, analyze, synthesize, model and integrate technologies to solve complex engineering problems.
- **PO2.** Problem analysis: Analyze complex engineering problems critically, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.
- **PO3.** Design/development of solutions: Design and develop a system to provide a wide range of potential, feasible and optimal solutions for critical and challenging engineering problems to meet desired needs within social areas such as economics, environmental, and ethics.
- **PO4.** Conduct investigations of complex problems: Research Skill extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.
- **PO5.** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6.** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. PO7. Environment and sustainability: Understand contemporary issues in providing technology solutions for sustainable development considering impact on economic, social, political, and global issues and thereby contribute to the welfare of the society.

- **PO8.** Ethics: Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.
- **PO9.** Individual and team work: Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.
- **PO10.** Communication: Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.
- **PO11.** Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.
- **PO12.** Life-long learning: Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

Master of Technology (Information Technology)

Programme Educational Objectives

The main objectives of the programme are:

- Practice with an expertise in academics, entrepreneurship, design and development in information technology, or research in a specialized area of information technology to pursue higher studies.
- Identify and evaluate current and changing information system methodologies and assess their applicability in regulatory demands, strategic goals to address the clients' needs.
- Exhibit analytical, decision making and problem solving skills by applying research principles for handling real life problems with realistic constraints.
- Communicate the findings or express innovative ideas in an effective manner with an awareness of professional, social and ethical responsibilities.
- Practice and promote information technologies for societal needs.
- Contribute to advancement of information technology by means of research and lifelong learning.

Programme Outcomes

After completion of the course, the student will achieve the following:

- **PO1. Engineering knowledge:** Apply knowledge of Information Technology, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge to solve emerging IT based problems.
- **PO2. Problem analysis:** Analyze complex Information Technology related problems critically, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.
- **PO3. Design/development of solutions:** Design and develop a system to provide a wide range of potential, feasible and optimal solutions for critical and challenging information technology based problems to meet desired needs within social areas such as economics, environmental, and ethics.
- **PO4. Conduct investigations of complex problems:** Research Skill extract information pertinent to unfamiliar problems in information technology domain through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.
- **PO5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools of information technology including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and

cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- **PO7. Environment and sustainability:** Understand contemporary issues in providing IT solutions for sustainable development considering impact on economic, social, political, and global issues.
- **PO8. Ethics:** Acquire professional and intellectual integrity, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society using information technology solutions.
- **PO9. Individual and team work:** Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research.
- **PO10. Communication:** Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.
- **PO11. Project management and finance:** Demonstrate knowledge and understanding of information technology and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.
- **PO12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

Master of Technology (Computer Science)

CS 419 Distributed Computing

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand the hardware and software concepts of distributed operating systems, various design issues and communication and synchronization in distributed operating systems
- Understand scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems
- Understand the concept of design and implementation in the context of distributed operating systems

CS 431 Real Time Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Explain fundamental principles for programming of real time systems with time and resource limitations.
- Describe the foundation for programming languages developed for real time programming.
- Account for how real time operating systems are designed and functions.
- Describe what a real time network is.

- Use real time system programming languages and real time operating systems for real time applications.

CS 433 Soft Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Comes:

On successful completion of the course students will be able to

- Develop NN network based application.
- Differential between supervised, unsupervised and reinforcement learning.
- Apply fuzzy logic on real life problems.
- Design Hybrid Systems viz Neuro-Fuzzy, Neuro- Genetic, Fuzzy-Genetic systems.

CS 503 Advanced Computer Architecture

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Use the concepts and design of all type of sequential, combinational circuits for modern processor.
- Have knowledge to design and conduct experiments, as well as to analyze of the hardware of a parallel computer models,Multiprocessors.
- Design techniques such as pipelining and microprogramming in the design of the central processing unit of a computer system.
- Identify, formulate, and solve problems for vector processing.

CS 505 Advanced Topics in Algorithms

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Analyze the performance of various algorithms in terms of time and space and understand the concept of Amortization.
- Understand the concept and design of algorithms including matching, flow and circulator problems
- Understand numerous algorithm design techniques for problems like min-cut, Monte Carlo, minimum spanning tree.
- Choose appropriate algorithm design techniques for solving real world problems.
- Ability to understand how the choice of the algorithm design methods impact the performance of programs

Master of Technology (Information Technology)

CS 533 Software Engineering

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand and implement the concept of SDLC
- Understand the concept of project management
- Apply software quality assurance practices to ensure that software designs, development, and maintenance.
- Perform various testing techniques

IT 501 Advanced Database Management Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Learn basic concepts of Intelligent, Object relational Databases.
- Understand components of active, object, and deductive database
- To have knowledge of temporal, spatial, multimedia, mobile and web databases
- Able to write down queries in XML for parallel databases and information retrieval.
- Learn various security and authorization details related with advance database management system.

IT 504 Distributed Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand distributed systems concepts and issues.
- Understanding of communication, naming and file system in distributed system
- Learn synchronization and fault tolerance mechanism, security in distributed systems
- Basic understanding of Parallel Distributed Processing& learning

CS 525 Information Security Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Able to apply cryptography algorithms in real world problems.
- Understand need of security for information.
- Learn the role of digital signatures and cyber cash in digital world.

IT 510 Software Architecture and Project Management

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand the development cycle
- Understand the ways to deal with existing software architecture and how to interpret them for the new product development
- Apply basic software quality assurance practices to ensure that software designs, development, and maintenance meet or exceed applicable standards

CS 302 Data Communications and Networks

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Understand basic computer network technology
- Identify the different types of network topologies, protocols and network devices

- Understand the layers of the OSI and TCP/IP models
- Analyze the features and working of IPV4, IPV6 and their transition
- Understand and apply the features of Data Compression, Network and Data security

CS 314 Systems Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand concepts of System Software
- Enumerate and explain the function of the common operating system
- Learn Working of a compiler and text editor
- Understand MS DOS, ROM BIOS and Interrupt system

CS 315 Theory of Computation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory
- Understand abstract models of computing, including deterministic, non-deterministic, Push Down Automata and Turing machine models and their power to recognize the languages
- Relate practical problems to languages, automata, computability, and complexity.
- Apply mathematical and formal techniques for solving problems in computer science.

CS 406 Compiler Design

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Specify and analyze the lexical, syntactic and semantic structures of advanced language features.
- Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation.
- Write a scanner, parser, and semantic analyzer without the aid of automatic generators.
- Turn fully processed source code for a novel language into machine code for a novel computer.
- Describe techniques for intermediate code and machine code optimization.

CS 411 Computer Graphics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Acquire comprehensive knowledge about the principles and applications of computer graphics
- Implement various algorithms for scan converting the basic geometrical output primitives, area filling and clipping
- Design graphics applications such as animations and games
- Realistically display 3-Dimensional images on 2-Dimensional plane using projections, shading and illumination models.

CS 417 Database Management Systems

Max. Marks : 100	L	T	P	C

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Describe data models and schemas in DBMS
- Understand the features of database management system s and Relational database.
- Use SQL -the standard language of relational databases.
- Understand the functional dependencies and design of the database.
- Understand the concept of Transaction and Query processing.

CS 423 Java Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand basic concepts of Java such as Operators, Classes, Objects, Interface, Inheritance, Packages, Enumeration and various keywords
- Understand the concept of Exception Handling, Collections, Input/output operations, Socket Programming, Database Connectivity
- Design the applications of Java, Swing, Applet and JSP
- Analyze and Design the concept of Event Handling and Abstract Window Toolkit (AWT)

CS 427 Parallel Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop computer program for different type of parallel computers

- Measure the performance of algorithm used and parallel computers
- Solve problem using parallel computers
- Transform sequential code segments to parallel code segments

CS 602 Digital Image Processing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Explain how digital images are represented and manipulated in a computer
- Code programs implementing fundamental image processing algorithms
- Conversant with the mathematical description of image processing techniques

CS 436 Web Development and .NET Framework

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop working knowledge of C# programming constructs and the .NET Framework architecture
- Develop, implement and create Applications with C#.
- Build and debug well-formed Web Forms with ASP. NET Controls
- Perform form validation with validation controls
- Create custom controls with user controls

CS 501 Advanced Communication Networks

Max. Marks : 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

On successful completion of the course students will be able to

- Learn TCP/IP protocol and various routing algorithms
- Understand details of Wireless network, Network architecture
- Able to evaluate communication networks using different performance parameter.

CS 504 Advanced Java Programming

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand advance concepts of Java like swings and RMI
- Able to develop complex application for networking.
- Design and develop JSP pages.
- Understand basics of AJAX,CORBA and EJB.

CS 507 Artificial Intelligence

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop algorithms based on search, knowledge representation.
- Develop applications based on NLP Concepts
- Develop a Cognitive Agent

CS 511 Cloud Computing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Apply cloud computing model in real application.
- Use programming paradigms like MapReduce to create applications.
- Operate cloud by installing virtual machines and apply migration.
- Understand of challenges of cloud

CS 514 Computer Architecture and Organization

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Perform computer arithmetic operations.
- Use the concepts and design of all type of sequential and combinational circuits.
- Design and conduct experiments, as well as to analyze of the hardware of a computer system and its components such as control unit, arithmetic and logical (ALU) unit, input/output, and memory unit.
- Be able to design techniques such as pipelining and microprogramming in the design of the central processing unit of a computer system.
- Understand the concept of I/O organization

CS 519 Data Warehouse and Data Mining

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Identify the scope and necessity of Data Mining & Warehousing for the society.
- Describe the designing of Data Warehousing so that it can be able to solve the root problems.
- Understand various tools of Data Mining and their techniques to solve the real time problems.
- Develop ability to design various algorithms based on data mining tools.
- Develop further interest in research and design of new Data Mining techniques.

CS 526 Machine Translation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

On successful completion of the course students will be able to

- Develop MT systems based on Example Based Approach.
- Develop Translation Memories.
- Develop basic transfer-based MT system
- Develop statistical MT system
- Develop Neural MT System

CS 527 Mobile Computing

Max. Marks : 100	L	T	P	C

(CA: 40 + ESA: 60) **4 0 0 4**

Learning Outcomes:

On successful completion of the course students will be able to

- Have knowledge of fundamentals of mobile communication systems
- Choose system (TDMA/FDMA/CDMA) according to the complexity, installation cost, speed of transmission, channel properties etc.
- Identify the requirements of mobile communication as compared to static communication
- Identify the limitations of 2G and 2.5G wireless mobile communication and use design of 3G and beyond mobile communication systems.

CS 528 Modeling and Simulation

Max. Marks : 100 **L T P C**
(CA: 40 + ESA: 60) **4 0 0 4**

Learning Outcomes:

On successful completion of the course students will be able to

- Define basic concepts in modeling and simulation (M&S)
- Classify various simulation models and give practical examples for each category
- Construct a model for a given set of data and perform its validity
- Generate and test random number and apply them to develop simulation models
- Analyze output data produced by a model and test validity of the model
- Explain parallel and distributed simulation methods
- Know how to simulate any discrete system using queuing systems

CS 529 Natural Language Processing

Max. Marks : 100 **L T P C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop algorithms based on NLP Concepts.
- Develop applications based on Statistical Approaches of NLP
- Create applications for Indian Language Processing

.CS 530 Neural Networks

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand need of Neural network along with its architecture.
- Develop neural network algorithms like back propagation etc.
- Learn concepts of learning models for different applications.

ELE 502 Discrete Time Signal Processing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

On successful completion of the course students will be able to

- Understand Digital signal processing characteristics.
- Able to do transformation like FFT & DFT.
- Learn basic concepts of Multi rate Digital signal Processing.

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ELE 503 Embedded Systems

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Learn architectural issues in embedded system

- Understand memory hierarchy in embedded system
- Able to connect embedded system in real life scenario like digital camera etc.

ELE 505 Microprocessor and Microcomputer Applications

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning outcomes:

On successful completion of the course students will be able to

- Learn basics of bus structure, timing and sequencing of microprocessor
- Understand microprocessor architecture and its basic components of 8086/8088.
- Able to write code using assembly programming.

IT 505 Geographic Information System

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand data models for GIS applications.
- Able to design & develop GIS applications using different GIS software
- Implement map projection on spatial data.

IT 506 Human Computer Interaction

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop effective UI.

- Design menus using STM.
- Develop applications based on cognitive architecture

IT 507 Information Retrieval

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Develop algorithms based on various IR concepts.
- Develop applications based on textual classification
- Create applications for Indian Language Information Retrieval Systems

IT 511 System Testing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Learn different types of testing methods.
- Able to solve testing problems in software projects.
- Learn importance of documentation in testing.

CS 508 Big Data Analytics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course students will be able to

- Understand big data systems and identify the main sources of Big Data in the real world.
- Learn various frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics.

- Implement several Data Intensive tasks using the Map Reduce Paradigm in Hadoop.
- Program applications using tools like Hive, pig, NO SQL for Big data Applications.
- Construct scalable algorithms for large Datasets using Map Reduce techniques.
- Apply the knowledge of Big Data gained to fully develop BDA applications for real life applications.

IT 412 Internet of Things

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

On successful completion of the course, the student will:

- Understand the concept of IoT
- Understand what constitutes an IoT design solution
- Identify the sensors and basic electronic design needed for different IoT solutions
- Analyze basic proptocols of IoT
- Implement basic IoT applications on Arduino and Raspberry Pi to provide IoT solutions for various domains.

IT 402R Electronic Commerce

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

On successful completion of the course students will be able to

- Recognize the business impact and potential of e-Commerce;
- Explain the technologies required to make e-Commerce viable;
- Discuss the current drivers and inhibitors facing the business world in adopting and using e-Commerce;
- Explain the economic consequences of e-Commerce;

- Discuss the trends in e-Commerce and the use of the Internet.

IT 403R Enterprise Resource Planning

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- To make students able to learn fundamental concepts of ERP system and ERP related technologies.
- To provide students knowledge of different ERP modules and manufacturing perspectives of ERP.
- Use ERP system in different business organizations by having knowledge of latest scenario of ERP market in e-business.

IT 604R Semantic Web

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand role of semantic web in real world applications.
- Develop knowledge implementation in different domains
- Learn different types of ontologies.

IT 601R Information and Communication Technology

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand importance of ICT and its various components.
- Learn about different types of Network & internet terminologies.
- Able to understand the usability of human computer interaction.

Machine Learning

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course, the student will:

- Understand Machine Learning Techniques
- Design Basic Practical Applications
- Understand Model Based Prediction

Agile Software Development

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand basic of agile model for software development
- Understand roles of agile values
- Understand testing management

Blockchain

L	T	P	C
0	0	0	2

Learning Outcomes:

On successful completion of the course students will be able to

- Understand concept of Block Chain Technology
- Understand Bitcoin protocol
- Understand hashing and cryptography foundations

BANASTHALI VIDYAPITH

Master of Technology (Remote Sensing)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Banasthali Vidyapith is an epitome of tradition and modernity. Vidyapith aims to preserve and inculcate the essential values and ideals of Indian culture. It believes in simple living and high thinking. Our educational ideology is based on the concept of fivefold education focusing on physical, practical, aesthetic, moral and intellectual aspects in order to develop a balanced personality.

Realizing the potential of Remote Sensing Technology in Natural Resource management, Banasthali Vidyapith, took the lead in establishing the first Remote Sensing M.Tech. Programme for Women in India to cater the human resource development in scientific field of remote sensing. M.Tech. students carried out their dissertation research at various esteemed institutions and multinational industries, i.e., ISRO, DRDO, and NIH.

The M.Tech. Remote Sensing programme offers a flexible and complete education in the field of Remote Sensing technology and Geoinformatics. Students will comprehend the major Earth surface imaging systems and Geomatics based research & development. The integrated Remote Sensing technology plays a major role in natural resource management and develops multidisciplinary research environment.

The main objectives of the M.Tech. Remote Sensing programme are:

- To strengthen the ability for assessing and solving the real-time geospatial problems.
- To inculcate skills for developing realistic solutions to the challenges of emerging field of earth observation technology.
- To provide an adequate professional and technical environment that assists both in academia and industries
- To acquire skills in leaning modern earth observation techniques such as SAR, hyper-spectral, thermal and LiDAR scanning for mapping, modeling and monitoring.
- To prepare students for solving complex engineering problems by using innovative research.

Programme Outcomes

After successful completion of the programme the students will be able to:

PO1: **Remote Sensing Knowledge**: Describe the standard principle and concepts of advance 'Earth Observation' (EO) Technologies that ensure the effective use of Geoinformatics based generic applications to solve concurrent global and regional environmental problems.

PO2: **Problem Analysis**: Formulate robust, generic and ubiquitous research methodologies and approaches based on 'close-to-far' range remote sensing technology to resolve issues associated with natural resources.

PO3: **Design/Development of Solutions**: Develop and distribute free tools and realistic solutions based on Geoinformatics that can assist in natural resource management, environmental resiliency and infrastructure to expedite information sharing, which can be adapted and tailored to societal needs.

PO4: **Conduct investigations of complex problems**: Implement the Geoinformatics based operational research methods and optimization techniques in the extension of Geospatial policy for both academia and industrial arena. Share professional acumen to provide intellectual solutions for the complex geospatial problems with valid conclusions.

PO5: **Modern tool usage**: Construct, relate, and implement suitable geospatial techniques, industrialized resources, and cutting-edge Information Technology (IT) tools to forecast and modeling to manifold engineering activities with generous societal benefits.

PO6: **Remote Sensing professionals and society**: Implement the contemporary technical information and improved understanding of mapping sciences to encourage the development of responsible societal applications of Remote Sensing, Geographical Information Systems (GIS) and associate technologies.

PO7: **Environment and sustainability**: Perceive and relate the acceleration and impact of earth observation science, resource use, which increased the urgency to obtain quantitative, timely information about the environment at a variety of scales in space and time.

PO8: **Professional ethics**: Identify the significance of transparency in sharing of geospatial information in terms of a national policy to ensure data availability, accessibility, and quality to meet development goals of national mapping and imaging agencies, in accordance with issues associated to national security and intellectual integrity.

PO9: **Individual and team work**: Contribute as a team leader as well as individual in multi-disciplinary research groups in order to achieve common goals. Offer rational decisions based on objectivity to solve complex geospatial problems.

PO10: **Communication**: Empathize with relative arguments derived by the professionals during execution of the various global technological events. Create, design and disseminate effective reports, scientific articles and deliver presentations from different platforms.

PO11: **Project management and finance**: Demonstrate considerate interactions and knowledge of the remote sensing technology in real-time project management. Implement principles of project management into fields of applied remote sensing and interdisciplinary environments.

PO12: **Life-long learning**: Develop an attitude to ensure independent learning with value-added motivation in promptly changing scenario of global technical competence. Retain life-long intellect based on attained technological skills for sustainable development.

RS 504 Fundamentals of Geographic Information Sciences and Digital Cartography

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Differentiate GIS and science of map making, non-spatial vs. spatial data.
- Georeference the Topomaps and imagery and handle geospatial database.
- Describe concepts of database management system within spatial analytical framework.
- Design and frame initial requirements for WebGIS development.

RS 508 Principles of Remote Sensing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain fundamental principles of earth observation or imaging.
- Differentiate various earth imaging satellites and sensors.
- Know the appropriate use of aerial photographs for different applications.
- Explain the importance of ground truthing and ground equipment's used in validation process.

RS 515L Remote Sensing Lab – I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

After the completion of this course, students should be able to:

- Perform image fusion with different multispectral data and SAR data products.
- Generate spectral profiles for various LULC features, pre-process raw SAR images and explain their resolution components.
- Visualize indigenous as well as country outside agency SAR data products.
- Interpret satellite FCC images and aerial photographs, pre-process airborne-space borne raw imaging data products and their interpretation.

RS 516L Remote Sensing Lab – II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

After the completion of this course, students should be able to:

- Implement the knowledge about SQL in solving attribute queries.
- Analyze errors in spatial data and their removal.Design and produce the base map using map algebra, complex query generation.
- Write and describe .NET and Python scripting in their specified frameworks.
- Perform geo-processing using Python, and ArcGIS Server.
- Connect the desktop based GIS operation with real-time web operations and publishing newly generated geospatial maps on web.

RS 521P/RS 513P/RS 519S Term Paper-I/Minor Project-I/Seminar-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After the completion, students should be able to:

- Identify and formulate the statements of the research problem and objectives related to earth system sciences, and geocomputation for effective geospatial solutions.
- Review existing literature relevant to the problem selected and explore the research gap.
- Collect various geospatial data products, required to carry out the research and formulate the methodology to solve the identified problem.
- Deliver an effective technical presentation on selected research problem and prepare the term paper/project/ seminar report.

RS 503 Digital Image Processing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain sources of image degradation and their rectification.
- Describe various filtering operation and multispectral image enhancement techniques.
- Describe geospatial data dimensionality reduction techniques for fast and effective interpretation of the image variables.
- Describe utilization of artificial intelligence techniques for solving problems related to environmental monitoring and management.

RS 507 Photogrammetry, Global Positioning Systems and Mobile Mapping

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain concepts related to aerial photography, planning and execution of photographic flights.
- Describe standard digital photogrammetric operations i.e., Ortho-rectification.
- Describe concepts related to aerial camera lenses, and digital terrain modeling.
- Integrate the knowledge about GPS.

RS 517L Remote Sensing Lab – III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

After the completion of this course, students should be able to:

- Perform standard radiometric corrections on satellite imagery and calculate band indices for enhancement of the natural features on imagery.
- Classify the imagery using knowledge base for advanced mapping of LULC.
- Develop the Forecasting models for the crop production, flood hazards.
- Identify the suitable waste disposal sites, and Mapping the landslide hazard zonation maps.

RS 518L Remote Sensing Lab – IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes:

After the completion of this course, students should be able to:

- Prepare the Ortho- images using Photogrammetry software's
- Collect geographic co-ordinates using DGPS and post-processing of the attributes using standard software's.
- Generate contour maps for the DEM generation.
- Describe and design the concept of spatial databases its components, models, mining, analysis and visualization.
- Acquire and apply the strength and applications of Arc model builder.

RS 522P/RS 514P/RS 520S Term Paper-II/Minor Project-II/Seminar-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After the completion, students should be able to:

- Identify research problems related to the study domain.
- Apply the principles, tools and techniques to solve the selected complex geospatial problem.
- Analyze the research outcomes and suggest feasible/ practical solutions.
- Deliver an effective technical presentation on selected research problem and prepare the term paper/project/ seminar report.

RS 603P Project (Part - I)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After the completion, students should be able to:

- Select a relevant research topic related to social and engineering problems, natural disaster, decision support system etc. with integration of geospatial technologies.
- Evaluate and review significant existing literature of the topic selected.
- Collect various geospatial data products, required to carry out the research and formulate the methodology to solve the identified problem
- Deliver well-organized technical presentations and prepare the mid-term report.

RS 604P Project (Part - II)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After the completion, students should be able to:

- Select a relevant research topic related to social and engineering problems, natural disaster, decision support system etc. with integration of geospatial technologies.
- Apply the principles, tools and techniques to solve the problem.
- Process independent research to compute and resolve the chosen issue.

RS 501 Applications of Remote Sensing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Identify the potentials of remote sensing in allied sectors.
- Describe trends in remote sensing applications.
- Apply remote sensing technology in natural resource and disaster management.
- Explain basics about Environmental Impact Assessment (EIA).

RS 502 Applied Statistics and Research Methodology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Formulate research problems using geo-statistical methods.
- Apply statistical knowledge to the geospatial variability.
- Define research problems and selection of survey methods.
- Writing project proposal for various funding agencies.

RS 511 Geospatial Entrepreneurship

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Identify the elements of success of entrepreneurial ventures,
- Evaluate the effectiveness of different entrepreneurial strategies

- Interpret importance of the entrepreneurial infrastructure
- Recognise Geospatial technology for harnessing Innovation and Entrepreneurship

RS 512 Geospatial Intelligence

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain concepts and components of Geospatial Intelligence.
- Explain different aspects of spatial cognition and their characteristics.
- Describe multiple intelligence and discuss applications of geospatial technology in strategic planning and operations.
- Rationalize outlook of basic architecture of GEOINT.

RS 505 GIS Programming and Scripting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe object-oriented models and functional modeling in GIS Framework.
- Explain concepts of common language infrastructure and class library.
- Explain .NET and Python programming languages for geospatial tool development.
- Rationalize the concepts of WebGIS, Server, and geo-processing functionalities.

RS 506 Microwave, Thermal and Hyperspectral Remote Sensing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Explain concepts and components of satellite radar imaging.
- Explain different microwave sensors data (SLC and GRD) and their characteristics.
- Describe pre-processing requirements and discuss SAR image processing techniques.
- Rationalize outlook of SAR, thermal, and hyperspectral images.

RS 509 Spatial Database Systems, Analysis and Modeling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After the completion of this course, students should be able to:

- Statistically evaluate the spatial entities their topological, geometric, or geographic properties.
- Learn different analytic approaches.
- Describe and design the concept of spatial databases its components, models, mining, analysis and visualization.
- Apply the strength and applications of Arc model builder.

RS 510 Spatial Decision Support Systems

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the completion of this course, students should be able to:

- Study the spatial information systems developed for a specific problem or decision-making situation.
- Observe key concepts and theories underlying spatial information systems and technology trends.
- Explore and reform the solutions to spatial problems by generating a set of alternatives and selecting from among those that appear to be viable through multi criteria analytics.
- Illustrate and assess the emerging concepts that may impact spatial information system development and applications.

RS 609R Environmental Remote Sensing and Modeling

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe principles of environmental modeling and taxonomy of environmental models in the spatial sciences.
- Explain Remote Sensing applications to monitoring wetland dynamics and management of Ramsar sites.

- Apply concepts of remote sensing in urban biophysical environmental modeling and management.
- Explain methods and benefits of Environmental Impact Assessment (EIA).

RS 610R Geo-informatics for Resource Management

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Define resource classification systems for different natural and cultural resources.
- Explain methods related to natural resource inventory and mapping.
- Apply concepts of multiresolution approach for wildlife habitat assessment and corridor mapping.
- Explain the principles of biodiversity conservation, and essential ecosystem services for sustainable development.

RS 611R Geospatial BigData: Challenges and Opportunities

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe trinity of understanding BigData.
- Describe geocomputation and massive remote sensing data handling and associated challenges.

- Apply concepts of parallel computing and Internet of Things (IoT) in Geospatial BigData handling.
- Explain recent technology trends in public dissemination of the real-time geospatial data and analysis.

RS 612R Open Source Software, Services and Utility Application

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe current trends in remote sensing and GIS based open source software's.
- Understand role of Geospatial technologies in government projects.
- Familiarize with geo-statistical analysis in utility applications such as crime, PWD etc.
- Explain geo-statistical analysis to be used in utility applications.

RS 613R Remote Sensing in Hydrology and Water Resources

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Describe fundamentals related to satellite imaging based hydrological investigation.

- Apply hydro geomorphology based interpretation knowledge for the identification of potential ground water resources.
- Explain concepts of watersheds leading to its inventory and effective management.
- Explain methods of snow cover mapping based on hydrological and GIS based models.

RS 614R Spatial Planning and Urban Development

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students should be able to:

- Identify the potentials of remote sensing in allied sectors.
- Describe the land reforms in India.
- Apply spatial planning in effective urban management.
- Explain national and international initiatives for urban development sector.

BANASTHALI VIDYAPITH

Master of Technology (VLSI Design)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

B**ANASTHALI VIDYAPITH**
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

The M.Tech. (VLSI Design) programme aims for the holistic development of students through the unique and innovative fivefold educational ideology of Banasthali Vidyapith. State-of-the-art VLSI technology requires research in physical devices as well as novel design and development of integrated circuits. The M. Tech. (VLSI Design) programme at Department of Electronics aims to impart knowledge of VLSI system design covering algorithms, hardware description languages, system architectures, physical designs, verification techniques, simulation & synthesis, low power design techniques and etc. The programme offers foundational subjects like semiconductor devices, digital, analog and RFIC design, embedded system, electronic system packaging etc. Many courses have prominent lab component, offering hands-on training and exercises on numerous practical spects of crucial importance. The students also get an opportunity to participate in projects related to design and optimization of VLSI circuits and systems.

The main objectives of M. Tech. (VLSI Design) programme are:

- To provide in-depth knowledge of device fundamentals and modern circuits design to gain an ability to analyze, design, and implement VLSI Systems circuits and systems.
- To enrich students to excel in research leading to cutting edge technology in VLSI design to create competent, innovative and productive professionals.
- To train them to understand the various recent issues and find the solutions with good scientific and engineering knowledge, so as to comprehend, analyze, design, and create novel products and develop the capability to prepare the scientist report in lucid and articulate form.
- To provide students with an academic environment to develop scientific awareness, leadership, ethical conduct, positive attitude, societal responsibilities and the lifelong learning needed for a successful professional career.
- To develop entrepreneurial skills in starting industries using VLSI technology.
- Practice the ethics of their profession and inculcate a lifelong learning culture.

- Communicate effectively and manage resources skilfully as members and leaders of the profession.

Programme Outcomes

PO1. **Scholarship of Knowledge:** Acquire in-depth knowledge of VLSI technology in wider and global perspective, with an ability to discriminate, evaluate, analyze, synthesize and integrate for enhancement of knowledge. Graduates will be able to apply the knowledge of computing, mathematics, science and electronic engineering for designing VLSI circuits.

PO2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using basic principles of mathematics, science and engineering.

PO3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. Graduates will have an ability to design and conduct experiments, perform analysis and interpret the problems of VLSI design.

PO4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern VLSI tools including modeling to complex engineering activities with an understanding of the limitations.

PO6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental

contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. **Engineering Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Leadership Skills:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.

PO12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

VLSI 507 Digital CMOS IC Design

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Gain in-depth understanding of designing and analysis of CMOS inverters
- Explain the fabrication process and layout design of CMOS digital IC
- To describe the operation of semiconductor memories and low power circuits.

VLSI 531L Digital CMOS IC Design Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	2	1

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Understand of Cadence circuit design tool
- Understand procedure to analyse DC and Transient behaviour of circuits
- Understand procedure to analyse effects of device dimension variation on circuit performance

VLSI 512 HDL Based System Design

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Analysis and Design of Synchronous and Asynchronous sequential machines.
- Draw a FSM chart for digital designs and describe it using HDL.
- Detect and diagnosis different errors in digital circuit descriptions.
- Design the digital systems through VHDL and Verilog HDL.

VLSI 532L HDL Based System Design Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**6**	**3**

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Describe the IEEE Standard 1076 Hardware Description Language (VHDL).
- Model complex digital systems at several levels of abstractions; behavioural and structural, synthesis and rapid system prototyping.
- Develop and simulate register-level models of hierarchical digital systems.
- Develop a formal test bench from informal system requirements.

VLSI 516 IC Fabrication Technology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Understand thin film deposition and vacuum evaporation process.
- Differentiate dry and wet oxidation process and printing methods.
- Perform measurement techniques for extracting electrical properties of devices.
- Understand diffusion and ion implantation process.

VLSI 533L IC Fabrication Technology Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Understand fabrication process flow
- Understand Silvaco TCAD tool.
- understand the procedure to modeling devises and analysing their characteristics

VLSI 534P Minor Project (Part-I)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Formulate the project objectives and deliverables.
- Estimate the physical resources required, and make plans to obtain the necessary resources.
- Develop plans with relevant people to achieve the project's goals.

VLSI 536 Solid State Device Modeling and Simulation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Explain the carrier densities, charge transport, band diagrams and their relations to the device characteristics.
- Describe the SPICE device models and apply the basic governing model equations to analyse BJT and MOSFET.
- Explain and analyse the operation of optical, microwave and quantum effect devices.

VLSI 503 Analog and Mixed Signal IC Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Design basic cells like current sources, current mirrors and reference circuit.
- Explain stability issues and design compensated IC operational amplifiers.
- Design and analyse comparators and sample-and-hold circuits.
- Illustrate the operation of commonly used data conversion circuits.

VLSI 503L Analog and Mixed Signal IC Design Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Analyse and interpret the waveform, comparison of simulation results with the theoretical analysis.
- Ability to use the simulation software for performing the experiments.
- Ability to design and test various amplifier circuits, which meets the desired specifications.

VLSI 504 ASIC Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Analyze the concept of Full Custom ASIC and Semi-Custom ASIC, Cell Libraries, Data Logic Cells, Low-level Design Entry and Low Level Design Languages
- Explain ASIC I/O Cell: DC Output, AC Output, DC Input, AC Input, Clock Input, Power Input and PLA Tools.
- Describe Programmable ASIC Logic Cell, FPGA Logic Cells, and Programmable Interconnects to Solve the RC delay of routing resources for each ASIC.

VLSI 505 CAD for IC Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Understand Basic concept of describing VLSI design problems
- Understand graph theory and its utilization in finding solution for VLSI design problems.
- Understand algorithms to solve various VLSI design problem like floorplaning, scheduling, placement, routing etc.

VLSI 505L CAD for IC Design Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Understand the VLSI design automation.
- Understand the process to develop and analyse synthesis outcomes.
- Demonstrate knowledge of computational and optimization algorithms and tools, applicable to solving CAD related problems.

VLSI 535P Minor Project (Part-II)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes: After completion of this laboratory course, students will be able to:

- Identify, formulate, and solve VLSI design problems using advanced level manufacturing and design techniques
- Apply advanced level knowledge, techniques, skills and modern tools of VLSI Design.
- Understand the complexities and design methodologies of current and advanced VLSI design technologies.

VLSI 524 RF IC Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Understand basics concepts of radio frequency integrated systems and their performance parameters.
- Identify design trade-off used in various transmitters and receivers architecture with wireless standards.
- Perform VLSI implementation of oscillators, Mixers and Power amplifiers.

VLSI 602P Project (Part-I)

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**48**	**24**

Learning Outcomes: After successful completion of this course, students will be able to:

- Recognize the need to engage in lifelong learning through continuing education and research.
- Formulate the project objectives and deliverables.

- Estimate the physical resources required, and make plans to obtain the necessary resources.
- Develop plans with relevant people to achieve the project's goals.

VLSI 603P Project (Part-II)

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**48**	**24**

Learning Outcomes: After successful completion of this course, students will be able to:

- Demonstrate knowledge of contemporary issues in the area of VLSI design.
- Manage projects related to VLSI design in multidisciplinary environments.
- Understanding the Functioning with multidisciplinary teams, working cooperatively, respectfully, creatively and responsibly as a member of a team.

CS 429 Pattern Recognition and Image Processing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to

- Explain the concept of Image Processing, Mathematical preliminary of Image Processing and various Image Representations.
- Analyse the methods of Image Enhancement and Image Filtering.
- Identify different image analysis and pattern recognition methods and apply them in problem areas also develop an abundance of Image Processing applications that can serve mankind with the available and anticipated technology in the near future.

CS 431 Real Time Systems

Max. Marks : 100	L	T	P	C
(CA: 40+ ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- To present the mathematical model of the system.
- Analyse multi task scheduling algorithms.
- To explain Reliability Evaluation techniques and Real time communication algorithms.

ELE 502 Discrete Time Signal Processing

Max. Marks : 100	L	T	P	C
(CA: 40+ ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Apply discrete-time signal processing techniques analysis to perform various signal operations.
- Apply the principles of Fourier transform analysis to describe the frequency, and characteristics of discrete-time signals and systems.
- Understand the design techniques of various digital and analog filters.

VLSI 501 Advanced Digital Signal Processing

Max. Marks : 100	L	T	P	C
(CA: 40+ ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Modelling of random filter and identification of different parameters.
- Realization of Kalman filters and concept of spatial smoothing.
- Adaptive implementation of wiener filter and Adaptive noise cancelling.

VLSI 502 Advanced Digital System Design

Max. Marks : 100	L	T	P	C
(CA: 40+ ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Formulate and solve problems in Digital Systems design.
- Knowledge about the properties of symmetric networks and apply threshold logic on digital circuits.
- Analyze digital system design using PLD.

VLSI 506 Design of Semiconductor Memory

Max. Marks : 100	L	T	P	C
(CA: 40+ ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Know about architecture of semiconductor memories and methodologies adopted in data storage.
- Analyze the difference in volatile and non-volatile memory, and their building blocks.
- Know memory fault tolerance and testing methodology.

VLSI 510 Embedded System Design

Max. Marks : 100	L	T	P	C
(CA: 40+ ESA: 60)	4	0	0	4

Learning Outcomes: After successful completion of this course, students will be able to:

- Explain the challenges in the design of embedded system
- Describe the Hardware and Software Tools for Embedded System
- Describe the Features of OS and language for Embedded System

VLSI 511 Fault Tolerance in VLSI

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Diagnose and measure different type of Faults.
- Explain the detection, correction techniques and fault-tolerant networks
- Analyze fault tolerance strategies and enhance capabilities about applications of fault tolerant designs in arithmetic units and systems.
- Explain the basic mechanisms of fault-tolerance methods and fault tolerant computer systems.

VLSI 513 High Level System Design and Modeling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Understand describing a system
- Understand about information system and models
- Understand system analysis and system design

VLSI 514 High Power Semiconductor Devices

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Get knowledge of power semiconductor devices under extreme operation conditions like high voltage, high current and high temperature which are encountered under typical power electronic environment.

- Understand knowledge developed from this, will help in designing power devices with desired specifications.
- Get knowledge of VMOS, CMOS, DMOS Devices.

VLSI 515 High Speed VLSI Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Design Clocked logic styles non clocked logic styles.
- Understand knowledge of circuit designing margining.
- Get knowledge of Clock generation and distribution.

VLSI 517 Integrated Electronic System Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Understanding, gathering and processing of electronics system through basic Motherboard, PCB and IC technologies.
- Design their own circuits based on the knowledge learnt from class.
- Get the opportunity to become proficient in using the 8051 microcontroller for circuit modeling and analysis.

VLSI 518 Introduction to MEMS

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Families with the important concepts applicable to MEMS, their fabrication.

- Fluent with the design, analysis and testing of MEMS.
- Describe micro fabrication, micro actuators and surface micromachining and applications.

VLSI 519 Low Power VLSI Design

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Learn the design techniques low voltage and low power CMOS circuits for various applications.
- Design and implementation of various design structures of flip flop for low power applications.
- Design the different types of memory circuits and various CMOS static and dynamic logic circuits.
- Understand the mechanisms of power estimation and datapath width adjustment.

VLSI 520 Nanoelectronics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Get knowledge in electronics has been driven by miniaturization.
- Understand CMOS and MOSFET scaling.
- Understand the electronic properties of molecules, carbon nanotubes and crystals.

VLSI 537 Photonics Integrated Circuits

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Describe the optical waveguides and optical couplers with the help of coupled mode theory.
- Explain the basic operating mechanisms of optical switches and modulators.
- Identify the performance limiting factors and applications of integrated optics.

VLSI 523 Representation and Analysis of Random Signals

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Understand the theory and application of probability, random variables and random processes
- Understand to study and analyze analytical expression

VLSI 526 Speech Signal Processing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40+ ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes: After successful completion of this course, students will be able to:

- Describe the fundamentals of digital speech processing and digital model for speech signal process.
- Illustrate and analyze the time domain model and Fourier representation for speech processing.
- Explain basic principles of LPC equations and solutions.

BANASTHALI VIDYAPITH

Master of Technology (Biotechnology)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

The M. Tech. Biotechnology programme aims at overall growth and development of the students considering the exclusive five fold Educational ideology of Banasthali Vidyapith.

Biotechnology is a broad discipline of biological science dealing with commercial exploitation of living organisms and their products for the welfare of mankind. Past few decades have witnessed a steady growth towards invention and innovation oriented research. Thus, the M. Tech Biotechnology programme has been designed to provide knowledge, which can be applied by the students in various related R & D sectors and industries, to find solutions pertaining to bioproduct, bioprocesses, and technology development. It will also help them to inculcate the spirit of teamwork together with leadership qualities. The key objectives of the programme are:

- To provide expertise in various tools and techniques of biotechnology
- To facilitate postgraduates to identify, formulate and analyze complex biotechnological challenges
- To address the societal, ethical and environmental issues that a biotechnologist is facing
- To nurture competence in digital literacy that would support professional needs in biotechnology
- To nurture a temperament that would enable students to develop technical proficiency that can be used to cater the performance driven needs of industry, academia, research and startups
- To strengthen communication, entrepreneurial and leadership skills, which will promote a lifelong learning.

Programme Outcomes

PO1: **Knowledge**: Enrich with the knowledge of core domains like cytology, microbiology, genetics, biochemistry along with applied field including genetic engineering, cell culture, immunology, bioinformatics, , bioprocess engineering, food engineering.

PO2: **Planning ability**: Instill effective time and resource management skills accompanied with good team practices and organizational abilities

PO3: **Problem analysis**: Utilize technical skills to design, conduct experiments, analyze and interpret data for investigating problems in biotechnology.

PO4: **Modern tool usage**: Apply appropriate methodologies, resources, and techniques for biological manipulation and data interpretation.

PO5: **Leadership skills**: Work as an effective leader by applying reasoning skills to assess societal, environmental, safety and legal issues of biotechnology sectors.

PO6: **Professional Identity**: Understand their responsibilities related to biotechnological and engineering practices and work efficiently with multi-disciplinary team in research lab and industry

PO7: **Biotechnology ethics**: Understand the regulatory norms and ethics for production of various products and process development in biotechnology sectors.

PO8: **Communication**: Work as impressive personality in industry and research lab with eloquent communication skill of both oral and written form.

PO9: **Biotechnology and society**: Acquire the technical skills in solving societal challenges related to healthcare, food and environmental sectors through biotechnological approaches.

PO10: **Environment and sustainability**: Understand the impact of the biotechnology solutions on societal and environmental contexts and need for sustainable development.

PO11: **Life-long learning**: Develop self confidence and aptitude for life-long learning to maintain a positive attitude towards personal and professional development.

BIN 501 Biological Databases and Computational Biology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Mine the biological databases to identify relevant sequence/structure for studies.
- Carry out sequence based evolutionary studies.
- Perform molecular modeling studies with biological macromolecules and explain the results.

BT 523 Advanced Cell Biology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe processes in cell biology.
- Compare the role of various characteristic bio-molecules of living organisms.
- Apply concepts of cell biology to relevant and specific problems.

MATH 506 Engineering Mathematics

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Solve differential equation problems in the field of Biotechnology.

- Know how root finding techniques can be used to solve practical engineering problems.
- Use matrices techniques for solving system simultaneous linear equations.
- Apply elementary transformations to reduce the matrix to Echelon and normal form and determine its rank.
- Use the basic mathematical tools to solve engineering problems.
- Demonstrate knowledge of probability and the standard statistical distributions.
- Assemble a mathematical model for a range of physical situations.

BT 505L Biotechnology Lab - I

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate an understanding of microbial production of biomolecules.
- Gain hands on training on extraction and bio-separation techniques for various metabolites.
- Learn basic tools of bioinformatics.
- Analyze and solve problems for statistics, mass balance and energy balance.

BT 540P/BT 536P/BT 542S Term Paper-I/Minor Project-I/ Seminar-I

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate a depth of knowledge of advance research in applied engineering field of biotechnology.
- Comprehend knowledge of writing review/research papers and publishing research data in scientific journals
- Develop communication skills and effective use of visual aids.

BT 527 Bioprocess Engineering

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Plan and execute economically viable upstream and downstream processes for any biological products.
- Develop process flow diagram, utility equipments, piping and related instrumentation and controls.
- Give an account of important microbial/enzymatic/food and beverage industrial processes in pharmaceuticals, food and fuel industry.

BT 530 Genetic Manipulation Technology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Comprehend tools and techniques used for genetic manipulation of living organisms.
- Familiarize with current genome editing techniques.

- Develop research aptitude and technical skills to secure a job in genetic engineering labs.

BT 506L Biotechnology Lab - II

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Gain hands on training on techniques related to genetic engineering, plant tissue culture and immunology.
- Demonstrate an understanding of different methods for chromatography.
- Demonstrate a basic understanding of production and estimation of industrially important biofuel and acids.
- Demonstrate a basic concept of *In Silico* Primer designing.

BT 541P/BT 537P/BT 543S Term Paper-II/ Minor Project-II/Seminar-II

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Demonstrate a depth of knowledge of advance research in applied engineering field of biotechnology.
- Comprehend knowledge of writing review/research papers and publishing research data in scientific journals
- Develop communication skills and effective use of visual aids.

BT 606P Project Part - I

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After successful completion of the course, students should be able to:

- Gain exposure to work in renowned research institutions and industries of biotechnology.
- Develop skill to complete an independent research project and writing thesis report.
- Comprehend knowledge to publish their research outputs in high impact factor journals, conference proceedings, and patents.
- Develop an ability to present and defend their research work to a panel of experts.

BT 607P Project Part - II

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	48	24

Learning Outcomes:

After successful completion of the course, students should be able to:

- Gain exposure to work in renowned research institutions and industries of biotechnology.
- Develop skill to complete an independent research project and writing thesis report.
- Comprehend knowledge to publish their research outputs in high impact factor journals, conference proceedings, and patents.
- Develop an ability to present and defend their research work to a panel of experts.

BIN 502 Computer Aided Drug Designing

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the scope of pharmacogenomics and computer aided drug designing.
- Identify and search potential drug leads using various tools of computational biology.
- Develop data-mining skills pertaining to drug discovery.

BIN 503 Elements of Bioinformatics

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand principles behind the genome wide coding region prediction and RNA folding.
- Predict 3D structure of proteins and their regular structural elements for the integrity of the structure.
- Analyze, interpret and understand the protein structure informatics.
- Write perl program to solve the biological problems.

BIO 417 Structural Biology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After the successful completion of the course, students should be able to:

- Explain the biophysical processes working at molecular level.
- Answer the biological questions of macromolecular folding and interactions.
- Understand the molecular processes behind locomotion, neuronal signaling and vision.

BIO 501 Bioentrepreneurship

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Comprehend fundamental concepts of entrepreneurship.
- Identify and utilize various schemes promoting entrepreneurship.
- Develop skills to convert a viable idea into start ups.

BIO 502 Cancer Biology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Explain mechanisms leading to cancer.
- Identify sources of cancer causing agents.
- Understand various therapies involved in cancer treatment.

BT 510 Environmental Biotechnology

Max. Marks: 100	**L**	**T**	**P**	**C**

(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand sources and role of environmental contaminants.
- Demonstrate various techniques involved in bioremediation.
- Develop understanding of generation of energy from waste.

BT 512 Food Biotechnology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Learn processing and preparation of various food products.
- Determine role of microbes in food spoilage and understand the various methods used for food preservation.
- Understand the scope of food biotechnology for future endeavors.

BT 517 Medical Biotechnology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand various in utero diagnostic techniques.
- Identify gene therapy techniques used for the treatment of diseases.
- Comprehend the applications of embryonic stem cells.

BT 519 Nanobiotechnology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the fundamental concepts of nanobiotechnology.
- Apply engineering concepts to the nano-scale domain and design processing conditions.
- Plan research career in institute working on nanobiotechnology.

BT 511 Enzyme Technology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Describe structure, functions and the mechanisms of action of enzymes.
- Get exposure of wide applications of enzymes and their future potential.
- Describe methods for enzyme mediated production of drugs, fine chemicals and other industrial intermediates.

BT 516 Immunotechnology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

After successful completion of the course, students should be able to:

- Compare and describe the different components of immune system and their functions.

- Demonstrate and understand the principle techniques used for disease diagnostics.
- Apply the knowledge of disease resistance and gene therapy in clinical research.

BT 538R Molecular Plant Breeding

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand strategies and applications of plant breeding technologies.
- Comprehend the knowledge of different plant molecular markers.
- Plan a research career in the area of plant biotechnology.

BT 529R Drug discovery

Max. Marks: 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand basics of R&D in drug discovery and should be able to apply knowledge gained in respective fields of pharmaceutical industry.
- Understand the role of synthetic chemistry in the development of pharmaceutical agents and the modification of chemical structures to develop new drug molecules.
- Have an advanced understanding of the chemical structure of a pharmaceutical agent and determine the chemical group responsible for a given biological effect.
- Demonstrate a basic understanding of pharmacogenomics and bioinformatics as it relates to drug design and discovery.

BT 531R Human Genetics and Diseases

Max. Marks: 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand hereditary and molecular genetics with a strong human disease perspective.
- Describe genetic abnormalities underlying human disease and disorders.
- Develop interest in biomedical research, genetic counseling, medicine, and clinical genetics.

BT 534R Intellectual Property Rights

Max. Marks: 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After successful completion of the course, students should be able to:

- Understand the concept of IPR and its types.
- Describe the steps for patenting.
- Discuss the role of WTO and WIPO on IPR.

BT 535R Medical Microbiology

Max. Marks: 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After successful completion of the course, students should be able to:

- Identify various bacterial, fungal, viral and protozoan diseases and their epidemiology.

- Understand the relevance of emerging and reemerging diseases.

BT 539R Protein Engineering

Max. Marks: 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After successful completion of the course, students should be able to:

- Analyse structure and construction of proteins by computer-based methods.
- Describe structure and classification of proteins.
- Analyse and compare the amino acid sequence and structure of proteins, and relate this information to the function of proteins.
- Explain how proteins can be used for different industrial and academic purposes such as structure determination, organic synthesis and drug design.
- Plan and carry out activity measurements of isolated proteins and characterize their purity and stability.

BANASTHALI VIDYAPITH

Master of Technology (Chemical Engineering)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

- To develop latitude of effectiveness in solving advanced/complex engineering problems and tasks using engineering, science and statistics principles.
- To develop longitude of not only opening careers in the branch of study as well as interdisciplinary and multidisciplinary fields with the help of compulsory and elective courses followed by one year of project work in Industry along with reading electives.
- To develop altitude of professionalism and function effectively in the complex modern work environment, both as individuals as well as in team, with the ability to assume leadership roles and achieve understanding and appreciation of ethical behavior, social responsibility and diversity.

Programme Outcomes

Each graduate will be able to

- Evaluate the impact of own work on society including ethical, economic, global and environmental aspects and deliver effective presentations of engineering results in written and oral formats.
- Apply life-long-learning skills and engineering knowledge in critically evaluating relevant literature and new technology systems and become effective leaders, capable of working in diverse environments.

CHE 304 Advanced Chemical Reaction Engineering

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**3**	**1**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand mechanism of catalytic reactions and analysis of kinetic data.
- Understand yield and selectivity of reaction and diffusion in porous catalyst.
- Design catalytic reactors.
- Understand rector design for different type of reactions.

CHE 505 Advanced Process Control

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand the basic principles and importance of process control in industrial process plants.
- Specify the required instrumentation and final elements to ensure that well-tuned control is achieved.
- Understand the use of block diagrams & the mathematical basis for the design of control systems.
- Design and tune process (PID) controllers.
- Use appropriate software tools for the modeling of plant dynamics and the design of well tuned control loops.

CHE 501L Advanced Chemical Engineering Lab

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes:

The students will be able to:

- Understand the kinetics of various kinds of reaction
- Determination of COD and BOD
- Operate spectrophotometer, HPLC, GC, etc.

CHE 511 Computational Fluid Dynamics

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Develop geometrical model of the flow
- To select appropriate boundary conditions
- Obtain solution of dynamic flows using different mathematical models

CHE 517 Equipment Design

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Identify design parameters
- To design internal pressure vessels and external pressure vessels
- To design special vessels (e.g. tall vessels) and various parts of vessels (e.g. heads)

CHE 507L Advanced Simulation Lab

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes:

The students will be able to:

- Develop and implement dynamic models in simulation software
- Investigate effect of operating parameters using simulator
- Develop complex network of process flow diagram

CHE 512 Conceptual Design of Chemical Processes

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

The students will be able to:

- Identify the mathematical constraints involved in process design.
- Identify other constraints such as local government policy, environment clearance, safety concern and economics which can change feasibility of a process.
- Carryout flow sheeting of the process

CHE 513 Corrosion Science and Technology

Max. Marks: 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

The students will be able to:

- Understand the concept of thermodynamics and kinetics of aqueous corrosion

- Recognize the factors, forms and affecting parameters of corrosion
- Monitor, test and prevent corrosion

CHE 524 Polymer Processing and Reaction Engineering

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Get idea about extrusion, blow molding, wire coating etc. and it's affecting parameters
- Carry out various molding techniques, problems and their solutions
- Understand the methods to achieve polymerization by various reactors

CHE 527 Supercritical Fluid Extraction

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand the properties and chemistry of supercritical fluids
- Perform the supercritical fluid extraction process
- Develop and apply the strategies of supercritical fluid extraction

CHE 509 Bioenergy Engineering

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- To judge the different options available given the nature of the feedstock.
- To apply the acquired knowledge to design biomass energy plants and to evaluate their performances.

CHE 510 Catalysis and Surface Chemistry

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand colloids, association of colloids and electro-kinetic effects
- Prepare, understand and analyze the properties of catalysis
- Characterize, select the catalyst and design the reactor

CHE 514 Cryogenic Engineering

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand utilization of cryogenic engineering in the benefit of the society
- Understand working principles of various units such as cryo-coolers, gas liquefaction unit, refrigeration etc.

CHE 519 Industrial Heat Treatment

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand details analysis of heating process, heating or cooling requirements and problems encountered during heat treatment
- Learn about how control material properties with-out using stress
- Identify solution using automation for time-temperature controlled treatment to change material properties

CHE 515 Energy Conservation

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Carryout energy auditing, waste heat recovery and renewable energy resources.
- Carryout calculations related to pay-back, energy management, performs, energy conservation opportunities in various equipments, controllers and heat pumps.
- Understand concepts of non-conventional energy sources, designs and calculation will be explained.

CHE 408 Nano-Science and Technology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**3**	**1**	**0**	**4**

Learning Objectives:

The students will be able to:

- Demonstrate the understanding of length scales concepts, nanostructures and nanotechnology

- Identify the principles of processing, manufacturing and characterization of nanomaterials and nanostructures
- Apply the electronic microscopy, scanning probe microscopy and nano-indentation techniques to characterize the nano-materials and nanostructures
- Evaluate and analyze the mechanical properties of bulk nanostructured metals and alloys, nano-composites and carbon nano-tubes

CHE 502 Advanced Chemical Engineering Thermodynamics

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand the importance and relevance of thermodynamics in life processes
- Analyze various situations and apply the concepts of thermodynamics to problem solving.
- Work with single and multiphase systems of pure materials and mixtures.

CHE 503 Advanced Heat Transfer

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand flow behaviour in boundary layers
- Do analogs study between heat, mass and momentum
- Recognize factors affecting during transport of mass and energy

- Do make energy balances in boundary layers

CHE 516 Environmental Safety and Impact Assessment

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Develop the basic idea of impact assessment
- Able to predict the impact of air, water and noise pollution
- Assess and manage the environmental risk

CHE 306 Computational Methods in Engineering

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**3**	**1**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Solve linear and nonlinear algebraic equations
- Approximate functional value, integration and ODE
- Solve the ODE and PDE

CHE 317 Advanced Mass Transfer

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**3**	**1**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand single stage binary distillation

- Understand distillation of binary mixture and LLE
- Understand leaching and crystallization

CHE 523 Pinch Technology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Explain the role of thermodynamics in process design
- Calculate the minimum heating and cooling requirements for a process
- Identify existing non-optimal arrangements of heat exchangers
- Calculate lower cost solutions for arrangements of heat exchangers
- Critically assess any design changes to process.

CHE 525 Process and Product Development

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- To understand the basic concepts of process design, process development and product development.
- To apply material and energy balances for process development using process data.
- To apply algorithms for feasibility and optimization offlow sheet.
- To apply the scaling up processes.

CHE 508 Advanced Transport Phenomena

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to

- Understand the fundamentals of transport process
- Pertain the isothermal, non isothermal and multi-component systems
- Analyze the transport equation and computational methods involving multiphase flow

CHE 518 Fluidization Technology

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand the fluidization phenomena and operational regimes
- Design various types of gas distributors for fluidized beds and determine effectiveness of gas mixing at the bottom region.
- Analyze fluidized bed behavior with respect to the gas velocity
- Develop and solve mathematical models of the fluidized bed

CHE 521 Natural and Synthetic Polymers

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Understand the basics of polymer

- Understand kinetics of polymerization
- Classify polymers, their reinforcement and additives

CHE 526 Processing of Alternative Fuels

Max. Marks: 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Predict the future of energy scenario and availability
- Understand basic characteristics of alternative fuels including alcohol, biodiesel and gaseous fuels
- Realize the importance of electric and solar power vehicles

CHE 601R Green Energy

Max. Marks: 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcomes:

The students will be able to:

- Identify the need of wind Energy and solar energy and the various components used in energy, generation and know the classifications.
- Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications.
- Compare Solar, Wind and bio energy systems, their prospects, advantages and limitations

CHE 602R ISO Practices in Industry

Max. Marks: 100	**L**	**T**	**P**	**C**

0 0 0 2

Learning Outcomes:

The students will be able to:

- Differentiate various ISO standards
- Implement ISO practices in environmental management
- Apply ISO standards in energy management system

CHE 603R Life Cycle Assessment

Max. Marks: 100 **L T P C**
0 0 0 2

Learning Outcomes:

The students will be able to:

- Get basic idea of life cycle assessment including its goal and scope
- Classify and implementation of LCA
- Interpret LCA, identify its significant issues, report preparation and review the LCA

CHE 606R Safety in Process Industry

Max. Marks: 100 **L T P C**
0 0 0 2

Learning Outcomes:

The students will be able to:

- Potential hazards and hazardous conditions in process industries
- Pay more attention on precaution to avoid accidents
- Make carful decisions during plant malfunction

CHE 607R Social Responsibilities of industries

Max. Marks: 100 **L T P C**

0 0 0 2

Learning Outcomes:

The students will be able to:

- Understand the scope, value and philosophies of CSR activities
- Develop labor communities, techniques and processes in CSR
- Work for the betterment of working culture and industrial environment

CHE 608R Water and Land Pollution

Max. Marks: 100 **L T P C**
0 0 0 2

Learning Outcomes:

The students will be able to:

- Predict impact of pollution on future and can take appropriate action for prevention
- Identify causes of water and land pollution
- Recognize the conventional techniques which can help in reducing pollution

BANASTHALI VIDYAPITH

Master of Laws (Business Laws)
Master of Laws (Intellectual Property Laws)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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LL.M. (Business Laws)

Programme Educational Objectives

The Vidyapith has long history of nurturing women leaders in all walks of life. Of late its IT, Management and Technology graduates/post graduates have won accolades for themselves and their alma mater. In consonance with the value education imparted at Banasthali Vidyapith, it conceptualized an all women's Law School to nurture Legal professionals of the highest order from the academic year 2013-14. Further, in order to strengthen this academic leadership in the area of law and prepare legal experts with strong conceptual and research skill, Vidyapith offered LL.M. in the emerging areas of Business Laws and Intellectual Property Laws from the academic session 2018-19.

The one year LL.M. programme designed amidst the five-fold education model of Vidyapith would comprise a unique mix of foundational and variety of disciplinary courses in field of Business Law to enable the students to find a new career perspectives and play a leading role in growing corporate world.

The main objectives of LL.M. (Business Law) programme are:

1. To provide holistic development of the students by providing a combination of technology and value based traditional education.
2. To develop critical understanding of existing as well as emerging areas in the field of Business Law with an analytical and comparative approach.
3. To train women law graduates as legal experts with strong conceptual and research skill and to provide a centre where scholars might contribute to an understanding of law and participate creatively in its growth and improvement.
4. To demonstrate how the legal rules have developed, the reasons underlying them and to make them understand the nexus between legal and social history.
5. To inculcate the principles underlying the existing legal rules and to point the right road for future development and preparing the students to take up leadership roles in their specialised areas.

Programme Outcomes

PO1: **Knowledge:** The students with pre-developed understanding for basic legal principles will be able to analyse and evaluate the intricacies involved in Business and IP laws.

PO2: **Planning abilities:** The students will be equipped with different legal abilities after the completion of the course by which they can deal with the different legal issues associated with the corporate world.

PO3: **Problem Analysis:** They will be able to understand the real nature of issues and problems related to Business Laws and can suggest various alternatives to issues by applying their analytical skills.

PO4: **Modern Tool Usage:** Case analysis, Debates, Alternate Dispute Resolution methods, etc. will be used to improve their argumentative and writing skills.

PO5: **Leadership Skills:** Today legal education is getting redefined in terms of information technology, globalisation, environment and start-ups, the focus of this programme is on developing professional leaders among women in consonance with value education imparted at Banasthali Vidyapith with traditional as well as modern approach.

PO6: **Professional Identity:** Legal profession is a noble profession and it is not limited to the technical knowledge of legal rules. The prescribed course will help in nurturing the students in a way so that they can meet the standards of different avenues opening in legal profession.

PO7: **Ethics:** The learner will be imbibed with the ethical standards of legal profession & the values nurture at the Vidyapith that are required for practical and impartial behaviour of a law student.

PO8: **Communication:** Students will be able to express complex ideas effectively and accurately in every wake of life whether it is professional or social.

PO9: **Local and Global Citizenship:** Students will be able to assess the way in which legislation and government policies are formed and influenced the social, economical and legal order in national as well as global context. They will be able to understand and empathise cultural differences and practices required to work effectively in multi-cultural environment.

PO10: **Environment and sustainability:** Learners will involve in various co-curricular activities related to society and environment, at departmental as well as institutional level to gain practical exposure that will help them in adapting the socio-economic, legal and political environment.

PO11: **Life Long Learning:** The habit of continuous learning & life-long useful practical skills developed and acquired through the course that will motivate the students for further researches in the field of law, performing different professional roles, ultimately for leading a successful life.

LL.M. (IP Laws)

Programme Educational Objectives

The Vidyapith has long history of nurturing women leaders in all walks of life. Of late its IT, Management and Technology graduates/post graduates have won accolades for themselves and their alma mater. In consonance with the value education imparted at Banasthali Vidyapith, it conceptualized an all women's Law School to nurture legal professionals of the highest order from the academic year 2013-14. Further, in order to strengthen this academic leadership in the area of law and prepare legal experts with strong conceptual and research skill, Vidyapith offers LL.M. in the emerging areas of Business Laws and Intellectual Property Laws from the academic session 2018-19.

The one year LL.M. programme designed amidst the five-fold education model of Vidyapith comprises a unique mix of foundational and variety of disciplinary courses in field of Corporate Law to enable the students to explore emerging career perspectives and play a leading role in growing corporate world.

The main objectives of **LL.M. (IP Laws)** programme are:

1. To provide holistic development of the students by providing a combination of technology and value based traditional education.
2. To develop critical understanding of existing as well as emerging areas in the field of Intellectual Property Laws with an analytical and comparative approach.
3. To train women law graduates as legal experts with strong conceptual and research skills in domain of copyright, patent and other IPRs and to provide a centre where scholars might contribute to an understanding of law and participate creatively in its growth and improvement.
4. To demonstrate how the legal rules have developed, the reasons underlying them, and to make them understand the nexus between legal and social history.
5. To inculcate the principles underlying the existing legal rules and to point the right road for future development and preparing the students to take up leadership roles in their specialised areas.

Programme Outcomes

PO1: **Knowledge:** The students with pre-developed understanding for basic legal principles will be able to analyse and evaluate the intricacies involved in Corporate and IP laws.

PO2: **Planning abilities:** The students will be equipped with different legal abilities after the completion of the course by which they can deal with the different legal issues associated with the corporate world.

PO3: **Problem Analysis:** They will be able to understand the real nature of issues and problems related to IP Laws and can suggest various alternatives to issues by applying their analytical skills.

PO4: **Modern Tool Usage:** Case analysis, Debates, Alternate Dispute Resolution methods, etc. will be used to improve their argumentative and writing skills.

PO5: **Leadership Skills:** Today legal education is getting redefined in terms of information technology, globalisation, environment and start-ups; the focus of this programme is on developing professional leaders among women in consonance with value education imparted at Banasthali Vidyapith with traditional as well as modern approach.

PO6: **Professional Identity:** Legal profession is a noble profession and it is not limited to the technical knowledge of legal rules. The prescribed course will help in nurturing the students in a way so that they can meet the standards of different avenues opening in legal profession.

PO7: **Ethics:** The learner will be imbibed with the ethical standards of legal profession & the values nurture at the Vidyapith that are required for practical and impartial behaviour of Law students.

PO8: **Communication:** Students will be able to express complex ideas effectively and accurately in every wake of life whether it is professional or social.

PO9: **Local and Global Citizenship:** Students will be able to assess the way in which legislation and government policies are formed and influenced the social, economical and legal order in national as well as global context. They will be able to understand and empathise cultural differences and practices required to work effectively in multi-cultural environment.

PO10: **Environment and sustainability:** Learners will involve in various co-curricular activities related to society and environment at departmental as well as institutional level to gain practical exposure that will help them in adapting the socio-economic, legal and political environment.

PO11: **Life Long Learning:** The habit of continuous learning & life-long useful practical skills developed and acquired through the course that will motivate the students for further researches in the field of law, performing different professional roles, ultimately for leading a successful life.

First Semester

LAW 619 Comparative Public Law

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After Completion of the course student will able to:

- Understand the similarities and differences between leading legal traditions in key areas like separation of powers, protection of rights and the role of judiciary.
- Get familiar with the methodology of comparative public law.
- Use comparative methodology in public law analysis.

LAW 620 Competition Law

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course student will be able to

- Students will be able to understand various aspects of Competition Law and how it emerged on national and international level.
- Understand the recent issues of Competition Law which will encourage the students for further research

LAW 625 Intellectual Property Rights Law

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course student will be able to

- The learners will be able to use the principles of various IP laws while analyzing a problem related to IPR.

- Learners will further be able to assess the ways in which legislation and global policy influence the socio-economic environment in India and abroad.
- Proficiency with the ability to engage in competitive exams like CLAT, Patent Attorney, Bar Council of India, and other higher education and specialized courses will be developed.

LAW 628 Law and Justice in a Globalizing World

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course student will be able to:

- Find solutions to pressing problems of globalization in the domain of global justice
- Familiarize themselves with the multiple dimensions of the theoretical literature in relation to globalization.
- Critically evaluate the liberal, republican, and discursive democratic thoughts in relation to globalization.

LAW 634 Research Methods and Legal Writing

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course student will be able to

- Understand various intricacies associated with research
- Acquire knowledge related tool and techniques of research in Law.
- Make research proposal, research design, research report and thesis

Second Semester

LAW 621 Corporate Law

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After Completion of the course student will able to

- Develop an understanding on the working of Indian Corporates.
- Understand various provisions of the Company Law and other related legislations.
- Develop an analytical view of the subject and are updated with latest amendments in law & landmark judgment

LAW 627 International Trade Law

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

- The students will be able to understand the basic practicalities of International Trade.
- Students understanding about the various aspects of International Trade Law and all the steps taken on domestic and International level will be developed.
- Analytical skills will be developed among the students in relation to International Trade.

First Semester

Master of Laws (Intellectual Property Laws)

LAW 626 International Intellectual Property Law and Policy

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course student will be able to:

- Understand the basics understand of international intellectual property right law.
- Get adequate knowledge of various International Treaties related to IPR accustom with the international perspective of IP law, their dispute redressal mechanism and various issues attached with the International IP law**.**

LAW 631 Law of Patents

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course student will be able to:

- Understand the various aspect of Patents law in Indian context.
- Get adequate knowledge of Various International Treaties related to Patent Laws.

Second Semester

LAW 629 Law of Copyright

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

- The students will be able to understand various complexities associated with copyright law.

- The students will be able to file an application for copyright.
- The students will acquire knowledge about the contemporary issues relating to copyright law.

LAW 632 Law of Trademarks

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course the student will be able to:

- Understand the basics of trademark law.
- Get adequate knowledge of Various International Treaties related to of trademark law.
- Accustom themselves with the Indian legislation on of trademark law.

Discipline Elective

LAW 618 Bio-diversity Protection

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course student will be able to

- The learners will be able to know the importance of Biodiversity.
- Learners will further be able to acquaint themselves with legal and ethical issues relating to biodiversity.

LAW 633 Plant Varieties and Farmers Rights

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course student will be able to

- Know the significance of plant varieties in agrarian economy.
- acquaint themselves with legal provision under Plant Verities act

LAW 701 Principles of Taxation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course student will be able to

- The students will be able to define the procedure of tax assessment.
- The students will be imbibed with the practical knowledge to compute total income and define tax complicacies and structure.
- The Students will get problem solving skills, proficiency in matters related to taxation law

LAW 702 Securities and Investment Law

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes

After the completion of the course student will be able to

- An understanding about the various aspects of Securities Laws and all the steps taken to deal with stock exchange and listing of shares and investors protection will be developed.
- The students will get to know about the recent issues of Securities Laws in India.
- Analytical skills will be developed among the students in relation to Securities and Investment law

LAW 630 Law of Geographical Indications and Plant Varieties

Max. Marks : 100	L	T	P	C

(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

After the completion of the course student will be able to

- Understand the basics of geographical indications and plant varieties.
- Get adequate knowledge of Various International Treaties related to geographical indications and plant varieties.
- Accustom themselves with the Indian legislation on geographical indications and plant varieties.

Reading Electives

LAW 617R ADR and IP Disputes

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of the course student will be able to

- Understand the role of ADR system in IP dispute settlement, so that they can help their clients and society by adopting just and humane methods.
- Get the knowledge about the response of Indian ADR system.

LAW 623R Emerging Forms of IPR

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcomes:

After the completion of the course student will be able to

- Develop a critical approach towards the understanding of recent trends in IP laws.

- Know about the recent issues and domains of IPR to motivate further research.

LAW 624R Green Technology and IPR

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After the completion of the course student will be able to

1. Understand the nature and characteristics of Traditional Knowledge.
2. Get the knowledge of the interface between IPRs & Traditional Knowledge that can be used in practical way.

LAW 635R Traditional Knowledge, Traditional Cultural Expressions and Genetic Resources

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After the completion of the course student will be able to

- Understand the nature and characteristics of Traditional Knowledge.
- Get the knowledge of the interface between IPRs & Traditional Knowledge that can be used in practical way.

BANASTHALI VIDYAPITH

Master of Arts (Kathak Dance)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Master of Arts (Kathak Dance)

Programme Educational Objectives

A complete dance is a sum total of all aspects of arts, be it performance as a dancer, a dance critic, dance therapists a researcher, basic knowledge of all and specialization in any of these, later helps in identifying the student as a choreographer / performer, a teacher, a student, a researcher or a knowledgeable audience.

Apart from all the basics education required in this field, M.A. syllabi mostly focuses on the professional aspect, of dance. Be it in the field of performance, in recording or editing, in writing as a critic, or as a composer/choreographer.

Hence, this curriculum has identified all the essential competencies in the respective areas, for which practical and professional training will be provided to the students specializing in any of the above said.

The programme has been initiated with the objective to basically enable the students

- To understand the basics of technical skills for a performer.
- It introduces the students to the nuances of abhinaya and the processes of its enumeration.
- To expose the students of dance in managing/dealing with the music components of dance performance in which they are involved either a performer or choreographer.
- To prepare the concepts of theme and theme based choreographer.
- Boost confidence and be able to perform onstage with full enthusiasm.
- To gain professional and practical education in the required field regarding pedagogy Performance and area of Research.
- The course prepares the students to be effective are managers and entrepreneur.

Programme Outcomes

- **PO.1 Kathak knowledge** – Introduce students to the advance techniques of Kathak Dance regarding Prachilit and Aprachlit, taals helping and encouraging the students to perform and introduce them with techniques of research formulation in this area.

- **PO.2 Planning a syllabus and pedagogical techniques-** Demonstrate effective planning abilities including new techniques in the field of teaching, training, and appreciation and guided listening as well as time management, resource management and organizational skills.

- **PO.3 Modern Tool usage**- Learn, select and apply appropriate methods and procedures to understand the Basics of Technical Skills for choreography related areas.

- **PO.4 Professional Identity**-Understand and analyze the value of their professional roles in society as a teacher, a performer, a writer a researcher, to fulfill which learning professional presentation techniques is a must.

- **PO.5 Ethics and Values**- Honor personal values and apply ethical principal in professional and social context. Demonstrate behavior that recognizes cultural and personal variability in values. Communication and lifestyle. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associate with the decisions.

- **PO.6 Life long Learning**- Recognize the need for, and have preparation and ability to engage in independent and life long learning in the broadest context of riyaz and performance as well as technological changes. Self access and use feedback effectively from other to identify learning needs and to satisfy these needs on an ongoing basis.

Detailed Syllabus

First Semester

DNCE 409 History of Indian Classical Dance – I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome

- Understand the depth of dancing history and different Indian Classical danc forms.
- Explain, texts, based on Nritta, Nritya and Natya and have knowledge of different Gharanas of Kathak.
- Appreciate famous ancient Indian Theatrologists of Classical Dance

DNCE 411L Performance of Abhinaya and Taal - I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcome

- Learn the characteristics of different Gharana's of Kathak.
- Understand the basic technique and their improvisation in Kathak.
- Know about the technique of footwork in Kathak.
- Improve Expression through the use of Rasa.

DNCE 413 Principles of Kathak Dance – I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome

- Discuss the Tandava, Lasya and Hastabhinaya.
- Understand the technical terms of Kathak and Musical aspects of Dance

- Know about the contribution of Kathak maestro.
- Learn about notation skills.

DNCE 415L Stage Performance - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcome

- Execute and perform Kathak techniques.
- Demonstrate advance terms of Kathak Dance.
- Present solo items on stage.

Second Semester

DNCE 410 History of Indian Classical Dance - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome

- Understand the development of Dance through ages.
- Appreciate the knowledge of Master's who contributed significantly in its Growth.
- Understand dance in different context.
- Explain and apply the different regional dancing forms.

DNCE 412L Performance of Abhinaya and Taal - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcome

- Attain proficiency in advance technique of Kathak.
- Improve Abhinaya skill.
- Develop an ability to perform on stage with the use of stagecraft (Light, Props etc.)

DNCE 414 Principles of Kathak Dance - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome

- Learn technical terms of Natyashastra used in Kathak dance.
- Develop the complete knowledge of Aangikabhinaya and have presentation skills of different vocal styles used in Kathak.
- Write taal in various layakari and notation of technical terms of Kathak Dance.

DNCE 416 Stage Performance - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	16	8

Learning Outcome

- Perform solo Kathak on stage.
- Improvise expression during presentation.
- Have command over difficult Layakari.

Third Semester

DNCE 509 Aesthetic Sense of Kathak Dance – I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome

- Understand and explain the aesthetic sense, Nav-Ras and Nayika Bhed.
- Develop an ability to enhance the knowledge of Rangshala.
- Demonstrate the Bhav and Rasa.

DNCE 511 Analytical Study of Taals – I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome

- Apply and explain the knowledge of origin and development of Taal.
- Explain the non-prevalent taals.
- Formulate the notation of various taals and Layakaris.

DNCE 515L Performance of Abhinaya and Taal - III

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	14	7

Learning Outcome

- Recognize and execute the previous bols and bandish.
- Perform the prevalent Taals.
- Perform Abhinaya in various vocal styles.

DNCE 517L Stage Performance-III

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	14	7

Learning Outcome

- Perform independent Kathak Dance Performance.
- Understand the Stage Sense.
- Play instruments with Kathak Dance.

Fourth Semester

DNCE 510 Aesthetic Sense of Kathak Dance – II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome

- Appreciate Aesthetic sence in Kathak Dance.
- Understand and apply the concept of Rasa-Siddhant.
- Apply knowledge of new experiments taking place in Kathak Dance

DNCE 512 Analytical Study of Taals – II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome

- Understand and explain the origin and development of Taal.
- Recognize and apply the non-prevalent taals.
- Formulate the notation of various taals and Layakaris.

DNCE 516L Performance of Abhinaya and Taal - IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**14**	**7**

Learning Outcome

- Recognize and execute the previous bols and bandish.
- Perform the prevalent taals.
- Perform a complete repertoire.

DNCE 518L Stage Performance - IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**14**	**7**

Learning Outcome

- Perform live Show.
- Execute the self-made composition.
- Apply the technique of voice modulation during ‘PADHANT’.

BANASTHALI VIDYAPITH

Master of Arts - Music (Vocal/Instrumental – Guitar, Sarod, Sitar, Violin)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

The Master of Arts (M.A.) degree program in music emphasizes on composition, musicology, or performance and practice, and integrates studies in performance, composition/analysis and research. The program seeks to maintain a balance of skills and interests and to encourage a diversity of approaches among its graduate students. The curriculum includes courses in research methods, analysis, Theory and performance practices in Hindustani vocal/instrumental. Graduates of the M.A. program have become successful candidates for doctoral programs, academic positions, and other technical and professional careers in music.

The **Master's Degree in Classical Music Performance** will allow the student to develop a language based on the knowledge of the tradition and the most important styles in the music history of India, in all its styles and genres. It is also a unique opportunity to be in optimal conditions to gain access to professional practice in concert programs, recordings and professional activities related to creativity and the current music industry.

The Main objective of the programme are :-

- To enable students to take a creative and analytical approach to the music programme
- Whilst keeping in view the traditional values & modern trends of this discipline
- To provide an opportunity to extend the knowledge based on practical advancement so to have a healthy interaction at the international level
- To provides a broader overview of larger issues in aesthetic of music in general
- To focus on various approaches of music appreciation and audience response
- To appreciate analyze and critically respond to music and musical performance.
- Students learn to analyse aesthetic cultural phenomena, including the way they are practiced in society.

Programme Outcomes

- **PO1: Knowledge:** Music is a universal sound which can create emotions and express feelings in students. Developing Knowledge in Music, including concentration in the fields of Composition, Music History, Music Technique, Music Theory and Acoustics, or Music, Science, and Technology. Understanding the different styles of Indian music and western music.

- **PO2: Planning abilities:** Demonstrate how Practicle & theories have been used to explain different emotional responses to music , listening ,performance and other musical behavior and planning a series of case studies in key fields such as education ,therapy, advertising and technology of music .

- **PO3: Acquiring Skills**:.The Music program offers rigorous practical training of Indian classical music, enabling to acquire leadership roles in the professional field of music composition, production and performance. The course will endeavor to provide a general understanding of the hearing process of how musical skills are acquired from child hood to adulthood. And also Allow students to develop skills in Composition , performance or music technology.

- **PO4: Musical Ethics**: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

- **PO5: Communication**: Communicate effectively with the musical community and with society at large, such as, being able to comprehend and perform effective, make effective performances and demonstration, with the audience at large.

- **PO6: Environment and sustainability**: Understand the impact of the professional competency participation in societal and environmental contexts, and demonstrate the knowledge of music, and also understand the need for sustainable development of self.
- **PO7: Life- long learning**: Recognize the need for learning , and have the preparation and ability to engage in independent and life-long learning of the subject music . Self access and use feedback effectively from others to identify learning needs and to satisfy theses needs on an ongoing basis.

First Semester

MUS 409L Comparative Study of Ragas - I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcomes:

The following progamme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & performance.
- Student will be able to learn & voice modulation techniques in all three octaves.
- Move a step lighter from easy to complex ragas.

MUS 412 History of Music – I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The following progamme will enable the students to:

- Explore historical, political and social context of Indian music.
- Recognize styles and characterstics of each genres of Hindustani music.
- Identify musicians who contributed to the popularity of Indian music.

MUS 413 Principles of Music - I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The following programme will enable the students to:

- Explore historical, political and social context of Indian music.

- Recognize styles and characterstics of each genres of Hindustani music.
- Identify musicians who contributed to the popularity of Indian music with refrence to particular Gharanas.
- Recognize western music symbols and use music terminology to explain their functions.

MUS 415L Stage Performance - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

Learning Outcomes:

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments.

Second Semester

MUS 410L Comparative Study of Ragas - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**16**	**8**

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments.

MUS 411 History of Indian Music - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome

- Explore the historical, political and social context of south Indian & North Indian music.
- Recognize styles and characterstics of different Gharanas of Indian music.
- Learn elementary features of Western Notation System.
- Student's are able to differentiate between Hindustani and Karnatik music
- Recognize styles and characterstics of each genres of Hindustani music.
- Identify musicians who contributed to the popularity of Indian music.
- Recognize western music symbols and use music terminology to explain their functions.

MUS 414 Principles of Music - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The following programme will enable the students to:

- Explore historical, political and social context of Indian music.
- Recognize styles and characterstics of each genres of Hindustani music.
- Identify musicians who contributed to the popularity of Indian music.
- Recognize western music symbols and use music terminology to explain their functions.

MUS 416L Stage Performance - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	16	8

Learning Outcomes:

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments.

Third Semester

MUS 520 Aesthetics and Culture of Music - I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

The following programme will enable the students to:

- Acquaint with movement of art and aesthetic thoughts in different historical, cultural, social, political, ideologies and religious context.
- Learn the impact of the above mentioned contexts on the expression, aesthetical techniques and languages of art.
- Acquaint with the approaches and methodologies that help, understand the work, place and inter reltienship of music with other forms of fine arts.

MUS 523L Comparative Study of Ragas - III

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	14	7

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments.

MUS 530 Psychology of Music - I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The following programme will enable the students to:

- Become more aware of the impact of music on psychological processes.
- Learn the scope of music in various fields of psychology, including therapy and other aspects.

MUS 532L Stage Performance - III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**14**	**7**

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments.

Fourth Semester

MUS 521 Aesthetics and Culture of Music - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The following programme will enable the students to:

- Aquaint with the movement of art and aesthetical thoughts in different historical, cultural, social, political, ideological, psychological and religious.
- Learn the impact of the above mentioned contexts on the expression, aesthetical techniques and languages of art in indian's western form of music.
- Acquaint with the approaches and methodologies that help,understand the work, place audience, cultures & beliefs and their relation with music and musicians.

MUS 524L Comparative Study of Ragas - IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**14**	**7**

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments.

MUS 531 Psychology of Music - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The following programme will enable students to:

- Become more aware of the impact of music on various levels of the psyche.
- Learn the basics of voice modulation techniques through the structural knowledge of human anatomy & physiology of ear of threat.
- Learn the scope of music in various fields of psychology, including taste of music listeners & other brain activities.

MUS 533L Stage Performance - IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**14**	**7**

Learning Outcomes:

The following programme will enable the students to:

- Attain rigorous practical training of Indian classical music, enabling students to acquire leadership roles in the professional field of music composition, production and performance.
- Improvise & perform bandish (composition) into a performance.
- Learn techniques for easy, flow in all 3 octaves.
- Move a step higher from easy to complex ragas.
- Learn fingering techniques of specific instruments

Discipline Elective

MUS 522L - Basic Technical Skills for Audio Production

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Lerning Outcomes:

At the completion of the course the students will be able to:

- Learn professional presentation techniques.
- Understand and demonstrate the techniques o research thesis of dissertation along publishing of research papers in concerned journals.

- Enhance their skills ELECTIVE PAPER with elementary knowledge of playing instruments like Harmonium, Tabla, Sitar etc. for VOCAL INSTRUMENTS and knowledge of singing styles and other instruments for INSTRUMENTAL STUDENTS.
- Enhance their preliminary knowledge regarding Gambhir Gayaki and other contemporary Vocal and Instrumental styles.

MUS 525L Performance of Indian Classical Music (Harmonium)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

At the completion of the course the students will be able to:

- The following programme will enable the students understand the pattern & structural design of the instrument.
- Play/sing with zeal to get improved at beginning level and heading towards pro level, there by improving command even the 12 notes.
- Handling techniques of the instruments.

MUS 526L Performance of Indian Classical Music (Tabla)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

The following programme will enable the students to:

- Learn the practical demonstrating of terminology such as sam, kaal, khanda, maatra, laya etc.
- General information about the origin of tabla, Structure & handling techniques.
- Get a basic introduction of terminology such as kayada, palta, mukhra, tukra,etc. through practicals.
- Basic knowledge of Bhatkhande notation system in Hindustani Taal Paddhati.

MUS 527L Performance of Indian Classical Music (Vocal)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

The following programme will enable the students to -

- Get a formal training of the basics like types of notes, different patterns of notes (Alankaars), rhythm and its components with an initial start of learning ragas.
- Encourage students to sing with zeal to get improved at beginning level and heading towards pro level, there by improving command over the 12 notes.
- In Nibadha & Anibadh patterns.

BANASTHALI VIDYAPITH

Master of Arts (Drawing and Painting)

Curriculum Structure

First Semester Examination, December-2019
Second Semester Examination, April/May-2020
Third Semester Examination, December-2020
Fourth Semester Examination, April/May-2021

BANASTHALI VIDYAPITH
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(Rajasthan)-304022

July, 2019

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Programme Educational Objective

Postgraduate study in Drawing and Painting reflects the diversity of courses. Students will be encouraged to explore various methods with support from accomplished academic and technical staff.

The P.G. course of the department is maintaining a balance of theoretical and historical context. Sketching and drawing is a fundamental concern of the department. Students are encouraged to explore Portrait, Figure drawing, Mural Painting at a high level by focusing on the connections between thinking, feeling, looking and making. Painting is also developed through experimentation with other art forms such as Print making, Media Exploration, Photography, Installation and all manner of object and image making. Analysis and actualization of the pleasure and beauty of painting in all its complexity is the heart of the area. Discussion and debate fuel and sharpen the students critical awareness of the nature of painting with in a contemporary art context and their ability to question the position of painting today. The wide range of creative activity and cultural experience of students makes for a rich and diverse studio culture to create a vibrant and stimulating working atmosphere.

The curriculum has identified essential competencies in the respective areas for which practical and theoretical knowledge will be provided to the students specializing in academic and professional fields respectively. Students are sure to find an area that suits their expressive style. Rigorous study of art history across culture and time offers opportunities to consider multiple perspectives as well as providing a firm grounding for understanding that cultural context is a shaping force for all human activity. Skillful execution are essential elements for generating change in the world.

We believe that the studio arts provide an ideal venue for learning and practicing these critical skills. Ensuring that our students understand the applicability and transferability of the creative making process to all areas of life is a primary goal. The Visual Art Department has its own well equipped art studios in the Kala Mandir and Lalit Mandir building which support students development of artistic practice.

- Portrait Painting and Life Drawing Studio.
- Painting Studio.
- Print Making Studio
- Mural Painting Studio

The main objectives of the M.A. drawing and Painting programme are :

- To provide exemplary education in a stimulating environment with aesthetic sensibility. Develop and refine artistic techniques and methods in order to interpret, analyze and conceptualize art work.
- To prepare competent educationists and professional artists of various levels for India.
- To prepare globally recognized art educationists and artist.
- To use innovative theoretical and methodological approaches to generate new approaches to the history of representation understood within broader socio-cultural perspectives.
- To emphasizes the innovative practices and profound changes in the development of Visual Art.
- To develop writing and speaking skill effectively regarding art criticism, art appreciation and aesthetics.
- To create awareness in society about the effective and safe use of art materials and methods.
- To develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions through art creation.

Programme Outcomes

PO 1 : **Knowledge of Visual Art :** Clearly communicate the content and context of their work visually, orally and in writing. Through creative process use a variety of brainstorming techniques to generate novel ideas of value to solve problems. Develop behavior such as curiosity, initiative and persistence that will help them engage with world in productive ways. Work independently or collectively to achieve stated goals .

PO 2 : **Planning abilities :** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO 3 : **Problem analysis:** Utilize the principles of artstic enquiry, thinking analytically, clearly and critically, while solving problems and making decision during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO 4 : **Modern tool usages :** Learn, select, and apply appropriate methods and procedures, resources, and modern art-related computing tools with an understanding of the limitations.

PO 5 : **Leadership skills :** Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizen or leadership roles when appropriate to facilitate improvement in aesthetic environment.

PO 6 : **Professional Identity :** Understand, analyze and communicate the value of their professional roles in society (e.g. Art educators, free lance artists, Art therapist, Art Critic, Art conservators, Art historians and Art directors etc.)

PO 7 : Ethics of Visual Arts : Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO 8 : Communication : Communicate effectively with the artist community and with society at large, such as, being able to comprehend and write effective, make effective presentations and documentation, and give and receive clear instructions.

PO 9 : Visual Art and society : Recognize and understand major monuments, artists, methods and theories and be able to asses the qualities of works of art in their historical and cultural settings apply reasoning informed by the contextual knowledge to assess societal, environmental, and legal issues and the consequent responsibilities relevant to the professional art practice. Sensible and balanced approach between social values and creative expression.

PO 10 : Environment and sustainability : Understand the impact of the professional artistic societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. Understand the social environmental, cultural and historical contributions and dimensions of the art.

PO 11 : Life- long learning : Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological and day-to-day changes in society.

First Semester

DNP 402 History of Eastern Art –I (India)

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know different phases of Indian art history and its stylistic changes.
- Familiar with art and praxis.
- Speak articulately and critically about Indian art history.

DNP 403 History of Western Art - I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know the historical aspects of Western Art through its documented events and works of art as well as to develop the aesthetic sensibility.
- Understand the major artistic styles and genres of Western Art through a broad range of time periods from prehistoric to Gothic Art.
- Compare and contrast contemporary work with their historical antecedent.
- Enhance visual literacy, speak and write articulately about art, religion and society.
- Analyze works of art contextually.

DNP 419L Sketching and Media Exploration – I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes

After the accomplishment of the course students will be able to:

- Develop eye and hand coordination.
- Explore ideas and improve communication skills.
- Explore the expressive possibilities of various media.

Sketches (Indoor and Outdoor), Exploration of Possibilities and

Elective – I & II

DNP 413L Mural Painting- I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about various methods of painting and the ancient cultural tradition of mural art in India.
- Explain indigenous cultural tradition of mural art.
- Learn and enhance technical skill related to tempera process of mural painting.
- Create original work of art and apply skills for professional ends and develop personal style and contribute to art work.

DNP 415L Portrait Painting –I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes

After the accomplishment of the course students will be able to:

- Analyze own problem in portrait painting and solve accordingly.
- Learn proper techniques to create a portrait painting.
- Create aesthetic appeal in a portrait.

DNP 417L Print Making Art-I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know the meaning, nature and various methods of printmaking medium and its application in the field of art.
- Understand materials, tools and processes from variety of relief techniques like Wood cut and Linoleum cut.
- Apply relief printing process in their own creation and value the historic traditions of the medium.
- Develop self motivation, self direction and strong work ethic.

Second Semester

DNP 401 History of Eastern Art - II (China and Japan)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes

After the accomplishment of the course students will be able to:

- Recognize the philosophical differences of Confucianism, Taoism and Buddhism and their impact on art of China and Japan.
- Identify the artists and their art works belonging to particular dynasty.
- Formulate knowledge about China and Japan in their art Practice.
- Know about works of artists, subjects, themes, colors, techniques, perspectives and principles used in Chinese and Japanese painting.

DNP 404 History of Western Art-II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes

After the accomplishment of the course students will be able to:

- Understand major changes from 15^{th} to 18^{th} Century of Western Art and its great Artists.
- Think critically, communicate clearly and write effectively about works of art.
- Recognize and understand major monuments, artists, methods and theories and be able to assess the qualities of works of art and architecture in their historical and cultural settings.
- Analyze, compare and contrast Western art with Non-Western art.
- Explain historical and contemporary works of art from a critical perspective.

DNP 420L Sketching and Media Exploration - II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	8	4

Learning Outcomes

After the accomplishment of the course students will be able to:

- Develop unique approach regarding materials to create a work of art.
- Develop communication skills through Visual Art.
- Explore the expressive possibilities of various media used in creating works of art.
- Attain and understanding of personal aesthetic and visual language.

Elective – III & IV

DNP 414L Mural Painting-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about various methods of painting and the ancient cultural tradition of mural art in India.
- Explain indigenous cultural tradition of mural art.
- Learn and enhance technical skill related to tempera process of mural painting.
- Create original work of art and apply skills for professional ends and develop personal style and contribute to art work.

DNP 416L Portrait Painting-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about the role of portraiture in art practices (from ancient to contemporary).
- Understand the anatomy of face, structure, light, shade, proportion and the characteristics of model.
- Develop eclectic and aesthetic knowledge about portrait making

DNP 418L Print Making Art-II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	12	6

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know the several modes of artistic expression in the intaglio process of printmaking
- Understand materials, tools and processes from variety of intaglio techniques like dry point, etching and aquatint.
- Prepare portfolio of art work.
- Think critically, communicate clearly and work creatively in intellectual pursuit of print making.
- Analyze, interpret and evaluate the form and content of works of art.

Third Semester

DNP 503 History and Philosophy of Modern Art (Western)-I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about the turning point in art in the 19th century.
- Identify works of art, their artistic style and their Socio-Political and Cultural context.
- Understand formal elements and differentiate styles among cultures overtime.

- Analyze the influence of Photography in the emergence of modern art.
- Analyze the formal, technical, stylistic, compositional, characteristics of works of art.
- Demonstrate awareness of both western and non-western art

DNP 505 Indian Aesthetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Gain the knowledge of Indian Aesthetics with reference to Vedic and Puranic Literature.
- Explain the Ras Siddhant according to Natyashastra.
- Relate Aesthetics and its Philosophy.

DNP 517L Sketching and Media Exploration - III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Understand the fundamental of drawing and move beyond the fundamental concepts.
- Explore the endless possibilities of different media.
- Develop observational skill regarding time, space, form, perspective and color.
- Sketches (Indoor and Outdoor), Exploration of Possibilities and Limitations of Various Media.

Discipline Elective – I & II

DNP 513L Composition-I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Explore new mediums.
- Upgrade their previous Artistic experiments.
- Know critical theories and their applications in composition.

DNP 515L Mural Painting-III

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about the techniques and materials related to the wet process of mural painting.
- Understand and develop technical skill to create murals.
- Analyze the specific qualities of the medium to explore the possibilities of the medium for creative experimentation.
- Utilize their creativity to contribute towards society.

DNP 519L Study from Life (Full Human Figure)-I

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Draw human figure through observation.

- Enrich knowledge about various poses of human figure
- Cultivate several modes of artistic expression in study from life.
- Handle light and shade appropriate for full human figure.

Fourth Semester

DNP 504 History and Philosophy of Modern Art (Western)-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about the changing perspective of art in the 20th century.
- Correlate between art and discoveries and use them in executing work of art.
- Analyze the impact of Socio-Political situations on art and vice-versa.
- Think critically and develop research aptitude.
- Demonstrate awareness of both western and non-western art.
- Know the various aesthetic criteria by which modern art has been evaluated and discuss them in their cultural context.

DNP 518L Sketching and Media Exploration - IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**8**	**4**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Use creativity and imagination in Sketching and Media Exploration
- Use mediums, materials, tools and techniques
- Explore the endless possibilities of different media in contemporary art practices.

DNP 512 Western Aesthetics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Gain knowledge of Western Aesthetics from ancient to Renaissance period.
- Recognize the philosophical Approach of Western Aesthetics.
- Apply knowledge of Western and Indian Aesthetics in their own creations.

Discipline Elective – III

DNP 514L Composition-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know subjects and materials used in composition
- Explore socio-political subjects through composition.
- Identify the importance of realistic and abstract subject matter in composition.

DNP 516L Mural Painting-IV

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Know about the techniques and materials related to the wet process of mural painting.
- Understand and develop technical skill to create murals.
- Analyze the specific qualities of the medium to explore the possibilities of the medium for creative experimentation.
- Utilize their creativity to contribute towards society.

DNP 520L Study from Life (Full Human Figure)-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**12**	**6**

Learning Outcomes

After the accomplishment of the course students will be able to:

- Make free hand structural drawings of human figure with different gesture.
- Explore anatomical drawings of human figures.
- Experience human emotions through figure study.
- Realize the importance of light & shades in making human figure.

General Instructions:

C.A. (40 Marks): Continuous Assessment will be conducted by a Board of Examiners minimum three teachers one time in a Semester.

Practical Exam.- Final assessment for each Discipline Elective Course (Display of art work with report and Viva-Voce)

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BANASTHALI VIDYAPITH

Master of Arts
(Journalism and Mass Communication)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Journalism and Mass Communication education at Vidyapith is aimed to create women professionals with ethical values to contribute to the society and lead the industry. Media is a massive force that influences our society at each and every level. Journalism and Mass Communication process helps to understand how different elements of communication provide new development in social, political and economic context. The curriculum offers a systematic progression of hands-on production work, conceptual skills and artistic expression required to become an accomplished media practitioners in a social and technological environment. It also includes various on-field activities like real-time news reporting, on-field TV news coverage, industrial training, developing actual advertising campaigns etc.

- To promote journalism and mass communication education as a culture that attracts wider participation and focus to women with a view to empower them towards bridging the prevalent gender disparity.
- To prepare students to recognize and analyze the problems prevailed in society and effectively design media strategies that will provide solution to the problems.
- To emphasize on the development of critical thinking, professional writing skills and effective oral communication.
- To enable the learner to write, deliver and direct media programmes for the benefit of the society.
- To inculcate the values and attitudes that makes them representatives of social change and make competent to cope with ethical dilemmas of Mass Media.
- To acquaint with the latest technology incorporated and used in Mass Media.
- To develop research attitude in both qualitative and quantitative.
- To encourage students for publishing journals, working papers, case comments and reports based on the quality research.

Programme Outcomes

After completion of the course, the student will achieve the following:

- **PO1. Domain Knowledge:** Imbibe domain-specific knowledge and develop globally-relevant skills for academic and professional enhancement and understand the history, development, and practice of the print media, electronic media, and the new media.
- **PO2. Problem analysis:** Understand the media critically and recognize how media shape and are shaped by politics, society, culture, economics, and daily lives.
- **PO3. Analyzing Complex problems:** Use domain based knowledge to analyze the real life problems in the profession and society to provide effective solutions using available resources.
- **PO4. Usage of Modern IT tools:** Use MS Office tools, Design softwares like In design, Photoshop, Quark Xpress, Coral Draw, Multimedia Softwares for designing, interpretation of data, audio-video, text, pictures, graphics and simulation tools for smooth functioning in different media industry.
- **PO5. Environment and sustainability:** Understand the impact of the mass communication channels in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO6. Ethics:** To recognize the power of persuasion and ethical responsibilities of communicators in communication at all levels.
- **PO7. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO8. Communication:** To understand the role of communication in fostering interaction and interdependence across gender, race, and culture.

- **PO9. Project Management:** Demonstrate knowledge of journalism & mass communication application and management principles to apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO10. Research Domain:** Develop the research attitude in both qualitative and quantitative area.
- **PO11. Life-long learning:** Demonstrate effective writing, speaking and listening skills for communication in personal, public, and media areas.

FIRST SEMESTER

(Disciplinary Courses)

JMC 401 Communication, Media and Journalism Theories

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The students will be able to:

- Understand the importance of communication theories from multiple philosophical perspectives.
- Understand school of thoughts on the development of theories used in communication research.
- Trace the historical development, conceptual framework, and current status of several key communication theories in multiple contexts (e.g., interpersonal, mass, health, group, organizational, cultural) from major philosophical perspectives.
- Apply theories that are useful in interpersonal, group, organizational, and mass mediated contexts
- Evaluate communication theories on the basis of scientific and interpretive criteria

JMC 406 Research Methodology-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The Students will be able to:

- Demonstrate knowledge of research literacy
- Demonstrate a sound knowledge of basic research methods.

- Identify a significant risk and ethical issues raised by the conduct of media research
- Understand theories and frameworks through which media are analyzed and understood
- Understand the basic statistics of Research.

JMC 409 Transmedia Storytelling

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

The student will be able to:

- Demonstrate proper media writing and editing styles.
- Modify writing styles to fit various media platforms.
- Demonstrate effective information gathering skills and techniques.

JMC 409L Transmedia Storytelling Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

Writing for the Web - JCU

https://www.jcu.edu.au/__data/assets/pdf_file/0017/115721/jcu_131680.pdf

(PDF) Script writing for Radio and Television - ResearchGate

https://www.researchgate.net/.../272498429_Script_writing_for_Radio_and_Television

ECO 406 Public Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Upon completion of the course, the student will be able to:

Understand functions and significance of money.

Analyse the role of monetary forces and their interaction with the rest of economy.

Explain the nature, significance and theories of demand and supply of money.

Understand the role and working of RBI and critically analyse its monetary policy.

Explain the nature, importance, functioning process of credit creation of commercial banks.

Understand role of commercial banks in the process of growth and development.

Explain the concept and progress of microfinance in India

SECOND SEMESTER

(Disciplinary Courses)

JMC 407 Research Methodology-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The Students will be able to:

- Demonstrate knowledge of Statistics applied in Research
- Demonstrate a sound knowledge of basic research statistics.
- Identify a significance of Bi-variate and Multivariate analysis
- Understand theories and frameworks of Non-statistical methods
- Understand the basic statistics of Research.

JMC 410 TV Programming and Production

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Students will be able to:

- Understand the functioning of TV News channels in terms of programming, scheduling, mastering and logging.
- Produce and present the TV programmes of different formats and genres.
- Understand the challenges and oppurtunities of broadcast industry in India and abroad.
- Study and analyze the influence of electronic media in democracy and politics of the nation.

JMC 410L TV Programming and Production Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	6	3

JMC 405 Radio Programming and Production

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	4	0	0	4

Learning Outcomes:

Students will be able to:

- Understand the functioning of different models of radio stations like community, commercial and public.
- Produce and present radio programmes for community, commercial and public radio channels.
- Work as script writer, music manager, producer, radio jockey and coordinator in community, commercial and public radio channels.
- Study and analyze the impact of radio broadcasting in democracy and development of a country.

JMC 405L Radio Programming and Production Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

PSY 404 Positive Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course the students will be able to:

- Analyze the importance of positive emotions in well-being and mental health.

- Apply concepts of positive psychology for the development of positive values.
- Analyze the role and importance of positive relationships in the lives of human-beings.
- Synthesize the role of flexibility and complexity in intra- and interpersonal well-being.

THIRD SEMESTER

(Disciplinary Courses)

JMC 511 Research Methodology-III

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The Students will be able to:

- Identify Research tools
- Demonstrate a sound knowledge Sampling techniques.
- Identify a significance of sampling design
- Understand the techniques of Writing a Research Report

JMC 505 Digital Media

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

The students will be able to:

- Describe the techno-cultural discourse surrounding new-media technologies and practice.
- Evaluate communication technologies as the articulation of power and as an agent of social change.

- Evaluate ethical and legal considerations in working with digital media.

JMC 505L Digital Media Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

JMC 501 Advertising and Public Relation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Students will be able to:

- Explore the role and purpose of Advertising as an occupation.
- Conceptualize, Plan and Produce an advertising campaign.
- Explain the role of public relations professional in the corporate environment
- Describe the strategies, tactics and techniques of public relations.
- Write proposals, press release, notices etc. for specific audiences and purposes

JMC 501L Advertising and Public Relation Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

JMC 503 Community Broadcasting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**4**	**0**	**0**	**4**

Learning Outcomes:

Students will be able to:

- Understand the significance of participatory communication process in democracy and development of a country.
- Understand and analyze the role of non profit media in grassroot development.
- Write and present community radio programmes in popular formats.
- Link new media with the community media to address the challenges and hurdles in the path of community journalism.

JMC 503L Community Broadcasting Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**2**	**1**

POL 502 Indian Polity-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, students will be able to:

- Understand about the constitutional institutions of Indian Political System.
- Comprehend the dynamics of Indian Political System.
- Analyze the working of Indian Political System.

FOURTH SEMESTER

JMC 514P UIL Project

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**48**	**24**

Discipline Electives

JMC 403 Ethics, Constitution & Media Laws

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Students will be able to:

- Critically analyze the legal and regulatory restrictions on expression and their impact on journalism practice.
- Understand the nature of ethics and moral discourse.
- Demonstrate an understanding of a range of specific ethical issues, perspectives and debates.
- Communicate understanding of the relevant ethical and legal issues in written and oral forms.

JMC 404 International and Inter-Cultural Communication

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- Understand the basic concepts and principles of communication.

- Understand the importance of international communication as a part of media.
- Develop the understanding for eastern and western communication.
- Understand different channels of communication affected by cultures.
- Enhance their knowledge of inter-cultural communication.

JMC 402 Data Journalism

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Student will be able to:

- Identify steps in the reporting process for Data Journalism
- Understand the use of right data in a basic news story.
- Identifying, gathering and exploring a dataset for an investigative story.
- Understand the use of statistics to analyse data.

JMC 408 Sports Journalism and Sports Reporting

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

Students will be able to:

- Understand the fundamental of writing of sports stories, in short form and long form
- Produce and present the reporting of sports stories, in all media forms: print, audio, visual, online, social media.

- Understand the challenges and opportunities of sports journalism in India and abroad.
- Express, argument and amalgamation in written and oral forms
- Understand the relationship between hard-news and opinion-based presentations in sports journalism, in print and in other media.

Reading Elective Courses

JMC 512R Social Psychology

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes

Students will be able to:

- Identify the Sociological Approach to man.
- Become familiar with social psychological literature.
- Apply social psychological theories and principles to your everyday behavior.

JMC 502R Advertising Management

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The students will be able to:

- Understand basic and emerging concepts and principles in relation to better decision making in the areas of Advertising
- Integrate various functions with organizational goals and management strategies.

JMC 504R Critical Thinking and Modern Lifestyle

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

Students will be able to:

- Communicate effectively.

- Critically think on particular problems
- Solve problems related to today’s lifestyle.

JMC 508R Media and Public Administration

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

Students will be able to:

- Understand the viewpoint of a more uniform operating practice at the government level.
- Improve the performance of economic development agencies by providing current and future staff with better strategies that are more appropriate to their needs.
- Promote understanding of the political, social, legal, and economic environments in public organizations.
- Understand the concept of urban, rural and regional development.
- Understand the Open Government Directive: Transparency, Participation and Collaboration.
- Understand an extended overview of the impact of social media and ICT in Governance.

JMC 513R Tourism Planning and Sustainable Development

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The students will be able to:

- Develop an understanding of the basic concepts of Tourism Planning, both for public and private sector.
- Nurture good knowledge about planning & sustainable development.

JMC 506R Ethical Journalism

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The student will be able to:

- Define core concepts of Media Ethics.
- Identify different kinds of Ethical Values.
- Understand concepts of specific digital ethics on online forums

JMC 510R Psychology of Communication

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The student will be able to:

- Define core concepts and theories of media psychology.
- Identify different kinds of media effects.
- Explain the psychological processes underlying media effects.
- Analyze and synthesize relevant research

JMC 515R Women and Media

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The student will be able to:

1. Understand key theories and methods of studying media, power, and social identities

2. Examine the role of media in constructing gender and its intersections with race, ethnicity, class, and sexuality

JMC 507R Media and Popular Culture

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The student will be able to:

- Learn about folk media using body language or non verbal language.
- Inculcate knowledge of folk music, dance and drama.
- Differentiate between traditional media and electronic media

JMC 509R Pillars of Indian Journalism

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

The student will be able to:

- Learn about journalists who fearlessly picked up their pens and continued to publish nationalist articles.
- Understand the changing scenario in journalism.
- Gain knowledge about the renowned journalist in India.

BANASTHALI VIDYAPITH

Master of Arts (Economics)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

Department of Economics at Banasthali aims to train students to successfully take part in the exciting profession of Economics as Economists, Managers, Policy Makers, Bureaucrats, Researchers, Journalists and other forms of decision makers. The profession of Economics requires multiple skills and capabilities related to observing the decision making by economic agents at a micro and/or macro level and analytically interpreting these acts in a larger theoretical framework. The observation part requires Economists to collect data and the interpretation part requires that data is analysed and conclusions drawn within a theoretical framework.

These demands make it essential for our curriculum to focus on both the real and the theoretical world. In our curriculum design, Emphasis is therefore given on Economic Theory (Understanding), Indian Economy (Information) and Quantitative Techniques (Tools). To keep up with the dynamic real world and the ever expanding theoretical world it is ensured that the Curriculum is reviewed and if necessary revised every year.

The broad Course objectives are to impart knowledge and develop understanding of the economy at national and global level, and at the same time provide necessary analytical tools and intellectual training to make meaningful observations and interpretations.

The main objectives of the Masters programme in Economics are,

- To provide exemplary education in a stimulating environment where delivery of knowledge of Economics is integrated with nationally and internationally recognized research which enables students to undergo a transformative learning process.
- To prepare competent Economists at various levels for India.
- To expose students to theoretical approaches within the field of Economics and allied subjects and promote respect for all approaches.
- To develop gender-neutral attitudes and practices, respect for all races, nations, religions, culture, language and traditions.
- To promote scientific temper amongst the students in particular and the society in general.

- To nurture a temperament that would enable individuals to set and work towards self-driven performance goals, entrepreneurial ventures and overall leadership.

Programme Outcomes

PO1: **Knowledge of Economics:** Students will be able to develop understanding of economic concepts pertaining to the behavior of economic agents from micro and macro perspectives. Along with this they will be able to explain and analyze economic theories and models.

PO2: **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO3: **Problem Analysis:** Utilize economic, philosophical and scientific techniques to achieve clear, analytical and critical thinking process for solving problems and making logical decisions in their everyday life.

PO4: **Modern Tool Usage:** Ability to understand, select and apply appropriate methods and procedures of modern computing tools to achieve efficiency in economic problem solving, research and communication.

PO5: **Leadership Skills:** Equip the students with critical thinking and analytical tools to find solutions of economic problems and thereby play a leadership and/or participatory role in the society.

PO6: **Professional identity:** Apply their knowledge and understanding in their professional roles as Economists, Managers, Government Officials, Teachers and/or Researchers to achieve self growth and the larger welfare of the Society inclusive of all stakeholders.

PO7: **Professional Ethics:** Have a deep sense of respect for all disciplines and theoretical approaches so that a well rounded, dogma free intellectual activity is feasible.

PO8: **Economic Communication:** Develop critical thinking on current issues in the framework of economics and command the ability to effectively communicate economic ideas.

PO9: **Economists and Society:** Develop an interdisciplinary approach to analyse economic issues and thereby achieve the broader objective of becoming an informed citizen.

PO10 **Environment and Sustainability:** Understand the link between Environment and the Economy. Appreciate the role of Economic thinking in solving environmental problems. Understand and appreciate the concept of sustainable development.

PO11: **Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of economic, societal and technological change. Have the ability of Self assessment and use feedback effectively from others to identify learning gaps and work on these gaps on an ongoing basis.

First Semester

ECO 401 Macro Economic Theory - I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:
After completion of the course, the student will be able to:

- Describe Circular flow of income and expenditure and analyse the effect of leakages and injections in various sector of the economy.
- Calculate National Income and its related aggregates and analyse the problems and limitation of National income estimation
- Describe basic Classical Model of output and employment and estimate the effect of money market and labour market changes on the level of output and employment.
- Analyse Keynesian Model of output and employment and evaluate the level and process of National Income determination
- Explain the process and importance of Multiplier
- Analyse and Elaborate Income-Consumption Relationship
- Explain Absolute Income, Relative Income and Permanent Income Hypothesis

ECO 403 Micro Economic Theory- I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:
After completion of the course, the student will be able to:

- Analyze and appraise cardinal, ordinal and revealed preference approaches to consumer behaviour.
- Discuss various concepts of elasticity and its measurement.
- Apply the concept of elasticity in business decision making.
- Discuss the behaviour of production in short run and long run.

- Apply the theory of production in producer's decision making.
- Describe various revenue concepts and explain the behaviour of revenue under different market structures.
- Analyse short run and long run equilibriums of brims under perfect competition and monopoly.

ECO 406 Public Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:
After completion of the course, the student will be able to:

- Identify the role and functions of the government in a modern economy.
- Understand the concepts of public and private goods.
- Analyse the allocative and equity aspects of taxation.
- Critically examine different theories of public expenditure.
- Differentiate concepts of impact, incidence and Shifting of taxes in different market framework.
- Understand various sources of debts and methods redeeming it.
- Explain federal finance and centre-state financial relation in India.

MATH 408 Mathematics for Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:
After completion of the course, the student will be able to:

- Solve problems related to equilibrium of national income, market equilibrium and input output modeling by applying the concepts of matrices and determinants.
- Demonstrate consumer and producer's equilibrium employing linear programming technique.
- Demonstrate optimum strategies of economic agents using Game Theory Approach.

- Solve optimization problems of consumers and firms using differential calculus

SSC 402 Social Science Perspective

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Analyse the holistic view encompassing different social science disciplines.
- Provide insights to interpret social events.
- Understand the basic ingredients of social science disciplines to contextualize social reality.
- Critically evaluate the emerging themes in social sciences.

Second Semester

ECO 402 Macro Economic Theory - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Analyse the Samuelson, Hicks and Kaldor models of business cycles.
- Describe the investment behaviour through various theories of investment.
- Evaluate the tradeoff between inflation and unemployment and analyse the relation under adaptive expectations and rational expectations
- Examine the validity and applicability of the classical and Keynesian model of income and employment in recent years.
- Analyse the New Classical Model and New Keynesian Model.
- Describe the money market equilibrium and analyse the simultaneous equilibrium in money market and product market through IS-LM Model.
- Analyse the relative effectiveness of monetary policies and fiscal policies

ECO 404 Micro Economic Theory - II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Calculate equilibrium price and output of firms under monopolistic competition and oligopoly.
- Appraise various market structures in terms of their welfare implications.
- Discuss determination of factor prices.
- Analyse role of labour unions in determination of wages.
- Analyse efficiency of market outcomes under asymmetric information.
- Discuss the models of general equilibrium.
- Analyse the problems related to general equilibrium.
- Appraise various criteria for economic welfare.

ECO 405 Monetary Economics and Modern Banking

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand Basic concepts of Financial Economics spot prices, discount factors, arbitrage, spot rates, forward rates and yield-to-maturity, Price sensitivity, Hedging.
- Understand Security Analysis return and risks, management, diversification, optimal portfolio choice and portfolio weights.
- Apply single index model and multi index models, capital asset pricing model; arbitrage pricing theory.

- Understand Derivatives and options, forward and futures contracts, options, other derivatives.

STAT 404 Statistical Methods for Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Describe census and sample methods of data collection.
- Analyze relationship between economic variables using correlation and regression.
- Discuss various concepts related to theory of probability.
- Discuss various concepts related to hypothesis testing and their application in economic research.

SSC 401 Research Techniques in Social Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Develop aptitude for social science research.
- Identify various sources of primary and secondary data.
- Formulate hypothesis.
- Identify and apply various quantitative and qualitative methods of research.
- Summarize, analyze and interpret qualitative and quantitative data in social science research.
- Write a coherent report and research paper.

Third Semester

ECO 502 Economics of Growth and Development

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Define basic analytical concepts required for study of Economics of Growth and Development
- Explain the role of major factors which affect the processes of Economic Growth and Development.
- Explain and distinguish between the working mechanisms of different types of theoretical approaches and Economic models of Economic Growth and development.
- Appreciate intuitive aspects of development.

ECO 516 Financial Economics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Understand functions and significance of money.
- Analyse the role of monetary forces and their interaction with the rest of economy.
- Explain the nature, significance and theories of demand and supply of money.
- Understand the role and working of RBI and critically analyse its monetary policy.
- Explain the nature, importance, functioning process of credit creation of commercial banks.
- Understand role of commercial banks in the process of growth and development.
- Explain the concept and progress of microfinance in India.

ECO 507 International Trade and Commercial Policy

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Discuss various theories of international trade.
- Appraise and compare the theories of international trade.
- Identify the direction, composition of trade and gains from trade.
- Discuss the partial and general equilibrium effects of tariffs and quota.
- Calculate the economic effects of tariffs and quota.
- Appraise and compare the welfare effects of Tariff and Non Tariff Barriers to Trade.
- Discuss the various forms and effects of economic integration.
- Appraise the welfare effects of economic integration.

CS 513 Computer Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	3	0	0	3

Learning Outcome:

After completion of the course, the student will be able to:

- Basic knowledge of the computer system and its peripherals.
- Concept of operating system and their functions
- Understand databases and Network applications.
- Understand concept of Application software tools like MS- WORD, MS-EXCEL, MS-PowerPoint and SPSS.

CS 513L Computer Applications Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Semester-IV

ECO 501 Economics of Environment

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Explain the meaning and scope of Environmental Economics.
- Conceptualize and explain ideas like externality and market failure
- Undertake Environmental Valuation using different techniques
- Explain the idea of Sustainable development
- Understand various practical environmental issues at national and global level
- Understand the role of global and national governments and organizations in resolving environmental issues.

ECO 505 Indian Economic Development

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Explain different development strategies in pre and post liberalization era.
- Analyse contribution of different sectors to output and employment.
- Analyse problem like “jobless growth”.
- Examine policy initiatives for sustainable agriculture.
- Analyse opportunities and problems with service sector led growth

ECO 506 International Money and Finance

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Describe the structure of the Balance of Payment of a country.
- Identify the presence and nature of disequilibrium in Balance of Payment of a country.
- Discuss the various mechanisms of adjustment in Balance of Payment of a country.
- Appraise and compare the various mechanisms of adjustment in Balance of Payment of a country.
- Discuss various approaches to determination of exchange rates.
- Appraise and compare various approaches to determination of exchange rates.
- Explain the trends in the movement of Indian Rupee against major currencies of the world.
- Appraise the welfare effects of international capital movements.
- Identify the causes of debt and financial crises

SSC 501 Women Studies

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Explain the fundamentals of Women Studies and its multidimensional aspects.
- Develop the knowledge of how women's struggles or movements in the West and in India evolved leading to the establishment of the academic discipline.
- Describe interlinkages of gender, patriarchy and power.

Discipline Elective

ECO 509 Agriculture Economics

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand basic concepts of Agriculture Production, Debate of Farm size and productivity.
- Analyse theories of Agriculture Development.
- Examine issues and problems of Agriculture Price Policy in India.
- Understand impact of WTO on Indian Agriculture
- Acquire adequate knowledge to assess the Food Policy of India.
- Understand issues of agriculture marketing.

ECO 510D Dissertation

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Develop their analytical thinking
- Enhance their writing skills
- Refine their research aptitude

ECO 511 Economics of Discrimination

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Define and understand the concept of Discrimination
- Use economic tools for study of Discrimination

- Understand contours of caste based Discrimination and its economic angles
- Understand the nuances of feminist economics
- Understand the realities of labour market and the existence of gender based discrimination in opportunities of participation and wage disparity
- Utilise robust economic tools for analysis of controversial issues like Affirmative Action

ECO 512 Economics of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand of planning, financing and cost of education.
- Explain the link between the educational system and economic development.
- Analyze India's educational problems in the context of economic concepts.

ECO 513 Economics of Health

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand basic concepts of Health Economics like Prevention, Cure, Healing, Disease, Illness, and Sickness.
- Compare between Western System of Medicine and Indian System of Medicine.
- Estimate cost of illness and Burden of disease.
- Analyze demand and supply of healthcare and direction in health policy of India.

ECO 515 Economics of Insurance

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Understand the key concepts of insurance.
- Comprehend the fundamental principles of insurance, practices of insurance and different types of insurance.
- Critically analyse the relevance of insurance in economic development.
- Develop familiarity with regulatory authorities and mechanism of redressal in India.

ECO 519 Industrial Economics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Understand basic issues such as pricing policy, efficiency, demand analysis, forecasting, productivity and capacity utilization.
- Examine the internal structure of firms.
- Analyse various aspects of strategic interaction between firms and the determinants of industrial structure.
- Discusses the role of policy in the context of competition and industrial policies and regulation.
- Apply theoretical tools to analyse real issues.
- Learn industrial economics in cogent and analytical manner particularly in the Indian context.

ECO 520 Labour Economics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, the student will be able to:

- Understand methodical probes of concepts like human capital, fair wage, living wage and social security.
- Analyse theories of Labour Market.
- Develop understanding upon collective bargaining and opportunities and problems of labour in changing labour market.
- Analyselabour Market Policies in India; Employment generation programs in India and their evaluations.
- Understand the dynamics of Indian Labour Market (like Platform Market) in Globalised world.

ECO 521 Population Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand the role of population in economic development.
- Learn fundamentals of population studies like fertility, mortality and migration.
- Critically examine theories of population.
- Estimate composition and growth of population.
- Apply demographic concepts and population theories to explain past and present population characteristics.
- Assess the relationship between demographic change and policy

ECO 522 Regional Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand static and dynamics of regional development.
- Analyse the techniques of regional analysis.
- Apply economic theory to topical issues of regional economics.
- Discuss urban growth and policy implications.

- Compare regional inequalities and policy recommendations

ECO 523 Rural Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand dynamics of rural economy.
- Explain different approaches to rural development.
- Critically examine various schemes and projects that benefit the rural population.
- Identify different problems faced by rural population.
- Apply innovative tools to analyse, evaluate and solve problems related to rural development.

ECO 525 Urban Economics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Define a City and explain its economic functions.
- Explain the processes of formation of an urban space like City.
- Elucidate the importance of land, its scarcity, and its regulation in an urban setting
- Explain the impact of migration from rural areas to urban areas and role of regional and balanced development in managing the problems of migration.
- Understand various Urban problems and conceptualise the role of government at different levels in governance of Urban areas.

STAT 509 Econometrics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand fundamental concepts of econometrics.
- Critically examine the theory of econometrics.
- Apply different techniques relating to treatment of three main types of data namely cross section, time series and panel.
- Learn to construct econometric models, estimate the parameters of these models and interpret the parameters estimates.
- Analyse data drawn from real-world and use econometric methods in solution of economic, business and financial problems.

Reading Elective

ECO 514R Economics of Infrastructure

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand economic foundations for public policy.
- Analyze the infrastructural issues.
- Identify various tools required for policy analysis of infrastructure.
- Explain the strength of physical infrastructure in the process of economic development.

ECO 517R Financial Institutions and Markets

Max. Marks : 100	**L**	**T**	**P**	**C**
	0	**0**	**0**	**2**

Learning Outcome:

After completion of the course, the student will be able to:

- Understand changing role of financial markets and institutions.
- Analyze different types of financial instruments and services.
- Explain working of the financial system in the era of liberalization, privatization and globalization.

ECO 518R Global Economy

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Define basic concepts required for understanding the working of Global Economy.
- Understand the role of India in Global Economy.

ECO 524R Startup Economics

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Define basic concepts required to observe and understand Startups globally and in India
- Understand the role of Entrepreneur in Economic theory
- Appreciate the idea of a Firm and understand the different phases of evolution of a Firm according to economic theory.

List of Online Reading Elective

Energy within Environmental Constraints

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Analyse basic environmental science, and economics of energy system.
- Understand working of energy technologies.
- Analyse environmental impacts of the energy system, focusing on air pollution, climate change, and land use.
- Elucidate techniques for estimating monetary costs and carbon impacts.

Making Government work in Hard Places

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcome:

After completion of the course, the student will be able to:

- Identify and analyze obstacles to building better government
- Identify solutions tool-kit for solving several common yet difficult problems
- Familiariarise with some important contemporary reform leaders, their work, and their ideas
- Understand some basic skills, including streamlining a process, project-management, and strategy development

BANASTHALI VIDYAPITH

Master of Arts (History)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

In compatibility with Banasthali Vidyapith's aim to materialize the ethos of nation-building, Indian Culture and *Panchmukhi Shiksha*, the MA History Programme develops the enlightened and human value based education along with the academic, competitive and research pursuits of the students.

Through a series of core and elective disciplinary courses, reading electives, open elective, problem-solving courses and dissertation writing, the curriculum disseminates comprehensive knowledge of the subject, self study habits, as well as awareness to use the subject knowledge for the betterment of the society.

The main objectives of the MA History programme are to:

- Introduce students to understand the statecraft, theory of kingship and the nature of state in pre-colonial, colonial and post-colonial India through a series of core, elective and reading elective courses.
- Analyze fundamental theories of historical investigations and to deal with the developments in the fields of science, sports, art, cinema and medicine.
- Understand world history through ideas like humanism, industrialization, globalization and terrorism.
- Acquaint students with recent trends in historiography like gender, sports, folklore, military history, and environment.
- Create individuals with sound historical knowledge and professional ethics, contributing towards further research and inter disciplinary and multi-disciplinary research needs.
- Realize the significance of regional history in the realm of history writing with a chance to study the political, regional, cultural and folk history of Rajasthan.
- Develop a critical analysis of both primary and secondary sources to explore research methodology and historiography for their dissertation writing.

- Raise sensitivity to ethical codes of conduct and social values and to develop gender-neutral attitudes and practices; respect for all races, nations, religions, cultures, languages and traditions.

Programme Outcomes

- **PO1: History Knowledge:** The Program enables learners to possess knowledge and comprehensive skills to evaluate the core ideas associated with the discipline, inclusive of methodological, theoretical and interdisciplinary approaches to understand the socio-political, economic and cultural history of India.
- **PO2: Planning Abilities**: The dissertation work will develop planning abilities including time management and resource management; and ability to implement plans and organize work to meet deadlines.
- **PO3: Problem Analysis:** This will be ensured through teaching of the basic principles of identifying a research problem, analysis of historical data develops analytical thinking, writing and research aptitude.
- **PO4: Usage of Modern Historical Methodology:** The discussion on traditions of historiography, recent researches and diverse schools of interpretations of history enhances the writing skills for further research.
- **PO5: Leadership Skills:** The courses on pioneers of change in societal, economic and political as well as cultural history will motivate the students to take up positions of leadership as well as complete tasks at hand in a time bound manner.
- **PO6: Professional Identity:** The students will be able to understand, analyze and communicate the value of their professional roles in society, as history teachers, historians, archivists, researchers, administrators, etc.
- **PO7: Ethics of History:** The discussions on ‘truth’, ‘fact’, ‘multiple truths’ as part of historical concepts encourages students to value and apply ethical principles in personal, professional and social contexts.
- **PO8: Communication:** The programme would develop skills for effective communication with community of historians' world-wide and in India; promote research, comprehend and write efficiently about the same; and engage in healthy academic debates on historical aspects.
- **PO9: The Historian and Society:** The programme opens up the deeper arena of knowledge about social formation in different regions, social stratification, and aspects of caste, class, race, gender and equality. This will enable the students to understand the dynamics of

social change and take conscious decisions to intervene at necessary situations.

FIRST SEMESTER

HIST 401 British Rule: Foundation, Resistance and Response (1757 - 1947 AD)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Evaluate how the British rule was established in India and the British strategy and approaches to take over India and learn the administrative transformations established by British Rule.
- Comprehend how Gandhi transformed Indian National Movement ideologically and assess the participation of masses in freedom Struggle.
- Understand how India became free; the concept of communalism and its role in the context of partition and its impact.

HIST 404 Introduction to Traditions of Historical Writings

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand key philosophical development since the Greco Roman times to the postmodern times.
- Develop comparative dimension of development of historiography in Europe, China, India and Arabia.
- Develop a critical thinking with regard to the genesis and nature of the discipline.

HIST 405 Political and Cultural Trends in Ancient Indian History (Earliest Times to 1000 AD)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Be acquainted with trends of political developments in early India.
- Be oriented to continuity of cultural evolution beginning from Lithic Ages.
- Be familiar with regional and Indian stylistic development of aesthetics.

HIST 406 Selected Issues in Medieval Indian History (1000-1526 AD)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Answer queries on sources of writing Delhi Sultanate's history , the circumstances that paved way for the Turkish invasion of India.
- Describe the different theories of kingship under various Sultans, their administrative, military and revenue organizations.
- Determine the changes in economy, society and culture during the Mughal time period.

SSC 402 Social Science Perspectives

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the student will be able to:

- Analyze the holistic view of encompassing different social science disciplines.
- Provide insights to interpret social events at any given point of time.
- Understand the basic ingredients of social science disciplines to contextualise social reality.

SECOND SEMESTER

HIST 402 Economy, Education and Empire (1757-1947AD)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the student will be able to:

- Develop an analytical approach about the consequences of colonization of Indian economy on agriculture, industry, commerce.
- Write a research paper pertaining to related aspects of syllabus.
- Develop their insight and debate on nationalist and imperial perspective of British impact on India.

HIST 403 Fundamentals of Historical Investigations

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the basic fundamentals of the discipline of history.

- Familiarise oneself with the concepts and techniques of writing history.
- Get accustomed with archaeological excavations and explorations, dating methods and 'new archaeology'.

HIST 407 Selected Issues in Medieval Indian History (1526-1740 AD)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Acquaint themselves with the medieval Indian political systems, strategies and administrative reforms under different rulers.
- Enhance their analytical skills as the course includes theoretical implications regarding specific topics.
- Gain knowledge of cultural contributions of the Mughals.

HIST 408 Social and Economic Life in Ancient India (up to 1000 AD)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Critically assess the social stratifications emerging in due course of time.
- Comprehend fundamentals involved in Indian economic processes as taxation, banking, credit, land grants, etc.
- Establish linkage between political formations and process of urbanization.

SSC 401 Research Techniques in Social Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Develop aptitude for social science research.
- Identify various sources of primary and secondary data.
- Formulate hypothesis.
- Identify and apply various quantitative and qualitative methods of research.
- Summarize, analyze and interpret qualitative and quantitative data in social science research.
- Write a coherent report and research paper.

THIRD SEMESTER

HIST 501 An Outline of the History of Rajasthan

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Comprehend the evolution of Rajputana to Rajasthan and evaluate the importance of Rajputs during medieval India.
- Assess British expansion, economic-social changes and reforms in modern Rajputana.
- Analyze the popular movements and integration of Rajasthan.

HIST 502 Exploring Science, Technology and Medicine in Indian History

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Recognize science and technology as an integral part of Indian Culture.
- Analyze the development of technology and medicine during the various phases of Indian history as a response to scientific ideas in Arab thought and colonial explorations.
- Perceive the Indian Renaissance as one which coincided with the Independence Struggle and the innate ability to perform creatively in sciences backed with an institutional set up.

§ https://www.jstor.org/stable/3518179?Search=yes&resultItemClick=true&search

§ Baig. A.K. History of Technology in India. Retrieved from https://archive.org/details/in.ernet.dli.2015.205662

HIST 508 Understanding History of Modern World through Ideas

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Gain knowledge of historical writings along with new trends, the progress of historical writings and the different stages of historiography after Renaissance period.
- Comprehend revolutions in the context of economy and production and identify the concepts of nation, nationalism and imperialism.
- Trace the existence of class struggle and the emergence of the movement by Karl Marx, and discuss the transformation of the political system and people's participation.

CS 513 Computer Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	3	0	0	3

Learning Outcomes:

After completion of the course, the student will be able to:

- Describe the usage and importance of computer and its peripheral devices.
- Learn the basic concepts Internet services.
- Describe various types of networks and OSI/ISO standards.
- Prepare documents; make PowerPoint presentations and working with spreadsheets.
- Use SPSS for data evaluation.

CS 513L Computer Applications Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

FOURTH SEMESTER

HIST 506 Representative Historians of Indian Historiography

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the student will be able to:

- Familiarize themselves with the major schools of historiography.
- Analyze contributions of representative, pioneer Indian historians.
- Mainstream regional histographical tradition for developing a compact reconstruction of Indian history.

HIST 507 Survey of Folk Culture of Rajasthan

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Discuss Folk studies as an important source of History.
- Analyze the vibrant data with a critical eye and be motivated to begin to question that data.
- Relate to folk life, art and traditions and thus to the importance of preservation of their surrounding culture by the example of significance of folk culture and art of Rajasthan in the history, culture and tourism of Rajasthan.

SSC 501 Women Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Explain Women's Studies as an interdisciplinary subject and develop a conceptual understanding of different aspects of feminist history.
- Understand the feminist thought and development approaches in the contribution of gender bias, discrimination and empowerment.
- Develop an understanding about women's socio-economic profile and their role in development process.
- Critically analyse various institutional and legislative mechanisms for protecting women's human rights.

HIST 512D Dissertation

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Develop their analytical thinking.
- Enhance their writing skills.

- Refine their research aptitude.

DISCIPLINE ELECTIVES

HIST 509 1857: Indian History's Turning Point

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Assess the nature, perspective, and causes of the 1857 event.
- Appreciate the real dynamics of 1857.
- To understand the civilizational intricacies involved during the war.

HIST 511 Cinema Studies in History

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Traverse through the silent cinema of early studio years, the coming of sound, the auteur and new studios, the consolidation of the star system to the globalization of contemporary cinema
- Transition of Indian economy and its representation in cinema.
- Explain the folkloric tradition through cinema.

HIST 513 Environmental History of India

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Establish link between technological growth and environmental degradation.
- Interpret Gandhian approach towards environment.

- Develop acquaintance with environment related movements and assess their impact.

HIST 503 Gender History

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Conceptualise Gender, its origin, approaches and the development of Feminism through historical analysis.
- Explain women's status and position in various aspects of society such as religion, philosophy and domestic life from ancient to contemporary times.
- State how women's question is raised in modern period by the European scholars and Indian social reformers and activists.

HIST 504 India since Independence

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Comprehend the various trends of writing history of contemporary India.
- Realize the repercussions that the colonial rule had produced over the social, political and economic aspects of the country.
- Develop an analytical power of their own.

HIST 516 Intersection of Art and Science through Human Civilization

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Develop the appreciation of antiquity of art, culture and science.

- Discuss about the 21st century development of aesthetics in society.
- Sharpen the scientific knowledge and skills in drawing, painting, sculpture, and visual art.

HIST 517 Introduction to Indian Folklore

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Comprehend the significance of folkloric tradition.
- Undertake research on related topics.
- Explore avenues for professional opportunities as archiving, etc.

HIST 518 Modern Social and Economic Thinkers

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Define the theories of classical and neo classical economics.
- Comprehend the intellectual history of modern world.
- Discuss the interrelation among the society, economy and history.

HIST 520 Partition Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the student will be able to:

- Identify the complex themes in discussions regarding partition.
- Locate the global and local contexts of nationalist politics.
- Develop an awareness of the human and social costs of geopolitical power struggles.

HIST 521 South Indian History and Culture (Earliest times to 1565 AD)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the contribution of south India towards Indian History.
- Contextualize the state formation process in south India.
- Analyze dynamics of the socio-economic and cultural life of south Indian History.

READING ELECTIVES

HIST 510R Book History

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- To discuss the tradition of knowledge and the role of book in the histories of human civilization.
- To understand the socio-historical transformations carried by writing and print technology in the Book history.

HIST 514R Food Culture and History

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Analyze the eating activity of human civilization and the quest for food.
- Examine the antiquity of food and nutrition, and its cultural, economic, environmental, and sociological perspectives.

HIST 515R History of Warfare

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- Understand the natural history of warfare in the advancement of life.
- Analyze the military tactics and the use of cavalry, artillery and infantry in the defense forces.

HIST 519R Museums in History

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After completion of the course, the student will be able to:

- To understand the significance of material culture in the art of writing history.
- To explain the folkloric museums, ethnic museums, horticulture museums, anthropological museums.

BANASTHALI VIDYAPITH

Master of Arts (Political Science)

Curriculum Structure

First Semester Examination, December, 2019

Second Semester Examination, April/May, 2020

Third Semester Examination, December, 2020

Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

Programme Educational Objectives

Following the ethos of Banasthali Vidyapith which aims to materialize the ethos of nation building, women leadership through five-fold education, this Programme develops ethical values through practical, moral and intellectual aspects of five-fold education, the ability to understand & appreciate human diversity and to engage in community life as active citizens. This programme also enhances the knowledge and creates the research aptitude about political phenomena of local to global context. The main objectives of the programme are:

- To develop specialized field of knowledge and integrate knowledge across the discipline of Political Science.
- To provide understanding about the leading policies, legal issues and major problems confronting contemporary political systems.
- To develop insights of alternative moral and ethical frameworks for interpreting contemporary political discourse.
- To enhance the knowledge of basic facts and concepts about the Indian political system, including its history, philosophical, constitutional and legal foundations, governing institutions and policy-making process.
- To develop analytical skills for understanding and building subjective perspectives for the leading policies, legal issues, major problems and challenges confronting diverse contemporary political systems around the world.
- To enhance knowledge about broader understanding of International Organizations, Institutions, Laws and Process.
- To make awareness about gender issues, status of women in society in general and politics in particular and their role and participation in Indian Politics.
- To apply disciplinary and interdisciplinary learning across multiple contexts, integrating knowledge and practices.

- To develop analytical skills for critical inquiry through different approaches or methods in specialized area of Politics.
- To acquaint with the qualitative and quantitative research techniques for conducting field based research studies including selection of research problems, sampling, and preparation of research tools and adoption of statistical methodologies.
- To train students in using the applications of computer for data interpretation, analysis and power point presentations.
- To increase awareness of career options available in the public and private sectors with postgraduate degree in political science. Also to make aware about its value as entry in Politics, administrative services, teaching positions, legal education and various other fields.

Programme Outcomes

After completion of the M.A. Programme in Political Science, students will be able to:

PO1: **Knowledge of Political Realm:** Understand the fundamental concepts, theories, Governments and issues of national and international politics, including the structure and relationships between the branches of government of India. Effectively apply comparative and analytical skills in reading, writing to address significant issues of the political world.

PO2: **Interdisciplinary Perspective:** Understand interdisciplinary & feminist perspective to the study of social sciences. Evaluate diverse point of views embedded within various frameworks which may include temporal, cultural, linguistic, socio-political or technological contexts.

PO3: **Critical Perspective:** Demonstrate critical thinking, including the ability to form an argument, detect fallacies, and evidence about key issues of politics and thoughtful & well-articulated presentations on specific field.

PO4: **Communication Skills**: Able to interact with diverse population of formal or informal arena; communicate effectively in both oral & written presentations and public speaking also.

PO5: **Technical skills:** The ability and the knowledge to use electronic and traditional library resources to study key local, state, national and international policy issues. Use the applications of computer for data analysis and power point presentations to explain the research findings.

PO6: **Management Abilities**:The capacity to perform duties, effective planning & management, ability to interact effectively with people and also identifying and setting achievable goals, developing necessary strategies, and outlining the tasks and schedules on how to achieve the set goals.

PO7: **Leadership:** Demonstrate the quality to lead a team an organization or country.

PO8: **Problem Solving:** Conduct research in political areas, collect, interpret qualitative, quantitative data as well as review and synthesize relevant political science literature. Able to apply political science knowledge and skills to avoiding crisis situations and solving actual problems when occur.

PO9 **Community Service:** Participate as a civically engaged member of society and provide community service.

PO10: **Ethical Understanding:** Apply ethical considerations in professional, personal and social life and also recognize cultural & personal variability in lifestyle.

PO11: **Professional Identity:**Understand & perform their professional roles in state and society, such as political leader, administrative officer, civil servant, educationalist, manager, and political analysts, Social Worker, Public Relations Assistant, Legal Assistant and Campaign Staffer and so on.

PO12: **Environment and Sustainability:** Demonstrate the role for the promotion of environmental sustainability and an understanding of comprehensive systemic analysis across both physical and behavioral dimensions involving society, the environment, and the economy.

PO13: **Life- Long Learning:** Engage in Life- long learning to participate in political process and making a positive contribution to the society.

MA (Political Science)

First Semester

POL 402 Contemporary Political Theory

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand key concepts, approaches and main problems of political theory.
- To think analytically on the concepts and issues involved in political theory.
- To explicate their own views in political theory.
- Develop ability to research current political issues and relate them to the course material

POL 404 International Politics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Critically analyze the theories of international politics.
- Evaluate the concept of power and its changing nature.
- Explore the instruments for the promotion of national interest.

POL 406 Principles of Public Administration

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand about theory and practice of Public Administration.
- Work with people and manage them.
- Learn about leadership skills, motivation and decision making

- Aware about working of Public Administration.

POL 408 Western Political Thought

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the diverse intellectual political traditions in the west.
- Aware about conceptual debate of fundamental political ideas in the west.
- Critically analyze the political philosophy of western political thinkers.

SSC 402 Social Science Perspectives

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the basic conceptual frameworks and Approaches of Social sciences disciplines in an integrated manner.
- Analyze the social phenomena from various Perspectives.
- Critically evaluate emerging themes in Social Sciences.

Second Semester

POL 401 Comparative Politics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the basic concepts and approaches of Comparative Politics.
- Critically evaluate the problems and relevance of Comparative Politics.
- Analyze contemporary issues and challenges before the state and Constitutionalism from the comparative Perspective.

POL 403 Contemporary Political Thought

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Know and discuss the central themes, concepts and ideas on the development of the central tradition of western political thought .
- Understand and assess the structure and significance of particular texts produced within this tradition and be able to illustrate problems involved in their interpretation;
- Address a number of key questions in political theory with reference to texts and arguments introduced in the course.

POL 405 International Politics : Issues and Challenges

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand about various dimensions and emerging issues of international politics in post cold war era.
- Aware about the role of U.N and NAM.
- Analyze the global institution, issues and challenges.

POL 407 Public Administration in India

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Know about evolution and development of Indian Administration.
- Analyze the working of Indian Administration.
- Aware about the administrative problems and reforms in India.

SSC 401 Research Techniques in Social Sciences

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Develop aptitude for social science research.
- Identify various sources of primary and secondary data.
- Formulate hypothesis.
- Identify and apply various quantitative and qualitative methods of research.
- Summarize, analyze and interpret qualitative and quantitative data in social science research.
- Write a coherent report and research paper.

Third Semester

POL 502 Indian Polity - I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand about the constitutional institutions of Indian Political System.
- Comprehend the dynamics of Indian Political System.
- Analyze the working of Indian Political System.

POL 504 Modern Indian Political Thought

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Demonstrate and familiarize with main ideas of the key Modern Indian Political Thinkers.
- Analyze and compare the ideas and theories of Modern India Political Thinkers

- Aware about the relevance of Modern Indian Political Thought in present era.

POL 506 Public International Law

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the basic doctrines and concepts of public international law.
- Critically discuss the limits and potentials of international law.
- Analyze contemporary issues from the perspective of international law.

CS 513 Computer Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Describe the usage and importance of computer and its peripheral devices.
- Learn the basic concepts Internet services.
- Describe various types of networks and OSI/ISO standards.
- Prepare documents; make PowerPoint presentations and working with spreadsheets.
- Use SPSS for data evaluation.

CS 513L Computer Applications Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Fourth Semester

POL 503 Indian Polity-II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the basic structure of federal system.
- Know about electoral process in India.
- Critically analyze the Issues and challenges of Indian Democracy.

POL 521 Public Policy in India

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the basic conceptual frameworks and Approaches of the Public Policy.
- Know about public policy formation, implementation and evaluation.
- Aware about Public Policy Process and some Public policies in India

POL 526 UN and Regional Organizations

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the working of international organizations and regional organizations.
- Aware about the global challenges.
- Analyze the role of U.N. and regional organizations.

SSC 501 Women Studies

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Explain the fundamentals of Women Studies and its multidimensional aspects.
- Acquire the knowledge of how women's struggles or movements in the West and in India evolved leading to the establishment of the academic discipline.
- Develop a critical understanding of feminist theories.
- Describe inter-linkages of gender, patriarchy and power.

Discipline Electives

POL 510D Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcome:

After completion of the course, student will be able to:

- Develop their analytical thinking
- Enhance their writing skills
- Refine their research aptitude

POL 511 Electoral Politics in India

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Identify and explain how electoral rules and procedures in India affect selection outcomes.
- Evaluate and critically analyze the Indian electoral system with respect to theories related to political representation.
- Acquire knowledge about Electrol politics in Indian.

POL 512 Gender, Governance and Politics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Apply theoretical framework to gender, governance and politics.
- Accurately describe processes of political change as they relate to gender politics.
- To reach their own conclusion and write an effective research paper.
- Explore theoretical and practical aspects of legal framework and social justice as they relate to gender, governance and politics.

POL 514 Global Politics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the concept and perspective of Globalization and global economy.
- Aware about contemporary Global Issues like ecological issues.
- Critically analyze the trends and issues of Global politics.

POL 501 Human Rights

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the issues concerning the rights of citizens in general and the marginalized groups in particular.
- Understand basic conceptual framework of Human Rights
- Assess the institutional and policy measures which have been taken in response to the demands of various movements.

- Analyze conceptual dimensions, international trends and the Indian experience.

POL 520 Politics in South Asia

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the significance of south Asian regions.
- Aware about issues and challenges of nation building in south Asia.
- Analyze the politics of south Asia.

POL 524 State Politics in India

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the emerging trends of state politics in India.
- Analyze the political institution in states.
- Familiarize role of media in state politics in India.
- Understand pattern of political leadership in Rajasthan.

POL 529 Women in Panchayati Raj

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of the course, student will be able to:

- Understand the present constitutional, legal and Political status of women in Rural local bodies.
- Analyze the impact of women's participation in Pachayati Raj .
- Aware about the measures needed to improve the functioning of local bodies and effective participation of women in panchyati Raj.

Reading Electives

POL 515R India and World Politics

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the India's security concerns and India's policy towards world politics.
- Analyze the India's policy towards world.
- Awareness about the impact of Globalization and recent trends & Issues in 21 century.

POL 509R Administrative Institutions and Regulatory Authorities In India

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Develop an understanding of constitutional and extra constitutional bodies .
- Know about the institutional aspect of Indian Administration.
- Analyze the working of administrative institutions in India.

POL 518R Neo Marxism

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcome:

After completion of the course, student will be able to:

- Understand the development of Marxist ideology.
- Analyze the ideology in terms of empirical realism.

- Apply Marxist theory to the assessment of some current economic debate.

POL 517R Neo Liberalism

Max. Marks : 100	**L**	**T**	**P**	**C**
(ESA: 100)	**0**	**0**	**0**	**2**

Learning Outcome:

After completion of the course, student will be able to:

- Understand all main arguments for and against the basic liberal thought.
- Produce critical and well structured argument in political philosophy of liberalism.
- Balance and contrast the strength and weakness of the theory of justice of Rawls and ideas of Nozick.

BANASTHALI VIDYAPITH

Master of Arts (Sociology)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH

P.O. BANASTHALI VIDYAPITH

(Rajasthan)-304022

July, 2019

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No. F. 9-6/81-U.3

Programme Educational Objectives

The two year M.A programme in Sociology is designed to develop analytical and critical thinking of the relationship between self and society among students. It enhances the sociological imagination among students which enable them to articulate and evaluate how individuals are shaped by social structures, social institutions, cultural practices and realities based on social difference and inequality. This programme also inculcates in-depth understanding of sociological theories along with research methods to interpret social phenomena.

Thus, better learning and application of sociological knowledge will create interest among students for pursuing career in teaching, research, administrative and social services.

The main objectives of this programme are:

- To develop sociological knowledge through theoretical and methodological approaches in order to promote ability to think imaginatively and rationally about social reality.
- To explain the macro and micro level sociological theories with interconnectedness and their application to understand social phenomena.
- To identify fundamental and emerging approaches in qualitative and quantitative research methodologies and their role in constructing sociological knowledge.
- To explain the terms of sociological theories concerning with the different issues into the complex fabric of social life.
- To develop critical and analytical understanding of global and local social issues to prepare globally competent academicians, researchers, policy makers and development interventionists.
- To stimulate sensitivity cultural sensitivity and allowing planned social change to be based on different cultural values.
- To encourage the ethical code to know the social reality with individual’s perspectives and their live’s experiences.

- To provide sociological knowledge for effective communication by using written, oral and other technological mediums.
- To focus on environmental challenges and sustainability with regional, national and international significance and role of society in creating attitude and habits about the ecological degradation.
- To cultivate self-realization and motivation towards emerging social issues by sociological perspective which guide and affects the skills and development of an individual in a society.

Programme Outcomes

PO1: Sociological Knowledge: Define sociological concepts, theories and research methodology to understand contemporary social issues through the individual lives experiences are shaped by existing social structure, interaction and group relations.

PO2: Planning abilities: Learn and demonstrate skills related to time and resource management, organization of activities and leadership for effective execution of tasks with individual and team work efforts

PO3: Problem analysis: Think critically, reason logically and apply scientific methodology in the analysis of empirical social reality from sociological perspective to resolve issues emerging from multi-cultural, global, ethnic and racial inequalities

PO4: Modern tool usage: Apply various approaches and research methodology including new computer based tools and technology particularly softwares for qualitative and quantitative research.

PO5: Leadership skills: Understand and think about change in social structure and cultural values while fulfilling personal, professional and social responsibilities **;**play an active and leading role as members of civil society.

PO6: Professional Identity: Prepare for undertaking successful careers by acquiring knowledge and skills in public and private sectors.

PO7: Sociological Ethics: Consider social values, norms and professional ethics in personal and professional sphere as an individual and as a member of society

PO8: Communication: Effectively communicate sociological concepts and their application.

PO9: The Sociologist and society: Understand their roles and responsibilities as a member of society and contribute in solving problems related to individuals and society.

PO10: Environment and sustainability: Understand environmental issues; contribute in protecting environment through generating awareness and participating in creating green and clean society;

formulate policies of national and international level to promote and implement sustainable development practices.

PO11: Life- long learning: Develop sensitivity towards cultural values and norms; become self –motivated, generous, adapting social beings; strive for establishing harmonious social order based on the principles of equality, liberty and fraternity.

First Semester

SOC 403 Indian Society: Structure and Change

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of this course, students will be able to

- Acquaint with the characteristics of Indian society and historical importance of culture unity and diversity.
- Explain the changing trends in basic institutions of Indian society.
- Develop sociological knowledge and solving the contemporary problems of Indian society.

SOC 404 Rural Sociology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of this course, students will be able to

- Describe the background of rural society, structural problems responsible in changing patterns of relationship in the society.
- Understand the role of communities in traditional and contemporary movement.
- Identify the intricacies of rural social life and emerging issues of development
- Analyze the role of NGOs in rural development

SOC 412 Sociological Thinkers

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of this course, students will be able to

- Introduce the development of sociological thought in the light of historical and intellectual context.

- Understand the impact of socio-economic and political forces in the development of sociological though.
- Contribute the role of theoretical perspective in relation to the application of social world.
- Analyze social conditions of emergence of sociological thought in traditional and contemporary scenario

SOC 410 Theoretical Sociology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of this course, students will be able to

- Explain the various aspects of culture, personality and society in the sociological perspectives.
- Gain a deeper understanding about various concepts of Sociology with theoretical understanding
- Discuss the role of social processes in shaping the personality of individuals and groups.
- Apply a critical thinking towards study of society

SSC 402 Social Science Perspectives

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Analyse the holistic view encompassing different social science
- Provide insights to interpret social events.
- Understand the basic ingredients of social science disciplines to contextualize social reality.
- Critically evaluate the emerging themes in social sciences

Second Semester

SOC 401 Globalization and Society

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of this course, students will be able to

- Understand conceptual framework of globalization
- Apprise on the different socio-cultural consequences of globalization.
- Explain globalization and its relation with culture and identity.
- Discuss the Indian experience of globalization in terms of the problems and prospects.
- Critically engage in recent debates on globalization.

SOC 402 Indian Social System

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcome:

After completion of this course, students will be able to

- Explain various approaches to study Indian society.
- Describe caste and class system and its impact on society.
- Critically analyze the processes of change.

SOC 406 Social Stratification and Change

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of this course, the students will be able to

- Understand the concept and theories of social structure and stratification
- Enhance their knowledge about the structure of society through social change with theoretical perspective.

- Analyze the concepts of development in critical perspective.

SOC 411 Urban Sociology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After Completion of this course, the students will be able to

- Understand the nature of urban Society and how it is different from rural society.
- Explain the emergence and development of urban centres
- Critically analyse various problems existing in urban society.

SSC 401 Research Techniques in Social Sciences

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of this course Students will be able to

- Develop aptitude for social science research.
- Identify various sources of primary and secondary data.
- Formulate hypothesis, Identify and apply various quantitative and qualitative methods of research.
- Summarize, analyze and interpret qualitative and quantitative data in social science research and Write a coherent report and research paper.

Semester III

SOC 503 Indian Social Thinkers

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, the students will be able to

- Describe historical trajectory of Indian Sociology.
- Explain major approaches to study Indian society and culture.

- Comprehend the contributions made by Indian sociologists and their contemporary relevance.
- Explain Indian social reality from text view and field view perspectives.

SOC 522 Industrial Sociology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain the concepts and theories of industrial sociology.
- Identify problems related to industry and labour.
- Critically analyse the role of legislation in labour welfare.

SOC 510 Sociological Approaches and Theories-I

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain various approaches of sociology.
- Analyse relationship between social theory and empirical research
- Apply the sociological theories to understand the social phenomena

CS 513 Computer Applications

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**3**	**0**	**0**	**3**

Learning Outcomes:

After completion of this course student will be able to:

- Basic knowledge of the computer system and it's peripherals.
- Concept of operating system and their functions.
- Understand databases and Network applications.

- Understand concept of Application software tools like MS- WORD, MS-EXCEL. MS-PowerPoint and SPSS.

CS 513L Computer Applications Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Learning Outcomes:

After completion of this course student will be able to

- Basic knowledge of the computer system and it's peripherals..
- Concept of operating system and their functions
- Understand databases and Network applications.
- Understand concept of Application software tools like MS- WORD, MS-EXCEL. MS-PowerPoint and SPSS.

Semester IV

SOC 509 Social Psychology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain the concepts of social psychology.
- Understand the self and its development with reference to society.
- Identify the influence of various factors on development of personality.
- Apply social psychological perspective to understand human behavior

1. Brehm, S. S., and Saul M. Kassin. (1990). *Social psychology*. Boston: Haughten Mifflin Company.
2. Worchel, S., Cooper, J., & Goethals, G. R. (1991). *Understanding social psychology*. London: Thomson Brooks/Cole Publishing Co.

SOC 511 Sociological Approaches and Theories-II

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcome:

After the completion of this course, students will be able to

- Explain new theoretical approaches of sociology.
- Discuss relevance of modern and post modern sociological approaches.
- Apply the sociological theories to understand the social reality

SSC 501 Women Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain the fundamentals of Women Studies and its multidimensional aspects.
- Develop the knowledge of how women's struggles or movements in the West and in India evolved leading to the establishment of the academic discipline.
- Describe interlinkages of gender, patriarchy and power.

SOC 521D Dissertation

L	**T**	**P**	**C**
0	**0**	**10**	**5**

Learning Outcomes:

After the completion of this course the students will be able to

- Develop their analytical thinking.
- Enhance their writing skills.
- Refine their research aptitude.

Discipline Elective

SOC 519 Diasporic Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course the students will be able to

- Describe the upcoming multidisciplinary field of Diaspora Studies.
- Understand the key debates in migration and diaspora studies.

- Know the global, historical, political and cultural contexts of Indian Diaspora.
- Explain the policies of diaspora from a critical perspective

SOC 501 Environment and Society

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Understand man- nature relationship and ecological balance.
- Know the impact of environmental problems on society.
- Identify the environmental movements in social context.
- Critically analyze environmental policies and programmes

SOC 523 Industry and Society

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain the concepts and theories of industrial sociology.
- Identify problems related to industry and labour.
- Critically analyse the role of legislation in labour welfare

SOC 507 Science, Technology and Social Change

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Explain interrelations of science, technology and social change

- Develop an understanding of policy formulation regarding technology and society
- Critically analyse the role of technology in development of society

SOC 508 Social Demography

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Understand and apply the concepts and theories on population problems**.**
- Know about importance of population control measures and their implementation.
- Explain reproductive health and social impact of new reproductive technologies.

  Critically analyze population problems and policies

SOC 405 Social Movements in India

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, the students will be able to

- Explain the concepts related to collective action and social movements.
- Describe different sociological approaches of social movements.
- Compare the traditional and new social movements in Indian society.
- Critically understand the impact of social movements in social transformation

SOC 512 Sociology of Deviance and Crime

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Elucidate the crime as a form of deviant behaviour.
- Apply theoretical approaches to understand changing patterns of crime and criminal behavior.
- Understand the correctional homes and different perspectives of punishment.

SOC 409 Sociology of Education

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of this course student will be able to

- Explain different perspectives of sociology of education.
- Identify the problems of education in context of multi-culturalism ethnicity and gender inequality.
- Discuss the relevance of educational policies in promoting quality education.

SOC 526 Sociology of Exclusion and Inclusion

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of course the students will be able to

- Comprehend the concept of social exclusion and inclusion
- Learn about the various forms of social exclusion.
- Understand how social groups are excluded.

SOC 513 Sociology of Health and Medicine

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Understand the concept of health and its dimensions from sociological perspective.
- Develop a proper understanding of the evolution of social medicine.

- Identify the role of hospital as a social organization,its types and functions
- Explain concept of community health and social service
- Gain insights regarding rehabilitation agencies working in both public and private sector

SOC 514 Sociology of Information Society

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Describe the historical changes of technology, society and its transition in organizations and institutions.
- Understand the change and transition of science and technology in society.
- Explain information technology revolution and its relevance to study society.
- Learn about the importance of media culture and its relationships with social dualism, networks.

SOC 515 Sociology of Popular Culture and Mass Communication

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of this course, students will be able to

- Know the concept of different forms of popular culture.
- Develop a proper understanding of the advancement of mass communication
- Explain the impact of popular culture on society
- Acquaint with the changing profile of communication in India like satellite television and its impact on commercialization of folk culture.

SOC 527 Sociology of Religion

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course the students will be able to,

- Explain the sociological approaches of religion.
- Understand the significance of religious movements and its role in politics.
- Critically analyze the process of secularization in India

Reading Electives

SOC 520R Digital Sociology

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to

- Know the concepts and methods of digital technology and its impact on society.
- Identify the positive and negative effects of technology on personal and social life.
- Apply social research related to digital and information society.
- Crtically analyze digital initiatives and programmes.

SOC 524R Political Sociology

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of the course the students will be able to,

- Understand political system and processes.
- Describe the process of political socialization and and its agencies.
- Critically analyze voting behviour and political participation

SOC 525R Social Engineering

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After the completion of this course, students will be able to

- Explain the Socio-Economic-Political Systems, emerging development issues, development Planning and social policy.
- Describe various problems in the society through practical approaches using multi-disciplinary perspectives.
- Apply various techniques and tools in an integrated way to make decisions.
- Critically understand about emerging development concerns with social policy framework.

SOC 528R Sociology of Youth

Max. Marks : 100

L	T	P	C
0	0	0	2

Learning Outcomes:

After completion of this course, students will be able to

- Explain youth's transition to adulthood in present scenario and how this transition is shaped by social status, social norms and current economic conditions.
- Identify the problems related to youth and provide their sociological explanation
- Understand how youth could be agent of constructive social change
- Critically analyze the issues related to education and livelihood of youth and role of policies for ensuring better opportunities

BANASTHALI VIDYAPITH

Master of Arts (Psychology)

Curriculum Structure

First Semester Examination, December 2019
Second Semester Examination, April/May 2020
Third Semester Examination, December 2020
Fourth Semester Examination, April/May 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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Programme Educational Objectives

In compatibility with Banasthali Vidyapith's aim to materialize the ethos of nation-building, Indian Culture and Panchmukhi Shiksha, the M.A. Psychology Programme develops an enlightened and human value based education along with the academic and competitive pursuits of the students.

The Department of Psychology carries out its programme within the context and spirit of the university's vision for excellence. It supports and reinforces the aims of Banasthali Vidyapith by valuing all students equally as individuals. The Department strives to build a community which encourages all its members to develop respect for one another.

In addition, we provide a happy, stimulating and caring environment where there are opportunities, encouragement and stimuli to develop each student to her full potential. It ensures value driven commitment to reducing psychological distress and enhancing and promoting psychological well-being through the systematic application of knowledge derived from psychological theories and develop a democratic attitude that respects the worth, uniqueness, and potential for growth and development of all individuals.

The main objectives of the programme are:

- To appreciate, understand and respect aspects of their own and other cultural environments in terms of beliefs, values, attitudes, customs, knowledge and skills.
- To understand the concepts and practice of ethical principles in a broad range of professional contexts, understand the role of academic, professional, and personal integrity in maintaining a healthy community.
- To design and formulate ideas that expressed in a comprehensible language, culturally sensitive, and non-discriminatory in terms of age, gender and disability.
- To assess the relevance of information critically so that alternative perspectives and solutions can be developed.
- To demonstrate critical awareness of one's own worldview, values, and biases and their influence on one's approach to Psychology, science and practice.

- To understand, express, use and control feelings and emotions that may encourage empathy in terms of relationships with others.
- To develop a range of personal values and beliefs based on a sense of curiosity and respect towards self and others.
- To prepare culturally and ethically competent professionals who are committed to the collaborative practice of psychology and lifelong learning.
- To apply therapeutic and counseling skills to help clients (individuals and groups) to overcome their psychological distress.
- To apply theories, concepts and previous experiences to inform new situations and creatively solve practical problems related to human behavior.
- To demonstrate an understanding of psychological research by having learned how to identify, conduct, and critically evaluate quantitative and qualitative studies used throughout the psychological studies.

Programme Outcomes

PO1: Psychological Knowledge: Fundamental knowledge of theoretical and applied perspectives of psychology in terms of counseling psychology, clinical psychology, health psychology, organizational behavior and positive psychology.

PO2: Planning Abilities: Mastery in completions of projects, formulation of research problems in terms of hypothesis testing, identification of variables and implications of the research findings or results in the form of generalization of results.

PO3: Problem Analysis: Competence in making solution of the problem through deep investigation of the problems in systematic ways including identification of the problem, hypothesis testing, design of research problem that encourage analysis ability among students.

PO4: Modern Tool Usage: An implication of modern advancement of tools and tests over research in terms of data collection, analysis of the data and organization of the results, application and conceptual understanding of scientific methods in researches.

PO5: Leadership Skills: Cultivation of leadership skills and competence, development of vision of becoming a leader, concern about societal issues and problem, competence in dealing with conflictual situation through strategic ways.

PO6: Professional Identity: Self-awareness about own identity and identity crisis while working and behaving in particular formal situations, knowledge of teamwork and working skills of teamwork, handling stressful situations.

PO7: Psychological Ethics: Development of ethical principles and consideration regarding appropriateness of conducts in different situations such as professional settings and university settings. Learning of values and ethics promotes effectiveness of dealing with variety of issues.

PO8: Communication: Demonstration of communication skills and development of assertiveness that foster improvement in interpersonal relationship during different phases of life including work, family and university phases.

PO9: The Psychologist and the Society: Application of theoretical approaches in understanding human phenomena's occurring in society and implication of contextual factors in ruling out the causes of these phenomena's along with intervention strategies.

PO10: Environment and Sustainability: Generating awareness about the environment including physical, psychological and social facets and also provide theoretical framework regarding natural phenomena of the nature in terms of earthquake and climate change and its impact on human behavior.

PO11: Lifelong Learning: Mastery over self in terms of regulating and monitoring own behavior during diverse phases of life, deeper understanding of lifelong learning process including developmental and degeneration phases of age and competence in dealing with these crisis effectively.

First Semester

PSY 402 Cognitive Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain the historical development of cognitive psychology.
- Explain the organization of basic cognitive functions from different perspectives.
- Discuss the relevance of higher cognitive processes for understanding people's behavior.
- Explain neuropsychological aspect behind various cognitive processes.

PSY 410 Indigenous Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Discuss the appropriateness of Indigenous Psychology.
- Analyze the Assumptions and Approaches of Indian Philosophy.
- Explain types of Yog and the techniques of Meditations.
- Evaluate the Role of Yog and Meditation in improving Holistic Health and Well-being.

PSY 408 Theories of Personality

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Discuss the significance of personality theories and constructs.
- Recognize the complexity of human behavior thought and emotion.
- Explain personality-related processes that underlie individual differences in behavior.

- Examine seminal and current research studies and describe important findings using empirical approach.

SSC 402 Social Science Perspective

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Analyze the holistic view of encompassing different social science disciplines.
- Provide insights to interpret social events at any given point of time.
- Understand the basic ingredients of social science disciplines to contextualise social reality.

PSY 411L Psychology Lab-I

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate the utility of personality tests.
- Discuss the appropriateness of different intelligence tests.
- Explain various constructs and their tests in term of decision making, Vedic personality, communication etc.
- Analyze the concept of Indian psychology.

Second Semester

PSY 401 Advanced Quantitative and Qualitative Analysis

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain research process and its fundamental steps in terms of

hypothesis, problem and variables.

- Discuss quantitative and qualitative analysis techniques for analyzing and interpretation of psychological data.
- Discuss and explain the concept of research design and its types in terms of between and within group design.
- Illustrate factorial, correlational and regression analysis.

PSY 409 Human Values and Professional Ethics

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the students will be able to:

- Describe and evaluate ethical and social value in historical and cultural contexts.
- Evaluate the role of ethical leadership promoting effectiveness of the organizations.
- Identify the competencies and issues professional ethics.
- Distinguish between values and skills, happiness and accumulation of physical facilities, the self and the body, intention and competence of an individual.

PSY 404 Positive Psychology

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After completion of the course, the students will be able to:

- Analyze the importance of positive emotions in well-being and mental health.
- Apply concepts of positive psychology for the development of positive values.
- Analyze the role and importance of positive relationships in the lives of human-beings.

- Synthesize the role of flexibility and complexity in intra- and interpersonal well-being.

SSC 401 Research Techniques in Social Sciences

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Develop aptitude for social science research.
- Identify various sources of primary and secondary data.
- Formulate hypothesis.
- Identify and apply various quantitative and qualitative methods of research.
- Summarize, analyze and interpret qualitative and quantitative data in social science research.
- Write a coherent report and research paper.

PSY 412L Psychology Lab – II

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain conceptual foundation of Life skills
- Apply life skills in various domains of life.
- Develop skills in the operationalization of SPSS software.
- Conduct data analysis and its interpretation using SPSS software.

Third Semester

PSY 501 Clinical Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Identify how psychologists study human behavior and how this knowledge can be used to explain, predict, and influence behavior.
- Identify and critically evaluate psychological research methods.
- Explain various methods for collecting information from the client.
- Perform personality assessment by using various methods and approaches.

PSY 503 Counseling Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course the students will be able to:

- Summarize the process of counseling and its principles.
- Analyze the basic concept, approaches, history and trends in counseling.
- Explain implication of Indian and integrative approaches of counseling.
- Describe the counseling processes and its relationship involve in different classical and modern counseling therapies.

PSY 519L Psychology Lab – III

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcomes:

After completion of the course the students will be able to:

- Conduct case study by using various psychological tests.
- Develop skills in the administration and interpretation of various projective tests.
- Discuss ethical issues in the administration of various tests.

- Identify and handle problems in data collection and dealing with the clients.

CS 513 Computer Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	3	0	0	3

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate knowledge of the computer system.
- Have the ability to define operating system, databases and Network application.
- Have and understanding of the proper contents of a computer system and these software tools like MS-WORD, MS-EXCEL, MS-Power Point and SPSS.

CS 513L Computer Application Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

Fourth Semester

PSY 502 Community Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain different communities of society in terms of advantaged and disadvantaged groups.
- Explain the concept of disempowerment and disadvantage groups in terms of excluded community.
- Discuss the feature of empowered group and social capital globally.
- Demonstrate the knowledge of human behavior and psychological health.

PSY 508 Organisational Behaviour and Human Resource Development

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learnng Outcomes:

After completion of the course, the students will be able to:

- Analyze challenges and issues of organizational behavior.
- Identify and apply the theories, principal and skills of organizational behavior and HRM.
- Compare and evaluate approaches and methodology of organizational behavior.
- Examine challenges of effective functions of HRM organizational communication.

SSC 501 Women Studies

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain Women's Studies as an interdisciplinary subject and develop a conceptual understanding of different aspects of feminist history.
- Understand the feminist thought and development approaches in the contribution of gender bias, discrimination and empowerment.
- Develop an understanding about women's socio-economic profile and their role in development process.
- Critically analyse various institutional and legislative mechanisms for protecting women's human rights.

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PSY 514D Dissertation

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Develop their analytical thinking.
- Enhance their writing skills.
- Refine their research aptitude.

Discipline Elective

PSY 504 Cross-Cultural Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate understanding of the major concepts, theoretical perspectives and historical trends in a cross-cultural psychology.
- Evaluate the ethical implication tied to culture in psychological research.
- Evaluate the theoretical positions in culture and cognition.
- Identify and critique the influence of culture on social issues.

PSY 513 Diagnostic Techniques in Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain the process of psychological assessment and evaluation.
- Discuss various approaches to psychological assessment in terms of rational, theoretical and empirical views.

- Evaluate different personality test in terms of MMPI, NEO-FFI, TAT, and Rorschach tests.
- Explain the concepts of behavioural techniques and types in personality assessment.

PSY 403 Environmental Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Evaluate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Explain the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.
- Apply systems, concepts and methodologies to analyze and understand interactions between social and environmental processes.

PSY 516 Foundations of Guidance

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Describe the different basic concepts and challenges of guidance.
- Demonstrate knowledge, principles and functions of guidance to ensure a safe learning environment in school settings.
- Analyze the concepts, scope, history, theories and techniques that govern the process of guidance.
- Explain practical implications of educational, vocational, and group guidance.

PSY 506 Gerontology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain the key concepts associated with the study of aging and gerontology.
- Apply theoretical perspective to analyze contemporary issues associated with the study of aging and gerontology.
- Describe the physical, social, familial, and community support system of old age people.
- Explain old age issue and psychological impact of bereavement, grief, and mourning.

PSY 507 Health Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate understanding of biological, behavioural, cognitive and social determinants of health.
- Manifest advanced knowledge of individual, group and community based approaches to he management and presentation of major health problem (Both acute and chronic conditions).
- Plan and critically evaluate research in health psychology and behavioural medicines.
- Determine the risk factor for health compromising behaviour and strategies for their modification, across the age range from childhood to old age.

PSY 517 Neuropsychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Describe methods used in developmental neuropsychological research and practice.
- Identify the stages of brain development, major subdivisions of the brain, and specialized brain circuits that support neuropsychological functions.
- Explain neuropsychological bases behind various psychiatric conditions.
- Perform neuropsychological assessment for rehabilitation purpose.

PSY 407 Psychopathology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Apply various psychological theories to the conceptualization of individual with various mental disorders.
- Identify the major mental disorder throughout the life span.
- Describe the principles of the Diagnostic and Statistical Manual of Mental Disorders (DSM5).
- Discuss various research approaches used for the study of various mental problems.

PSY 521 Sports Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Discuss the applications and scopes of sport psychology.
- Identify principles of sport psychology in sporting events, athletes, and various personalities.
- Demonstrate an understanding of the use of psychological methods in enhancing personal development and human performance in sport and physical activity.
- Evaluate the challenges and effect of counseling in sports.

PSY 522 System and Theories in Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate ability to recognize theories, and arguments in psychology, and reason in ways that link psychology with other disciplines.
- Demonstrate ability to identify important contemporary areas of psychology and theology.
- Explain the creative aspects of theory construction, and application of collaborative work in psychology.
- Recognize the interaction of situational and individual characteristics on the development of personality.

PSY 511 Consumer Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Discuss decision making process, leadership, modeling, branding and other related concepts of consumer behavior.
- Analyze communication skills involve in written text, oral messages and multi-media presentations used in business.
- Apply their substantive knowledge to marketing situations (cases, scenarios) in an analytical manner.
- Analyze the cross cultural aspects of consumer behavior in different social and cultural settings.

PSY 510 Rehabilitation Psychology

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After completion of the course, the students will be able to:

- Apply the principles of disability-related legislation including the rights of people with disabilities to the practice of rehabilitation counseling
- Describe and implement approaches that enhance personal development, decision-making abilities, personal responsibility, and quality of life of individuals with a disability.
- Describe the purpose of forensic rehabilitation, vocational expert practice, and the reasons for referral of individuals for services.
- Perform assessment of various disabilities.

Reading Elective – I

PSY 512R Cultural Intelligence

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain the concept of cultural intelligence.
- Analyze the role of culture in human behavior.
- Analyze the role of leaders in creating and navigating culture.
- Apply the foundational concept of culture and the dynamics that influence human interaction and communication and cross cultural.

PSY 515R Ecological Intelligence

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate a competency to respond to a design brief and develop critical thinking skills in analyzing environmental projects and scenarios within the context of ecological intelligence.
- Discuss application of ecological intelligence.
- Develop ‘Green Infrastructure’ principles from historic, theoretical and case studies and the relationship of Ecological Intelligence
- Demonstrate a competency to articulate, communicate and critically evaluate design intentions, applications and outcomes using a variety of technologies and techniques.

PSY 518R Psychology in Digital Age

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After completion of the course, the students will be able to:

- Describe the relevance and applications of digital psychology
- Analyze the importance of understanding human behavior when working with media applications in educational, entertainment, health services, commercial or public policy environments
- Discuss how media be used effectively for socially constructive purposes?
- Elaborate the distinction between online and offline in how we communicate and make meaning of the world around us?

PSY 520R Publication Manual of the American Psychological Association, Sixth Edition

Max. Marks : 100	L	T	P	C
(ESA: 100)	0	0	0	2

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain all parts of a scholarly manuscript.
- Organize the table and figure in APA style.
- Write references and bibliography in APA format.
- Apply the rules of APA in writing manuscript.

List of Online Reading Elective

Cultural Intelligence (Online Course)

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain the concept of cultural intelligence.
- Analyze the role of culture in human behavior.
- Analyze the role of leaders in creating and navigating culture.
- Apply the foundational concept of culture and the dynamics that influence human interaction and communication and cross cultural.

Ecological Intelligence

Learning Outcomes:

After completion of the course, the students will be able to:

- Demonstrate a competency to respond to a design brief and develop critical thinking skills in analyzing environmental projects and scenarios within the context of ecological intelligence.
- Discuss application of ecological intelligence.
- Develop 'Green Infrastructure' principles from historic, theoretical and case studies and the relationship of Ecological Intelligence
- Demonstrate a competency to articulate, communicate and critically evaluate design intentions, applications and outcomes using a variety of technologies and techniques.

Psychology in Digital Age

Learning Outcomes:

After completion of the course, the students will be able to:

- Describe the relevance and applications of digital psychology
- Analyze the importance of understanding human behavior when working with media applications in educational, entertainment, health services, commercial or public policy environments
- Discuss how media be used effectively for socially constructive purposes?
- Elaborate the distinction between online and offline in how we communicate and make meaning of the world around us?

Publication Manual of the American Psychological Association, Sixth Edition (Online Course)

Learning Outcomes:

After completion of the course, the students will be able to:

- Explain all parts of a scholarly manuscript.
- Organize the table and figure in APA style.
- Write references and bibliography in APA format.
- Apply the rules of APA in writing manuscript.

BANASTHALI VIDYAPITH

Master of Arts (English)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
P.O. BANASTHALI VIDYAPITH
(Rajasthan)-304022

July, 2019

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PROGRAMME EDUCATIONAL OBJECTIVES

The programme intends to develop a harmonious and holistic personality of students with a strong base of Indian culture, nationalism and ethos. It also seeks to inculcate linguistic, literary, and communicative competence so that they can create an inclusive and sustainable society. In addition, it also seeks to familiarize students with different literary forms, critical theory and literary criticism that may enrich their intellectual and epistemological realities.

The main objectives of the programme are:

- To acquaint students with complex textures of Indian culture and ethos.
- To equip students with wide understanding of literatures and communicative competence so that they may be able to communicate effectively.
- To familiarize students with some major concepts of all classical and modern literatures so that they may develop critical thinking.
- To engage students in self-reflexivity and lifelong learning.
- To help integrate different aspects of physical, practical, aesthetic, moral and intellectual dimension of education to develop holistic personality of each student.
- To develop effective citizenship with strong value base and ethics.
- To familiarize students with environmental contexts, inclusivity and sustainable development.

PROGRAMME OUTCOMES

PO1: **Enrichment of Intellectual and Epistemic Tradition**: It indents to develop a taste for Indian, British, American and Postcolonial English literatures and also for different literary forms; poetry, fiction, drama, essays and short stories. It may also show a wide knowledge of classical and contemporary literature with analytical capacity to place texts in theoretical, historical or social contexts.

PO2: **Inculcation of Planning Abilities**: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Focus on the development and implementation of plans and the organization of works to meet deadlines.

PO3: **Amelioration of Problem Solving Skills**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decision during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decision.

PO4: **Appropriate Application of Modern Literary and Linguistic Tools**: The judicious application of modern literary and linguistic theories may develop critical and analytical analysis. It may unravel different layers of text.

PO5: **Development of Soft Skills:** Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizen or leadership roles when appropriate to facilitate societal responsibilities.

PO5: **Formation of Professional Identity:** Understand, analyze and communicate the value of their professional role in society.

PO6: Nurturing Ethics and *Dharma*: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and taking responsibilities for the consequences of the decisions taken.

PO7: **Development of Communicative Competence**: Communicate effectively in textual, personal and interpersonal contexts so that the discursive practices may be enriched and the trajectory of knowledge may get strengthened.

PO8: **Language, Literature and Society**: Develop both material and metaphysical dimensions of life where language, literature and society can be seen together.

PO9: **Environment, Inclusivity and Sustainability**: Understand the impact of human behavior and action on environment and social relationship. It includes the exploration of inclusivity and sustainability.

PO10:**Lifelong Learning**: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broader context of social, economic, technological and cultural changes. The identification of some thrust areas on the basis of self-criticality and reflexivity may keep the process of lifelong learning in continuum.

First Semester

ENGL 401 Critical Theories (Part-I)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- familiar with basic concepts and theoretical and philosophical strands of Structuralism, Post-structuralism, Marxism, New Historicism, Romanticism etc ;
- understand Indian intellectual tradition;
- develop critical thinking;
- inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions;
- sense various issues of environmental and sustainability as they have been portrayed in different writings of Romanticism;
- engage themselves in the praxis of applying those theoretical and philosophical underpinnings in the analysis of the essays prescribed in the syllabus.

ENGL 402 Grammar and Usage

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- comprehend the underlying rules and patterns of grammar through forms and functions of grammatical units;
- identify and analyze different types of phrases and clauses in terms of structure and function in a sentence;
- understand the difference in the concept of time and tense;
- identify and use present and past tenses in the contextualized speech; to use the various forms of future expressions: simple present, present progressive, is going to vs. will and modals.

ENGL 403 Indian Writing in English

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- identify relationship between Indian Writing in English and its social context;
- interpret texts with attention to their complexity, intricacy and aesthetic value;
- demonstrate literary sensibility and emotional response to the literary texts;
- know various eminent figures of Indian literature in English ;
- assimilate and synthesize Indian values and sensibility through their understanding of the texts.

ENGL 404 Introduction to Language and Linguistics

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- have an understanding of major aspects of English Phonetics and Phonology;
- understand standard R. P. symbols, word transcription, word-stress, sentence stress and intonation;
- display better pronunciation skills;
- evince improved grammatical and communicative competence.

ENGL 405 Literature in English (1550-1660) : Poetry, Non-fictional Prose and Drama

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- learn basic concepts and movements related to the Elizabethan & Jacobean Age and the then existing poetic and literary trends;
- focus on the development of critical thinking by discussing the literary texts, poetry, prose as well as drama, in consonance with the relevant theoretical and philosophical backdrop of the Elizabethan & Jacobean Age;
- communicate effectively in all forms of academic and social interaction;
- inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions;
- engage themselves in the praxis of applying those theoretical and philosophical underpinnings in the analysis of some texts prescribed in the syllabus.

Second Semester

ENGL 406 Literature in English (1660-1798): Poetry, Drama and Fiction

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- understand and follow the genres like philosophy, poetry, drama and prose;
- comprehend Literary Theories and basic theoretical and philosophical strands of Structuralism, Post-structuralism, Marxism, New Historicism, Romanticism, etc;
- critically think and appreciate various literary pieces;
- communicate effectively and develop better social interaction;
- address the issues of environmental sustainability as those have been portrayed in different writings of the literary period.

ENGL 407 Literature in English (1798-1914): Romantic Poetry

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- familiarize themselves with the Romantic Movements of Germany, France, Britain and America;
- know the historical, political and aesthetic milieu of the romantic age;
- understand German Idealism, theories of realist discourses, metaphysics and the aesthetics discourses on art and artist;
- develop their creative and critical thinking;
- assimilate aesthetic sense through the understanding of the respective texts.

ENGL 408 Literature in English (1798-1914): Victorian Poetry, Drama and Non-fictional Prose

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- familiar with a wide range of poetry, drama and non fictional prose written during the Victorian period;
- able To develop social, intellectual and ethical concerns and relate the same to define and preoccupy these works;
- able to Consider formal and historical aspects of these texts, especially as they correspond with Victorian debates surrounding religious belief, anxieties of nation;
- able to develop critical thinking;
- able to Enhance effective communication and develop better social interaction;
- able to develop sensibility to address the issues of environmental sustainability as they have been portrayed in different writings of the literary period.

ENGL 409 Translation Studies

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- comprehend the basic concepts, types, theories, models of translation;

- Know relationship between language and translation, culture and translation, politics and translation, knowledge and translation, translation and multiculturalism;
- enhance effective communication both in Source Language and Target Language to develop better social interaction;
- engage in the praxis of applying those theoretical and linguistic ideas for translating a text from a source language to target language.

CS 421 Introduction to Computer Applications

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**3**	**0**	**0**	**3**

Learning Outcomes:

After the completion of the course, students will be able to:

- Demonstrate knowledge of the computer system.
- Have the ability to define operating system, databases and Newtwork applications.
- Have an understanding of the proper contents of a computer system and these software tools like MS-WORD, MS-EXCEL, MS-Power Point and Corel Draw.

CS 421L Introduction to Computer Applications Lab

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**4**	**2**

Third Semester

ENGL 501 American Literary Tradition

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- discuss various socio-political aspects of American Literary Tradition;
- show awareness of the historical, cultural, and formal issues of the literary texts;
- articulate the relation between forms meanings, and values;
- compare and analyze relative importance of American, British and other world literatures;

- realise the contribution of American literature to the literary tradition of the world.

ENGL 502 Classical Literature in English

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- understand of basic concepts of Indian, Greek and Latin classical literatures.
- develop critical thinking;
- improve social interaction through the understanding of classical literary tradition;
- inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions;
- inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions.

ENGL 505 Fiction (1798-1914)

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- able to form a theoretical background to Fiction as a literary genre;
- critically think and analyse the art of fiction in a given literary piece;
- use their understanding of various issues dealt with in a work of fiction and thereby develop social interaction.

ENGL 508 Modern and Contemporary Poetry Since 1914

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- learn major concepts of Modern Poetry, Modernism, and Modernity;
- enhance effective communication and develop social interaction by addressing global issues through poetry;
- inculcate the art of language use, its experimentation as dealt with in English poetry of the age.

Fourth Semester

ENGL 503 Contemporary Fiction

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- familiarize themselves with basic concepts of contemporary fiction;
- interpret the basic concepts of home, exile, nostalgia, dislocation/relocation migration, transnationalism and other diasporic elements in a text of contemporary fiction ;
- critically analyze the postmodern elements in a text of contemporary fiction;
- understand the various narrative techniques used in contemporary texts.

ENGL 504 Critical Theories (Part - II)

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- learn basic concepts on theoretical and philosophical strands of Structuralism, Post-structuralism, Marxism, New Historicism, Romanticism etc;

- understand Indian intellectual tradition and inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions;
- develop critical thinking;
- enhance effective communication and develop better social interaction.

ENGL 507 Modern and Contemporary Drama Since 1914

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- learn major concepts of Modern Drama, Modernism, Modernity, and Stream of Consciousness, fragmentation and futility;
- understand the difference between Aristotalian and Brechetian theory of drama;
- apply some theoretical and philosophical concepts in the analysis of the plays prescribed in the syllabus;
- develop their critical thinking;
- develop their self-reflexivity and lifelong learning.

ENGL 510P Project

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**0**	**0**	**10**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- develop analytical and critical thinking;
- enhance effective written communication and develop social and argumentative interaction;
- learn the nuances of art of writing and developing literary themes and topics into discourses.

Discipline Elective

ENGL 511 Indian Literatures

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- know some major concepts of Indian culture, art, aesthetics, and literature, Indian knowledge system or Indian Intellectual Tradition;
- learn some major concepts of Indian culture, art and literature;
- understand the theoretical complexes that may enrich their understanding of Indian culture, art and literature;
- develop analytical and cognitive ability and appreciate different aspects of Indian culture, art and literature.

ENGL 514 New Literatures in English

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

Learning Outcomes:

After the completion of the course, students will be able to:

- develop critical thinking through a sense of comparing new literatures in English;
- develop analytical and cognitive ability and examine different aspects of New Literatures in English;
- understand the theoretical complexes which help in organizing and characterizing various complexes of New Literatures in English.

ENGL 509 Postcolonial Studies

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- understand the basic concepts of Colonialism, Postcolonialism, Imperialism, Identity, Ideology, Orientalism, Culture and Imperialism**;**
- know the process of knowledge formation, Epistemological realities and the relationship between power and knowledge, hegemony, and homology;
- apply basic concepts of colonialism, Imperialism, history, language, culture, hegemony, interpellation, decolonization, orientalism, and subaltern to a literary text;
- critically analyse postcolonial thought and appreciate its contribution to epistemic tradition.

ENGL 516 Seventeenth and Eighteenth Century Drama

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- know the basic concepts of Drama, Tragedy, Revenge Play, Satire, and tragi-comedy;
- develop analytical and cognitive ability among students so that they may appreciate different aspects of Seventeenth and Eighteenth Century Drama;
- understand the theoretical complexes that may enrich their understanding of Seventeenth and Eighteenth Century Drama;
- inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions;
- enhance effective communication among students so that they may develop social interaction.

ENGL 506 Fiction Since 1914

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

Learning Outcomes:

After the completion of the course, students will be able to:

- take up a work of fiction and locate various philosophical ides embedded in those works;
- critically think and see a work of fiction through conceptual understanding of various literary lenses available to them;
- communicate effectively for better social interaction.

Reading Elective

ENGL 512R Literature and Gender

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- learn to place Gender, Sexuality and Feminist Studies in historical, political, economic, and theoretical perspective;
- develop critical thinking on the basis of issues of gender as a construct and its treatment in literature;
- inculcate effective citizenship with a deep grounded sense of ethics and moral dimensions;
- learn major concepts of Gender Studies and the relationship between literature and gender;
- develop analytical and cognitive ability and examine different aspects of Cultural Studies;
- understand the theoretical complexes that help them in organizing and characterizing various complexes of literature and Gender**.**

ENGL 513R Literature, Visual Arts and Cinema

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- know some major concepts of Literature, Visual Arts and Cinema;
- develop their analytical and cognitive ability so that they may examine different aspects of Literature, Visual Arts and Cinema;
- understand the theoretical complexes that may help them in organizing and characterizing some complexes of Literature, Visual Arts and Cinema;
- develop critical thinking so as to have better social interaction;
- inculcate effective citizenship by addressing various social issues with a deep grounded sense of ethics and moral dimensions;
- learn some major concepts of Literature, Visual Arts and Cinema;
- develop analytical and cognitive abilities and examine different aspects of Literature, Visual Arts and Cinema;
- understand the theoretical complexes which help in organizing and characterizing some complexes of Literature, Visual Arts and Cinema.

ENGL 515R Research Methodology

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- understand overall process of research, research design and research methods
- define and formulate research problem
- carry out a systematic research by developing a critical awareness of the major aspects of good research
- develop an understanding of the annexure documents related to research to introduce the students to various types of research

ENGL 517R Varieties of Prose

Max. Marks : 100	L	T	P	C
	0	0	0	2

Learning Outcomes:

After the completion of the course, students will be able to:

- critically examine prose text for style
- develop language proficiency
- examine the socio-cultural context
- communicate effectively in all form of situations
- evaluate concerns of the prose writers
- learn the value system of the cultural text

BANASTHALI VIDYAPITH

Master of Arts (Hindi)

Curriculum Structure

First Semester Examination, December, 2019
Second Semester Examination, April/May, 2020
Third Semester Examination, December, 2020
Fourth Semester Examination, April/May, 2021

BANASTHALI VIDYAPITH
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July, 2019

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- fgUnh Hkk"kk dh lkLdfrd i"BHkfe d lkFk gh Hkkjkih; Hkk"kk ifjokjk e fgUnh d fodkl vkj LFkku dk iofRreyd v/;;u djkukA
- noukxjh fyfi d ekudhdj.k rFkk lx.kd o Vd.k d vu:Ik mldh fof’k"V fLFkfr dk v/;;u djkukA
- fgUnh Hkk"kk dk vk/kfud Hkk"kk oKkfud fl)krk d vk/kkj ij oKkfud v/;;uA

- fofHkUu dkYk[k.Mk e mnHkr lkfgR;d iofRr;k] mud ifji{; e rR;xhu jktuhfrd] lkekftd] lkLdfrd ifjfLFkfr;k dk vfHkKku djkukA
- fgUnh i=dkfjrk d mnHko&fodkl] lpkj ek/;ek e fgUnh dh Hkfedk] lekpkj y[ku ,o liknu d l)kfrd vk;kek dk v/;;u djkukA
- Hkkjrh; ,o ik'pkR; dk0;'kkL= d leh{kk fl)krk dk v/;;u ,o fof'k"V leh{kdk dh 'kfy;k dk fo'y"k.kRed foopu djkukA
- Hkkjrh; lkfgR; ,o fgUnhrj Hkk"kkvk d vufnr lkfgR; d v/;;u l vU; Hkkjrh; Hkk"kkvk dh lkfgfR;d ijijk l ifjfpr djkukA
- Lokr«;kRrj fgUnh lkfgR; e vk; ifjoruk dk rR;xhu ifji{; e vkykpukRed v/;;u djkukA
- ioklh lkfgR; d ek/;e l fofHkUu n'kk e fgUnh y[ku l ifjfpr djkukA
- odfYid Lok/;k; d ek/;e l Nk=kvk e Lov/;;u ,o fo'y"k.k dh le> fodflr djukA
- 'kk/k ifof/k d fofHkUu l)kfrd ,o 0;kogkfjd i{kk dk vfHkKku djkukA
- fgUnh lkfgR; e l tukRed y[ku d ifr Nk=kvk e vfHk:fp tkxr djukA
- y?k 'kk/k ic/k d ek/;e l 'kk/k dh vk/kkjHkfe dk r;kj djukA

vif{kr ifj.kke

Ø **Hkk"kk oKkfud vfHkKku** ¼ fgUnh Hkk"kk **d mnxe dh lkLdfrd ifjfLFkfr;k d vfHkKku d lkFk gh vk/kfud Hkk"kk oKkfud fl)krk d vk/kj ij le> fodflr gkxhA**

Ø **LkkfgfR;d fo/kkvk dk ifjKku** ¼ **mijkDr ikB;de d ek/;e l fgUnh dk0; d lkFk gh vk/kfud x| dh leLr fo/kkvk ;Fkk] miU;kl] dgkuh] fuc/k] vkykpuk] 0;X;] fjikrkt] lLej.k] thouh vkfn leLr fo/kkvk l ifjp; d lkFk gh mud leh{kkRed fo'y"k.k dh {kerk Nk=kvk e fodflr gkxhA**

Ø **dk0;'kkL= ,o lkfgR;kykpu dk Kku** ¼ **vkykpuk lkfgR; dh dlkVh ekuh tkrh gA mijkDr ikB;de d v/;;u l Nk=kvk e lkfgR; dh le> d lkFk gh Hkkjrh; dk0;'kkL=h; fl)krk ,o ik'pkR; lkfgR;kykpu i)fr;k d vk/kj ij fo'y"k.k dh {kerk dk fodkl gkxkA**

Ø **Lok/;k; dh iofRr** ¼ **dk;de e lfEefyr Lok/;k; odfYid ikB;de d ek/;e l mue lkfgR; dh fofHkUu fo/kkvk d Lov/;;u vkj euu dh iofRr c<xhA**

Ø **lkfgfR;d vfHk:fp** ¼ **lkfgR; u doy lkekftd ifrfcEc gkrk g] vfir ;g ekuo eu d ifj"dj.k dk gr gkrk gA ikB;de e p;fur jpukvk d ek/;e l Nk=kvk dh lkfgfR;d vfHk:fp fodflr gkxhA**

Ø **l'tukRed {kerk dk fodkl** ¼ **fo/kkvk d v/;;u&euu ,o foopu d ek/;e l Nk=kvk e l tukRed {kerk dk mRiUu dh tkrh gA dFkkRed vk/kj Hkfe] fof'k"V y[ku 'kyh] vfHk0;fDr d fofHkUu :ik dk fodkl gkxkA**

Ø **lpkj ek/;ek dh vuq:lk y[ku** ¼ **i=dkfjrk ikB;de d ek/;e l Nk=kvk e oreku tulpkj ek/;ek e lekpkj y[ku] liknu ,o ehfM;k d l)kfrd ,o 0;kogkfjd i{kk dk vfHkKku vkj y[ku {kerk fodflr gkxhA**

- **ufrd eY;k dk fodkl %** lkfgR; d v/;;u d ek/;e l Nk=kvk e ufrd eY;k dk fodkl gkrk gA ekuoh; x.kk d mRd"V Hkkok dk lpj.k gkrk g tk ,d LoLFk lekt d fuek.k dk vk/kkj cuxkA

- **'kk/k iofjr %** dk;de e 'kk/k ifof/k d v/;;u ,o ifj;ktuk dk; d rgr y?k 'kk/k ic/k r;kj dju l 'kk/k dh vk/kkjHkfe dh le> vkj mldh 0;kogkfjd leL;kvk ,o mud lek/kku dk Kku gkxkA

- **jktxkjkUe[krk %** fgUnh jk"VHkk"kk gku d lkFk gh vk/kfud le; e 'k{kf.kd] i'kklfud] tulpkj ek/;ek d vykok fofHkUu {k=k e jktxkj lftr dj jgh gA bld lkFk gh fofHkUu ifr;kxh ijh{kkvk e Hkh fgUnh ek/;e d ifr :fp dh of) gb gA ikB;de d v/;;u l Nk=kvk dk mijkDr {k=k e jktxkjkUe[krk dk ykHk feyxkA

iFke lel=

HIND 407 dFkk lkfgR;

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- miU;kl dyk rFkk dgkuh dyk d eyHkr vrj dk le>u e leFk gk ldxhA
- lkfgR; ,o lekt d vrlc/k dk le>u dh {kerk fodflr dj ldxhA
- miU;kl ,o dgkuh d iBu & ikBu] eY;kdu ,o fo'y"k.k dh vkykpukRed nf"V fodflr dj ldxhA
- fgUnh dFkk & lkfgR; dh fofo/k iofRr;k dk le> ldxh

HIND 403 HkfDrdkyhu dk0;

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- fgUnh lkfgR; d lokf/kd le) dky[k.M ^HkfDrdky* d mn; dh ifjfLFkfr;k ,o mld foLrkj dk vfHkKku gk ldxkA
- e/;;x e fofHkUu lx.k] fux.k /kkjk d fofHkUu lEink;k dh mikluk i)fr;k ,o mud lkfgR; dk vfHkKku gk ldxkA
- ;xhu ifjfLFkfr;k d ifji{; e lkfgfR;d ykdtkxj.k l ifjfpr gk ldxhA
- egkdk0;k ,o [k.Mdk0;k d v/;;u l dk0; fo"k;k] dk0; 'kfy;k d eY;kdu e l{ke gk ldxhA
- ct ,o vo/kh dh lkfgfR;d jpukvk dk ifjp; dj fgUnh Hkk"kk dh fodkl ijEijk dk vfHkKku gk ldxkA

HIND 408 jlfrdkyhu dk0;

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

vif{kr ifj.kke &‘

- **fgUnh lkfgR; d e/;dky dh 0;kid le> fodflr dj ldxhA**
- **bfrgkl d fofHkUu dky&[k.Mk d nkjku lkfgR; e gku oky ifjoruk dk fo’y"k.k dju e leFk gk ldxhA**
- **le;kulkj ifjofrr lkfgfR;d tu:fp dk le>u e leFk gk ldxhA**
- **ctHkk"kk ,o dk0; &’kyh d lkn; dk le> ldxhA**
- **dfo ân; dh ekfedrk ,o mudh eukfLFkfr;k dk le> ldxhA**

HIND 401 vk/kfud dfork ¼Nk;kokn rd½

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

vif{kr ifj.kke &

- **vk/kfud dfork d v/;;u l Hkkjrh; dk0;/kkjk dh li.k foopuk e l{ke gk ldxhA**
- **Nk;kokn dk0; e LFkkfir uohu Hkkock/k ,o ub dk0;’kfy;k l ifjfpr gk ldxhA**
- **fgUnh dk0;/kkjk e ;xhu ifjfLFkfr;k ;Fkk jktuhfrd] lkekftd] vkfFkd] lkLdfrd dkj.kk d fo’y"k.k {kerk dh of) gk ldxhA**
- **jk"Vh; Lok/khurk lxke e lkfgR; dh Hkfedk dk l{e :Ik l foofpr dju d nf"Vdk.k dk fodflr dj ldxhA**
- **Hkkjrh; n’ku vkj fpru dh oreku lnHkk e iklfxdrk dk le> ldxhA**
- **v/;kidh; ,o i’kkldh; lok dh r;kfj;k d fy, Kku vftr dj ldxhA**

HIND 402 vkfndkyhu dk0;

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- fgUnh dk0; d mnHko d dkjdk ,o ifjfLFkfr;k l ifjfpr gk ldxhA
- ikphu dk0; dh ie[k iofÙk;k] dk0; /kkjkvk d vkykpukRed foopu e l{ke gk ldxhA
- ikB;Øe e p;fur jpukvk d 0;k[;kRed fo'y"k.k l lkfgR; dh rn;xhu foopuk dh le> fodflr gk ldxhA
- viHk'k d ikphu 0;kdjf.kd :ik] dk0; 'kfy;k ,o dk0;xr vo/kkj.kkvk l ifjfpr gk ldxhA
- fl) lkfgR;] ukFk lkfgR; ,o jklk lkfgR; dh ie[k jpukvk dk vfHkKku gk ldxkA

f}rh; lel=

HIND 410 fgUnh Hkk"kk ,oa fyfi

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke

- fgUnh Hkk"kk d lkfgR;d fodkl l ifjp; ikIr dj ldxh A
- fgUnh y[ku ,o mPpkj.k e {k=h; iHkkok d Kku l y[ku e l/kkj dj ldxh A
- vk/kfud Hkkjr d fuek.k e Hkk"kk dh Hkfedk l Nk=kvk dk ifjp; gk ik,xkA
- noukxjh d 0;kdjf.kd ,o fyfic) Kku l fgUnh y[ku ,o Hkkf"kd ljpuk e ,d:Ikrk vk ik,xhA
- Hkk"kk vkj fyfi d Kku l Nk=kvk dh li"k.kh;rk dk fodkl gk ik,xkA

HIND 405 Hkk"kk foKku

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke

- Nk=kvk dk Hkkf"kd dk'ky o le> fodflr gk ldxhA
- Hkk"kk oKkfud fl)krk o ekU;rkvk dk le> ldxhA
- Hkk"kk o lekt d lEcUèk e –f"V fodflr dj ldxhA
- llkj dh vU;kU; Hkk"kkvk dh ç—fr o ljpuk l ifjfpr gkxhA
- 'kkèk d fy, Hkk"kk foKku tl u, fo"k;k d p;u e leFk gk ldxhA

HIND 404 Hkkjrh; dk0;'kkL=

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- fgUnh dk0;'kkL= d l)kfrd vk/kkjk rFkk LFkkiukvk l ifjfpr gk ldxhA
- fofHkUu dk0;'kkfL=;k d l)kfrd nf"Vdk.kk dk vfHkKku dj ldxhA
- dk0; ltu dh ifØ;kvk d fu:i.k d Ik'pkr mue y[ku d eyHkr rRok dk vfHkKku gk ldxkA
- dk0;'kkL=h; fl)krk d voykdu e vk/kfud jpukvk d eY;kdu e l{ke gk ldxhA
- uohu vkykpuk i)fr;k dk ikphu leh{kk fl)krk d vkykd e vUo"k.k ,o foopu dh {kerk mRiUu gk ldxhA

HIND 409 'kS/k&ifof/k

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke

- Nk=kvk dk 'kkèk&fo"k;d lokxh.k tkudkjh çkIr gk ldxh ,o lkFk gh vkykspukRed –f"V Hkh ç[kj gk ldxhA
- 'kkèk çfofèk l lkfgR; d vè;;u dh i)fr l ifjfpr gk ldxhA
- ryukRed nf"V fodfl r gk ldxh ,o lkFk gh mudh 'kkèkijd&–f"V Hkh fodfl r gk ldxhA
- ckf)d {ker fodfl r gk ldxhA
- fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gk ldxkA

CS 421 Introduction to Computer Applications

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	3	0	0	3

Learning Outcomes:

On successful completion of the course students will be able to

- Demonstrate knowledge of the computer system.
- Have the ability to define operating system, databases and Network applications.
- Have an understanding of the proper contents of a computer system and these software tools like MS-WORD, MS-EXCELL, MS-Power Point and Corel draw.

CS 421L Introduction to Computer Applications Lab

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	4	2

r'rh; lel=

HIND 503 fgUnh ukVd

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke&

- Nk=kvk e ukVd o jxep d çfr :fp tkxr gkxhA
- Nk=k, fgUnh ukVd o jxep foèkk l ifjfpr gk ldxh A
- ifBr ukVdk d vkèkkj ij ukVd d Øfed cnyr Lo#i l ifjfpr gk ldxh A
- Nk=k, 'kkèk gr uohu {k= dk p;u dj ik;xh rFkk jktxkj gr Hkh fofoèk jxeph; lLFkkuk l tM ldxh A
- Nk=k, viuh ijEijkxr ukV; foèkk l tM ldxhA

HIND 515 fgUnh vkykpuk

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- vkykpuk fo/kk d f'k{k.k l Nk=kvk e lkfgfR;d vknkyuk ,o dfr;k d eY;kdu dh ckf)d {kerk fodflr gk ik,xhA
- jpukvk d lkekftd iHkko ,o lkfgfR;d egRo dk vfHkKku gk ik,xkA
- uohu vkykpuk 'kfy;k dh le> fodflr gk ik,xhA
- ln< ,o Li"V x| y[ku e leFk gk ldxh A

HIND 508 ik'pkR; lkfgR;kykpu

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke&

- ik'pkR; lkfgR;kykpu dh vo/kkj.kkvk dk l)kfrd vfHkKku gk ldxkA
- dk0;'kkL=h; ifrekuk d lkFk gh uohu vkykpuk i)fr;k l ifjfpr gk ldxhA
- fofHkUu ik'pkR; dk0;'kkL=h; vkmkyuk ,o mud lkfgR;xr iHkkok dk vkykpukRed v/;;u dj ldxhA
- lkfgR; jpukvk dh l)kfrd ifrekuk d vk/kkj ij leh{kk dju e le{k gk ldxhA

HIND 502 Nk;kokmkÙkj dfork

	L	T	P	C
Max. Marks : 100				
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- Nk;kokmkRrj dk0;kmkyuk d dkj.kk d foopu l Nk=kvk dh fgUnh lkfgR; d ifji{; e rkfdd ,o ekufld {kerk e of) gk ik,xhA
- Lokr«;kRrj jktuhfrd] lkekftd] lkLdfrd ifjfLFkfr;k dk lkfgR; vkj lekt ij iMu oky iHkkok dk fo'y"k.k dju e l{ke gk ldxhA
- dk0;kmkyuk dh ie[k iofRr;k ,o dfo;k d y[ku l ifjp; ikIr dj ldxhA
- lkfgR; vkj lekt d fo'y"k.k dh l{e fpru nf"V dk fodflr dj ldxhA
- uohu f'kYi ifof/k;k l ifjp; ikIr dj ldxhA
- Hkkjrh; dk0;/kkjk ij iM Ikk'pkR; dk0;kmkyuk d iHkkok dk le>u dh {kerk fodflr dj ldxhA

prFk lel=

HIND 513 dFkrj x| fo/kk,|

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vifkr ifj.kke &

- vkèkfud dFkrj x| foèkkvk d vè;;u l lkfgR; dh lefpr ,oe 0;kid le> fodflr gk ldxhA
- Nk=kvk d ryukRed Kku d fy, lgk;d fl) gkxkA
- ckf)d {kerk dk fodkl gkxkA
- fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gkxkA

HIND 514 fgUnh miU;kl

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vifkr ifj.kke &

- fgUnh miU;kl e ;xhu iHkkok ,o ifjoruk l ifjfpr gk ldxhA
- p;fur miU;kl dkjk d dfrRo ,o jpuk 'kyh dk foopukRed v/;;u dj ldxhA
- ikB;Øe e p;fur miU;kl d ek/;e l ekuoh; pruk ,o fofHkUu lkfgfR;d ljkdkjk dk Kku gk ldxkA
- Lokr«;kÙkj miU;kl e nfyr foe'k] ukjh foe'k d uohu vk;kek dk vfHkKku gk ldxkA
- Nk=kvk dh v/;;u vfHk:fp ,o y[ku dk'ky e ifjfu"Brk vk ldxhA

HIND 509 i=dkfjrk

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke

- i=dkfjrk d {k= e jktxkj dh lHkkoukvk dk [kkt ldxhA
- fgUnh nfud lekpkj i=k e lokrnkrk] fo'k"k lokrnkrk vkj likrd d ink gr ;kX;rk vftr dj ldxhA
- byDVkfud ehfM;k e Qhpj y[ku] lekpkj y[ku] lekpkj okpu vkfn d {k= e {kerk fodflr dj ldxhA
- Lor= i=dkfjrk d x.kk ,o rkfdd {kerk dk fodkl dj ik;xhA
- Lkkef;d ifjfLFkfr;k e ehfM;k dh Hkfedk l voxr gk ldxhA

HIND 507P ifj;kstuk

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	0	0	10	5

vif{kr ifj.kke

- Hkkoh 'kk/k d fy, Nk=kvk dk mfpr tkudkjh fey ldxhA
- 'kk/k&icU/k y[ku d vko';d rRok l ifjfpr gk ldxhA
- jpukvk d vkykpukRed eY;kdu dh iofRr fodflr gk ldxhA
- i= o vky[k y[ku rFkk iLrfrdj.k dh 'kyh l ifjfpr gk ldxhA

fo"k;k/kkfjr p;fur ikB;dze leg

HIND 517 iokl lkfgR;

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke &

- Ikokl fgUnh lkfgR; dh vo/kkj.kk l ifjfpr gk ldxhA
- Hkkjr d fofHkUu n'kk l ifri{kh; lkfgfR;d lc/kk dk tku ldxhA
- fxjfefV;k etnjk d :Ik e Hkkjrof'k;k d of'od bfrgkl dk vfHkKku gk ik,xkA

- fon'kk dh lLdfr d Hkkjrh; lLdfr l feyu d vrlc/k dk igpku ldxhA
- fgUnh Hkk"kk ,o lkfgR; d of'od ifji{; ,o mld foLrkj l ifjfpr gk ldxhA

HIND 510 fof'k"V jpukdkj ¼ikepUn

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

vif{kr ifj.kke

- dFkkdkj çepUn d fucUèkdkj o i=dkj :i l ifjfpr gk ldxh A
- l tukRed y[ku o i=dkfjrk e #fp j[ku okyh Nk=k, ikB;Øe l ykHkkfUor gk ldxhA
- dkb Hkh lkfgR;dkj dkyt;h fdu vFkk e curk g] çepn lkfgR; d vè;;u l bl le> ldxhA
- çepn u lÙkk o lkerk dh feyh Hkxr dk igpkuk rFkk turk dh rdyhQk dk Hkh ok.kh nh] bl vFk e Hkh o lkfgR;dkj d nkf;Ro dk le> ldxhA

HIND 512 fof'k"V jpukdkj ¼lq;kdkUr f=ikBh ^fujkyk*

Max. Marks : 100	**L**	**T**	**P**	**C**
(CA: 40 + ESA: 60)	**5**	**0**	**0**	**5**

vif{kr ifj.kke

- Nk=k, dfo fujkyk d lkfgfR;d 0;fäRo d vU; i{kk l ifjfpr gk ldxhA
- lkfgR;dkj dh lonuk o nkf;Ro dk le> ldxh A
- Nk=k, fujkyk d lkfgfR;d vonku l ifjfpr gk ldxh A
- Nk;kokn dh mnHkodkyhu fLFkfr;k o lkfgfR;d çofÙk;k l ifjfpr gk ldxhA
- 'kk/k gr fujkyk lkfgR; d vU;kU; i{kk dh tkudkjh ikIr dj ldxhA

HIND 511 fof'k"V jpukdkj ¼ ljnkl

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke

- Nk=k, ljnkl d dk0; dh fofoèk çofr;k l ifjfpr gk ldxhA
- fl)kj ukFkk o fux.kokfn;k d [k.Mu&eMu oknh –f"Vdk.k d eè; Nk=k, ljnkl dh çekHkfä o Hkejxhr d egRo dk le> ldxhA
- Nk=k, Hkfädkyhu fofoèk lkfgfR;d lUnHkk dk le> ldxhA
- Nk=k, —".kHkfä 'kk[kk d ykdoknh Lo:i l ifjfpr gk ldxhA
- Hkfädky dk le>u dh uohu –f"V Nk=kvk e fodflr gk ldxhA

HIND 501 Hkkjrh; lkfgR;

Max. Marks : 100	L	T	P	C
(CA: 40 + ESA: 60)	5	0	0	5

vif{kr ifj.kke –

- Nk=k, fofo/k Hkk"kkvk e fyf[kr lkfgR; l ifjfpr gk ldxhA
- Hkkjrh; lkfgR; d vè;;u l ryukRed nf"V fodflr dj ldxhA
- 'kkèkijd &–f"V fodflr dj ldxhA
- fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gkxkA

Lok/;k;k/kkfjr p;fur ikB;de leg

HIND 518R lkfgR; vkj fluek

Max. Marks : 100	L	T	P	C
	0	0	0	2

vif{kr ifj.kke &

- fluek d tuki;kxh i{k l ifjfpr gkxhA
- fluek e lkfgR; dh iHkkoh Hkfedk dk le> ldxhA
- fgUnh lkfgR; dh ie[k jpukvk ij vk/kkfjr fQYek d ek/;e l ikBd vkj n'kd d :Ik e iMu oky nkgj iHkko d fo'y"k.k e l{ke gkxhA

- ie[k lkfgR;dkjk vkj fun'kdk d ltu vkj fuek.k dh ifd;k dk v/;;u dj ldxhA

HIND 519R lkfgR; vkj Hkkjrh; lLdfr

Max. Marks : 100	L	T	P	C
	0	0	0	2

vif{kr ifj.kke &

- Hkkjrh; lLdfr dh 0;kid ijEijk dk Kku gk ldxkA
- lkfgR; o lLdfr d vUr%lEcU/kk dk le> ldxhA
- lLdfr l tM fo"k;k l v/;;u fo'kn o 0;kid gk ldxkA
- ekuoh; eY;k d fodkl e lgk;d gk ldxkA

HIND 520R vkRedFkk] thouh ,oa Mk;jh

Max. Marks : 100	L	T	P	C
	0	0	0	2

vif{kr ifj.kke –

- bl ikBîØe d }kjk Nk=kvk dh vkykpukRed –f"V ç[kj gkxhA
- vkèkfud dFkrj x| foèkk, d vè;;u l lkfgR; dh le> fodflr gkxhA
- Nk=kvk d ryukRed Kku d fy, lgk;d gkxkA mudh 'kkèkijd&–f"V fodflr gku e enn feyxhA
- ckf)d {kerk dk fodkl gkxkA
- fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gkxkA

HIND 521R vufnr lkfgR;

Max. Marks : 100

L	T	P	C
0	0	0	2

vif{kr ifj.kke &

- **bl ikBîØe d }kjk Nk=kvk dk Hkkjrh; vufnr lkfgR; o dk0; d fo"k; e lokxh.k tkudkjh çkIr gkxhA**
- **Hkkjrh; lkfgR; dk vè;;u Nk=kvk d ryukRed Kku d fy, lgk;d fl) gkxk**
- **Nk=kvk dh 'kkèkijd&–f"V fodflr gku e enn feyxhA**
- **ckf)d {kerk dk fodkl gkxkA**
- **fofHkUu çfr;kxh ijh{kkvk d fy, Hkh ;g vR;r ykHknk;d fl) gkxkA**