

**NATIONAL COLLEGE (Autonomous)**  
**POST GRADUATE AND RESEARCH DEPARTMENT OF ZOOLOGY**  
**B.Sc.,Zoology - Programmes Structure under CBCS**  
(For Candidates to be admitted from the academic year **2016** onwards)

Practical Examinations will be in the even semester. There will be an oral test for all Practical Examinations and Communicative English Courses. The Oral test will carry 5 marks in the external component. Int= internal, Extension activities=NCC, NSS, Red Ribbon Club, etc. programs offered by the College, Inst Hours= instruction hours, Sem = semester.

**FIRST – YEAR**

Sem	Part	Course	Course Title	Inst. Hrs/ Week	Credits	Exam Hours	Marks			Total
							Int	External		
								W	O	
SEMESTER - I	I	Language Course- U16T1/U16H1/U16S1	Tamil/Hindi/Sanskrit	6	3	3	25	75	-	100
	II	English – I (U16E1)	English	6	3	3	25	75	-	100
	III	Core Course-I (U16ZY1)	Faunal Diversity-Invertebrates	5	5	3	25	75	-	100
		Core Course-II (U16ZY2P)	<b>Practical – I</b> (Faunal Diversity –Invertebrata, Faunal Diversity-Chordates)	3	-	*	-	-	-	-
		First Allied Course – I (U16IACH1)	Chemistry	5	3	3	25	75	-	100
		First Allied Course – II (U16IACH2P)	<b>Practical –(Chemistry)</b>	3	-	*	-	-	-	-
	IV	Environmental Studies Course (U16ES)	Environmental Studies	2	2	3	25	75	-	100
		<b>Total</b>		<b>30</b>	<b>16</b>					<b>500</b>
SEMESTER - II	I	Language Course- U16T2/U16H2/U16S2	Tamil	6	3	3	25	75	-	100
	II	English –(U16E2)	English	4	2	3	25	75	-	100
		Communicative English Course –(U16CE1)		2	1	3	25	70	5	100
	III	First Allied Course –(U16ACH2P)	<b>Practical –(Chemistry)</b>	3	3	3	25	70	5	100
			<b>Practical – I</b> (Faunal Diversity –Invertebrata, Faunal Diversity-Chordates)	3	6	3	25	70	5	100
		Core Course –(U16ZY2P)								
		Core Course-(U16ZY3)	Faunal Diversity-Chordata	5	5	3	25	75	-	100
		First Allied Course –(U16ACH3)	Chemistry	5	3	3	25	75	-	100
	Skill Based Elective course-I (U16SBE1)	Office Automation	2	2	3	25	75	-	100	
		<b>Total</b>		<b>30</b>	<b>25</b>					<b>800</b>

**SECOND – YEAR**

Sem	Part	Course	Course Title	Inst. Hrs/Week	Credits	Exam Hours	Marks			Total
							Int	External		
								W	O	
III	I	Language Course- U16T3/U16H3/U16S3	Tamil	6	3	3	25	75	-	100
	II	English- (U16E3)	English	6	3	3	25	75	-	100
	III	Core Course-(U16ZY4)	Cell Biology	4	4	3	25	75	-	100
		Core Course – V (U16ZY5P)	<b>Practical – II</b> (Cell Biology, Physiology and Biochemistry)	3	-	*	-	-	-	
		Second Allied Course- I (U162AZY1)	Biology of Invertebrates and Chordates (for Botany students)	4	3	3	25	75	-	100
		Second Allied Course-II (U16AZY2P)	<b>Practical-</b> Pertaining to 2AC1 & 2AC3 for Botany Students	3	-	-	-	-	-	
	IV	Skill based Elective course-II (U16SBE2)	<b>DTP</b>	2	2	3	25	75	-	100
		Skill based Elective course-III (U16SBE3P)	<b>Practical</b>	2	2	3	25	75	-	100
		<b>Total</b>		<b>30</b>	<b>17</b>					<b>600</b>
IV	I	Language Course- U16T4/U16H4/U16S4	Tamil	6	3	3	25	75	-	100
	II	English Language Course – (U16E4)	English	4	2	3	25	75	-	100
		Communicative English course – (U16CE2)	Communicative English	2	1	3	25	70	5	100
	III	Core Course – (U16ZY5P)	<b>Practical – II</b> (Cell Biology, Physiology and Biochemistry)	3	5	3	25	70	5	100
		Core Course- (U16ZY6)	Physiology and Biochemistry	4	4	3	25	75		100
		Second Allied Course –(U16AZY2P)	<b>Practical -</b> (Pertaining to 2AC1 & 2AC3)	3	3	3	25	70	5	100
		Second Allied Course – (U16AZY3)	Economic Zoology (for Botany students)	5	3	3	25	75	-	100
	IV	Non Major Elective course-I (U16NMZYI)	Communicable Diseases	2	2	3	25	75	-	100
		Value Education course (U16VE)	Value Education	1	2	3	25	75	-	100
		<b>Total</b>		<b>30</b>	<b>25</b>					<b>900</b>

**THIRD – YEAR**

Sem	Part	Course	Course Title	Inst. Hrs/ Week	Credits	Exam Hours	Marks			Total
							Int	External		
								W	O	
V	III	Core Course- (U16ZY7)	Developmental Biology and Immunology	5	5	3	25	75	-	100
		Core Course -(U16ZY8)	Microbiology and Bio technology	5	5	3	25	75	-	100
		Major Based Elective course – (U16ZY9E)	Economic Entomology	5	4	3	25	75	-	100
		Major Based Elective course – (U16ZY10E)	Aquaculture	5	4	3	25	75	-	100
		Core Course –(U16ZY11P)	<b>Practical – III</b> pertaining to Core Courses 7 and 8 (Developmental Biology and Immunology, Microbiology and Biotechnology)	3	-	*	-	-	-	-
		Core Course- (U16ZY12P)	<b>Practical – IV</b> pertaining to Core Courses 13,14 and 15 (Genetics and Evolution, Environmental Biology and Management, Biophysics and Biostatistics)	3	-	*	-	-	-	-
	IV	Non Major Elective course- (U16NMZY2)	Vermiculture	2	2	3	25	75	-	100
		U16SS	Soft skill	2	2		25	75		100
			<b>Total</b>	<b>30</b>	<b>22</b>					<b>600</b>
VI	III	Core Course –(U16ZY11P)	<b>Practical – III</b> pertaining to Core Courses 7 and 8	3	5	3	25	70	5	100
		Core Course- –(U16ZY12P)	<b>Practical – IV</b> pertaining to Core Courses 13,14 and 15	3	6	3	25	70	5	100
		Core Course- –(U16ZY13)	Genetics and Evolution	6	6	3	25	75	-	100
		Core Course--(U16ZY14)	Environmental Biology and Management	6	6	3	25	75	-	100
		Core Course--(U16ZY15)	Biophysics and Biostatistics	6	6	3	25	75	-	100
		Major Based Elective (U16ZY16E)	Wildlife Biology and Nanobiology	5	4	3	25	75	-	100
	V	Gender Studies Course –(U16GS)	Gender Studies	1	1	3	25	75	-	100
			<b>Extension Activities</b>	-	1	-	-	-	-	-
		<b>Total</b>	<b>30</b>	<b>35</b>					<b>700</b>	
		<b>Grand Total</b>	<b>180</b>	<b>140</b>					<b>4100</b>	

# jkpoha;Tj;Jiw> Njrpaf;fy;Y}up (jd;dhl;rp)> jpUr;rpuhg;gs;sp – 1.

## Kjw; gUtk;

jhs;; nkhopg;ghlk; - 1 nra;As; (,f;fhyk;)> ciueil> rpWfij> ,yf;fpatuyhW

U16T1

fw;gpf;Fk; fhyk;; 6 kzp

jug;Gs;spfs;; 3

**myF 1:** ghujpahu; - guk;ngHUs; tho;j;J  
ghujpjhrd; - ePq;fNs nrhy;Yq;fs;  
ftpkzp - Nfhpty; topghL  
gl;Lf;Nfhl;ilahu; - xz;zhapUf;fZk; mz;zhr;rp  
ehkf;fy;yhu; - Rje;jpuk; ahJ?

**myF 2:** fz;zjhrd; - Ntz;Lk; Ntz;Lk;  
thyp - Gd;dif kd;dd;  
ituKj;J - ghujp epidf;fg;gLfpwhd;  
K.Nkj;jh - RtUk; ge;Jk;  
mg;Jy; uFkhd; - jtwhd vz;

**myF 3: ciueil:**

1. guk;giuf;Fzk; - c.Nt.rh
2. fy;tp - aho;g;ghzk; nghd;dk;gyg;gps;is
3. ,yf;fpaKk; r%fKk; - v;].itahGupg;gps;is
4. fiyAk; fw;gidAk; - uh.gp.NrJg;gps;is
5. Fws; fhl;Lk; newp - fp.M.ng.tpRtehjk;
6. ,aw;iff; fhl;rpfs; - fp.th.[fe;ehjd;
7. rka ,yf;fpaq;fspy; mwnewp - Fd;wf;Fb mbfshu;

**myF 4: rpWfij:**

1. je;ijAk; kfDk; - fy;fp
2. flTSk; fe;jrhkpg;gps;isAk; - GJikg;gpj;jd;
3. ePjppgp tf;fPyhdhu; - mz;zhJiu
4. Kjy;gpby; - e.gpr;r%u;j;jp
5. fhfpj cwT - R.rKj;jpuk;
6. kNdhghtk; - ty;ypfz;zd;
7. kdpjae;jpuk; - tpe;jd;
8. gr;irf;fdT - yh.r. uhkhkpu;jk;

myF 5: ty;ypdk; kpFk; ,lq;fs;> ty;ypdk; kpfh ,lq;fs;  
,yf;fpa tuyhW (trdftpij> GJf;ftpij> ciueil> rpWfij kl;Lk;)

ghIE}y;; jkpo; - Kjw;gUtk; - Njrpaf;fy;Y}up ntspaPL

,yf;fpatuyhW - Njrpaf;fy;Y}up ntspaPL

**jkpoha;Tj;Jiw> Njrpfaf;fy;Y}up (jd;dhl;rp)> jpUr;rpuhg;gs;sp – 1.  
,uz;lhk; gUtk;**

**jhs;; nkhopg;ghlk; - 2 nra;As; (gf;jp> mw ,yf;fpaq;fs;)> Gjpdk;> ,yf;fpa tuyhW.**

**U16T2**

**fw;gpf;Fk; fhyk;; 6 kzp**

**jug;Gs;spfs;; 3**

**myF 1:** jpUQhdrk;ge;ju; - jpUthidf;fh gjpfk; - kioahu; kplwhkO thSilaha;..

jpUehTf;furu; - tplk; jPu;j;j gjpfk; - xd;W nfhyhk; mtu; rpe;ijAau;tiu

ngupaho;thu; - jpUtug;fk; ghRuk; 2 - kutbiaj; jk;gpf;F

FyNrfuu; - tpj;Jtf; Nfhl;L mk;khid Ntz;b epw;wy; - jUJauk;...10

**myF 2:** ts;syhu; - jpUtUl;gh - ngwhg;NgW - Mth vd;wid Ml;nfhz;IUsp..10

jhAkhdtu; - gd;khly - gd;khly jpuspUf;f...9

,NaRfhtpak; - ctik top nra;jp - flNyhuk; xUehs; VR epd;whu;..

Fzq;Fb k];jhd; - epuhkaf;fz;zp – 1-25 fz;zpfs;

**myF 3:** ehd;kzpf;fbif; (ghly; vz;fs;; 6> 10> 12> 16> 31> 38> 45> 56> 69> 75)

ehybahu;; (ghly; vz;fs;; 2> 29> 35> 77> 95> 109> 114> 172> 248> 269)

rpWgQ;r%yk;; (ghly; vz;fs;; 9> 12> 16> 26> 32> 39> 63> 82> 85> 90)

,dpait ehw;gJ: Kjy; gj;J ghly;fs;.

**myF 4:** Gjpdk; - fd;dpfh - uFehjd; Jiw ntspaPL

**myF 5:** ,yf;fpa tuyhW (irtk;;>itztk;>rkzk;>ngsj;jk;>fpwpj;Jtk;> Kfkjpak;

kw;Wk; Gjpdk; gw;wpad kl;Lk;)

**ghIE}y;;** jkpo; - ,uz;lhk;gUtk; - Njrpfaf;fy;Y}up ntspaPL.

fd;dpfh - rPij gjpg;gf ntspaPL> nrd;id.

,yf;fpatuyhW - Njrpfaf;fy;Y}up ntspaPL.

**jkpoha;Tj;Jiw> Njrpa;fy;Y}up (jd;dhl;rp)> jpUr;rpuhg;gs;sp – 1.**

**%d;whk; gUtk;**

**jhs;; nkhopg;ghlk; - 3 nra;As; (fhg;gpak;)> ehlfk;> ,yf;fpatuyhW**

**U16T3**

**fw;gpf;Fk; fhyk;; 6 kzp**

**jug;Gs;spfs;; 3**

**myF 1:** rpyg;gjpfhuk; - ePu;g;gil fhij

kzpNkfiy - ghj;jpuk; ngw;w fhij

**myF 2:** fk;guhkhazk; - Aj;j fhz;lk; - ,e;jpurpj;J tijg;glyk;

ngupaGuhzk; - fz;zg;g ehadhu; Guhzk;

**myF 3:** Njk;ghtzp - tsd; rdpi;j glyk;

rPwhg;Guhzk; - khDf;Fg; gpiz epd;w glyk;

ghQ;rhyp rgjk; - #jhl;lr; rUf;fk;

**myF 4:** ehlfk;; xj;jpif – m. ,uhkrhkp (vd;rpgpvr;. ntspaPL)

**myF 5:** ,yf;fpa tuyhW (fhg;gpak;> Guhzk;> ehlfk; gw;wpad kl;Lk;)

ghIE}y;; jkpo; - %d;whk;gUtk; - Njrpa;fy;Y}up ntspaPL.

xj;jpif – m. ,uhkrhkp (vd;rpgpvr;. ntspaPL)

,yf;fpatuyhW - Njrpa;fy;Y}up ntspaPL.

**jkpoha;Tj;Jiw> Njrpa;fy;Y}up (jd;dhl;rp)> jpUr;ruphg;gs;sp - 1.**

**ehd;fhk; gUtk;**

**jhs;; nkhopg;ghlk; - 4 nra;As; (gz;ila ,yf;fpak;> ,yf;fpatuyhW> nkhopngau;g;G)**

**U16T4**

**fw;gpf;Fk; fhyk;; 6 kzp**

**jug;Gs;spfs;; 3**

**myF 1:**

ew;wpiz:

1. Ntu; gpzp ntjpuj;J - ghy - ,sq;fPudhu;
2. rpyUk; gyUk; filf;fz; - nea;jy; - cNyhr;rdhu;
3. mupfhy; khwpa mk; fz; - kUjk; kpisf;fpohd;ey;Ntl;ldhu;
4. ,iy ,y gpltk;-Ky;iy - tpopf;fl;Ngijg; ngUq;fz;zdh;
5. Gjy;td; <d;w G+q;fz; - FwpQ;rp

FWe;njhif :

1. nfhq;F Nju; tho;f;if - FwpQ;rp - ,iwadhu;
2. ,bf;Fq; Nfspu; - FwpQ;rp - nts;sptPjpahu;
3. ahuzq;Fw;wid flNy - nea;jy; - mk;%tdhu;
4. khup ahk;gyd;d - nea;jy; - Fd;wpadhu;
5. ckzu; Nru;e;J fope;j kUq;fpd; - ghy - ngUq;fLq;Nfh
6. Mlik GiuAk; - ghy - XNuUotdhu;
7. Kspjapu; gpire;j - Ky;iy - \$IY}u; fpohu;
8. ,sik ghuhu; - Ky;iy - xf;\$u; khrrhj;jpahu;
9. Ntk;gpd; igq;fha; - kUjk; - kpisf;fe;jdhu;

**myF 2:**

mfehD}W:

1. gid;jpus; md;d - FwpQ;rp - guzu;
2. girgL gr;ir - Ky;iy - kJiu ks;sdhu;
3. ,k;ik cyfj;J ,irnahLk; - kUjk; - nry;Y}u;f;Nfhrpfd;
4. jpiucoe;J mir,a - nea;jy; - cNyhr;rdhu;
5. mspepiy nghwhmJ mkupa - ghy - ngUq;fLq;Nfh

fypj;njhif:

1. Rlu;j;njhB, Nfsha; - FwpQ;rp
2. fhu; Mug; nga;j fb nfhs; - Ky;iy
3. tPq;F ePu; mtpo; ePyk; gfu;tu; - kUjk;
4. khkyu; Kz;lfk; - nea;jy;
5. mupjha mwnda;jp - ghy

**myF 3:**

GwehD}W :

1. xUehl; nry;yyk; - ghlhz; - xsitahu;
2. gilg;Gg;gy gilj;J - nghJtpay; - mwpTilek;gp
3. ,isNahu; #lhu; - nghJtpay; - Flthapy; fPuj;jdhu;
4. gy;;rhd;wPNu - nghJtpay; - eupnt&cj; jiyahu;
5. fha;ney; mWj;Jf;ftsq; nfhsNd - ghlhz; - gprpuhe;ijahu;

jpUf;Fws;:

1. mwd; typAW;jjy;> 2.gz;Gilik> 3. xOf;fKilik>
4. tha;ik> 5. Co;> 6.nrhy;td;ik

**myF 4:** Ky;iyg;ghl;L KOikAk;

**myF 5:** ,yf;fpatuyhW (gjpndz; Nkw;fzf;F> fPo;f;fzf;F)> nkhopngau;g;G>  
nghJf;fl;Liu

**ghIE}y;:** 1. jkpo; - ehd;fhk;gUtk; - Njrpaf;fy;Y}up ntspaPL.

2. ,yf;fpatuyhW - Njrpaf;fy;Y}up ntspaPL.

**U16H1**

Semester – I

**PAPER 1 – PROSE, SHORT STORY AND GRAMMAR**

**PROSE**

**Prescribed Text Book**

INDI GADYA PRABHAKAR, Ed. Dr. Hiranma Shiksha Bharathi, shmiri Gate, Delhi-06.

**Prescribed Lessons**

- |                                    |    |                       |
|------------------------------------|----|-----------------------|
| 1. Bharat Eke hay                  | By | Ramdhari Singh Dinkar |
| 2. Japan Mein kaya dekka           | By | Premchand             |
| 3. Jeevan ke theen pradhan baathey | By | Acharya Vinobabavey   |

**SHORT STORY**

**Prescribed Text Book**

KAHANI VIVDHA, V. Mahadeven, Trichy.

**Prescribed Lessons**

- |                  |    |                           |
|------------------|----|---------------------------|
| 1. Idhaah        | By | Premchand                 |
| 2. Usne kaha tha | By | chandradhar Sharma guleri |

**GRAMMER**

Prescribed Portion



1. Noun
2. Verb
3. Gender (Change the gender only)
4. Number (Change the number only)
5. Aarth and Ultey Sabdh Likeye

### **Reference Book**

VYAKARANPRADEEP

By Ramdev, Saraswathi Prakashan, Varansi

**UNITISED SYLLABUS**  
**PAPER 1 – PROSE, SHORT STORY AND GRAMMAR**

Semester – I  
Time 3 Hrs

Max Marks 75

**UNIT- 1**

- 1.Noun
- 2.Bharath Eke Hai
- 3.Gender

**UNIT- 2**

- 1.Gender
- 2.Idhgaah
- 3.Jaapan mein kya dheka

**UNIT- 3**

- 1.Jeevan ke theyeen pradhan bhathey
- 2.Idhgaah
3. Number

**UNIT-4**

- 1.Ling Badhaliye, Vachan Badhaliye
2. Verb
- 3.Aarth (Meanings) Likeye

**UNIT-5**

- 1.Aarth (Meanings) Likeye
- 2.Ultey Sabdh (opposite) Likeye

## QUESTION PAPER PATTERN

### SECTION- A (20 Marks)

- I 1. Change the Gender (Ling) **10/12** (10Marks)  
2. Change the Number (Vachen) **10/12**

### SECTION- B (25 Marks)

#### II. One Question from each unit (either or)

- |    |                  |              |         |
|----|------------------|--------------|---------|
| 1. | From Prose       | (1 out of 2) | 5 Marks |
| 2. | From Short story | (1 out of 2) | 5 Marks |
| 3. | From Grammar     | (1 out of 2) | 5 Marks |
| 4. | Meanings 5 nos   | (Either or)  | 5 Marks |
| 5. | Opposites 5 nos  | (Either or)  | 5 Marks |

### SECTION- C (3x10=30 Marks)

#### III. One Question from each unit (**Three out of five**)

- 1. From Prose**
2. From Prose
3. From Short Story
4. From Grammar
5. From Grammar

## Semester – II

## PAPER II – COMPREHENSION, DRAMA, GRAMMAR-II, GENERAL ESSAY AND TRANSLATION – I

**COMPREHENSION** : General Paragraph from Anuvadh  
Abyas Bah – 3, Dakshina Bharath Hindi  
Prachar Sabha, Chennai – 17.

**DRAMA**

:  
**Prescribed Text Book** : Subodh Hindi patamala – 2  
Dakshina Bharath Hindi  
Prachar Sabha, Chennai – 17.

**Prescribed Portion** : **APPOORVA THYAG**  
By Balashori Reddy

**GRAMMAR – II**

**Prescribed Portion** : 1. Pronoun  
2. Adjectives  
3. Adverb  
4. Case Endings  
(Definition and Name of types only)  
5. Paryaivachaye Sabdh

**Reference Book** : **VYAKARANPRADEEP**  
By Ramdev, Saraswathi Prakashan, Varansi

**GENERAL ESSAY**

**Prescribed Book** : **Subodh Hindi Rachna – 2**  
**Dakshina Bharath Hindi**  
**Prachar Sabha, Chennai – 17**

**Prescribed Portions** : 1. Priya Theohar  
2. Gaayi  
3. Samachar pathra

**TRANSLATION -1**

**Prescribed Book** : **Anuvadh Abyas Bah – 1,1 to 10 lessons**  
**Dakshina Bharath Hindi**  
**Prachar Sabha, Chennai – 17**

**Prescribed Portions** : 1 to 10 Lessons

**UNITISED SYLLABUS**  
**PAPER II – COMPREHENSION, DRAMA, GRAMMAR-II, GENERAL ESSAY AND**  
**TRANSLATION – I**

Semester – II  
Time 3 Hrs

Max Marks 75

**UNIT- 1**

Comprehension  
Aproova Thyag  
Pronoun  
Translation 1,2

**UNIT- 2**

Comprehension  
Aproova Thyag  
Adjectives  
Translation 3,4

**UNIT- 3**

Comprehension  
Priya Theohar  
Adverb  
Translation 5,6

**UNIT-4**

Comprehension  
Gaayi  
Case Endings  
Translation 7,8

**UNIT-5**

Comprehension  
Samachar pathra  
Paryavachaye Sabdh  
Translation 9,10

## QUESTION PAPER PATTERN

### SECTION- A (20 Marks)

#### I . Answer all the Questions:

- (a) Write Same meaning (Paryavachi) 10 x 1 = 10  
(Each word two meaning must) – 10/12
- (b) Answer in one sentence (Any 5) 5 x 2 = 10

### SECTION- B (25 Marks)

#### II. One Question from each unit (either or)

- |                                   |              |         |
|-----------------------------------|--------------|---------|
| 1. From Drama                     | (1 out of 2) | 5 Marks |
| 2. From Grammar                   | (1 out of 2) | 5 Marks |
| 3. From Grammar                   | (1 out of 2) | 5 Marks |
| 4. Translation (Hindi to English) | (Either or)  | 5 Marks |
| 5. Translation (English to Hindi) | (Either or)  | 5 Marks |

### SECTION- C (3x10=30 Marks)

#### III. One Question from each unit (Three out of five)

1. From General Essay
2. From General Essay
3. From Grammar
4. From Grammar
5. Comprehension

**SEMESTER – III**  
**PAPER III – MODERN AND MEDIEVAL POETRY, DIALOGUE WRITING AND**  
**TRANSLATION – II**

**1. POETRY**

**Book Name** : 1. KAVYA SAURABH  
2. SUBODH HINDI – 2  
Pub. Dakshina B. Hindi P.Sabha  
Chennai.

**Prescribed Lessons** : 1. Samaya  
2. Chhah

1.Kabir key Dhohay 1to 5  
2.Thulsi key Dhohay 1to 5  
3.Rahim key Dhohay 1 to 5

**2. DIALOGUE WRITING** : 1. Doctor Aur Marij  
2. Kithab key Dhukhan  
3.Pariksha key Bharey Mein

**3. TRANSLATION - II**

**Prescribed Book** : Anuvadh Aabyas Bah – 1,  
Dakshina Bharath Hindi  
Prachar Sabha, Chennai – 17

**Prescribed Portions** : 11 to 20 Lessons

**UNITISED SYLLABUS**  
**PAPER III – MODERN AND MEDIEVAL POETRY, DIALOGUE WRITING AND**  
**TRANSLATION – II**

Semester – III  
Time 3 Hrs

Max Marks 75

**UNIT- 1**

Samya  
Kabir key Dhohay  
Translation 11, 12

**UNIT- 2**

Chhah  
Thulsi key Dhohay  
Translation 13, 14

**UNIT- 3**

Rahim key Dhohay  
Dialogue – Doctor Aur Marij  
Translation 15, 16

**UNIT-4**

Dialogue – Kithab key Dhukan  
Poetry Review  
Translation 17, 18

**UNIT-5**

Dialogue – Parisha key Bharey mein  
Translation 19,20



## QUESTION PAPER PATTERN

### SECTION- A (20 Marks)

I . Answer in one sentence

10 x 2 = 20 Marks

### SECTION- B (25 Marks)

II. One Question from each unit (either or)

1. Annotation from modern poetry (1 out of 2) 5 Marks
2. Annotation from modern poetry (1 out of 2) 5 Marks
3. Short Notes from Poetry (1 out of 2) 5 Marks
4. Translation (Hindi to English) (Either or) 5 Marks
5. Translation (English to Hindi) (Either or) 5 Marks

### SECTION- C (3x10=30 Marks)

III. One Question from each unit (Three out of five)

1. Summary of Modern Poetry
2. Summary of Medieval Poetry
3. Summary of Medieval Poetry
4. Dialogue Writing
5. Dialogue Writing

**SEMESTER - IV**  
**PAPER IV – FUNCTIONAL HINDI, GENERAL ESSAY, GRAMMAR – III AND**  
**TRANSLATION – III**

**1. LETTER WRITING**

<b>Prescribed Book</b>	<b>:</b>	<b>Abinav Patralekhan Hindi Parchar Sabha Chennai.</b>
<b>Prescribed Portion</b>	<b>:</b>	<b>1. Leave Letter 2. Placing Order for Books 3. Complaints Letter 4. Permission Letter for Tour</b>

**2. TECHNICAL TERMS**

<b>Prescribed Book</b>	<b>:</b>	<b>Hindi Vatayan, by Dr.Chandra Mohan Vishavidyalay Prakashan, Varansi.</b>
<b>Prescribed Portion</b>	<b>:</b>	<b>Annexure enclosed</b>

**3. GENERAL ESSAY**

<b>Prescribed Book Hindi</b>	<b>:</b>	<b>Nibandh Praveshika, Dakshina Bharath Prachar Sabha, Chennai – 17</b>
<b>Prescribed Portions</b>	<b>:</b>	<b>1. Pushthakalaya 2. Pradhusan 3. Vidhyarthi Jeevan</b>

**4. GRAMMAR – II**

<b>Prescribed Portions</b>	<b>:</b>	<b>1. Tense (Kal parivarthan) 2. Correct the Sentence (Sudha Keyjiye)</b>
<b>Reference Book</b>	<b>:</b>	<b>Vyakaranpradeep, by Ramdev, Saraswathi Prakashan, Varansi.</b>

**5. TRANSLATION – III**

<b>Prescribed Book</b>	<b>:</b>	<b>Anuvadh Abyas Bah – 2, Dakshina Bharath Hindi Prachar Sabha, Chennai – 17</b>
<b>Prescribed Portions :</b>	<b>:</b>	<b>1 to 10 Lessons</b>

**UNITISED SYLLABUS**  
**PAPER IV – FUNCTIONAL HINDI, GENERAL ESSAY, GRAMMAR – III AND**  
**TRANSLATION – III**

Semester – IV  
Time 3 Hrs

Max Marks 75

**UNIT- 1**

Leave Letter  
Technical Terms  
Pushthakalaya  
Translation 1,2

**UNIT- 2**

Placing Order for Books  
Technical Terms  
Pradhusan  
Translation 3,4

**UNIT- 3**

Compliant Letter  
Vidhyarthi Jeevan  
Technical Phrases  
Translation 5,6

**UNIT-4**

Permission Letter for Tour  
Technical Phrases  
Kal Parivarthan (Change the Tense)  
Translation 7,8

**UNIT-5**

Kal Parivarthan (Change the Tense)  
Sudha Keyjiye ( Correct the Sentence)  
Translation 9,10

## QUESTION PAPER PATTERN

### SECTION- A (20 Marks)

I . Answer all the Questions:

10x2 = 20 Marks

Write 10 Technical Terms in Hindi 10/12 (Only Designation)

### SECTION- B (25 Marks)

II. One Question from each unit (either or)

- |   |              |         |
|---|--------------|---------|
| 1. Change the Tense                           | (5 out of 7) | 5 Marks |
| 2. Correct the Sentence                       | (5 out of 7) | 5 Marks |
| 3. Technical Phrases (English to Hindi) 5 nos | (Either or)  | 5 Marks |
| 4. Technical Phrases (Hindi to English) 5 nos | (Either or)  | 5 Marks |
| 5. Translation (Hindi to English)             | (Either or)  | 5 Marks |

### SECTION- C (3x10=30 Marks)

III. One Question from each unit (Three out of five)

1. From General Essay
2. From General Essay
3. From Letter Writing
4. From Letter writing
5. Translation (10nos) English to Hindi

National College (Autonomous) Tiruchirapalli  
Language Programme Part I Sanskrit Semester I  
Paper I - Sanskrit - I

(For the students admitted from the the academic year June 2016 onwards)

Time: 3 Hours

Maximum Marks: 75

Unit I

देवनागरी लिपि: - परिचयः

- १। स्वराः (१५)
- २। व्यञ्जनानि (३३)
- ३। संयुक्ताक्षराणि
- ४। संयुक्ताक्षराणां लेखनप्रकारः
- ५। विसर्गस्य प्रयोगः तस्य उच्चारणप्रकारश्च।

Unit II

कर्तृपदानि - परिचयः

- १। अकारान्त-शब्दाः (पुंलिङ्गः)  
देवः
- २। अकारान्त-शब्दाः (नपुंसकलिङ्गः)  
फलम्
- ३। लिङ्गाः - सामान्यविधिः  
अ। पुंलिङ्गः  
आ। स्त्रीलिङ्गः  
इ। नपुंसकलिङ्गः
- ४। लिङ्गः वचनम् विभक्तिः च  
केवलम् एकवचनम् बहुवचनम् च
- ५। अनुवाद-अभ्यासः -  
अ। आङ्गल/तमिल् भाषातः संस्कृते  
आ। संस्कृतात् आङ्गल/तमिल् भाषायाम्

Unit III

१। क्रियापदानि (परिचयः)

- १। वर्तमानकाले परस्मैपदिनः धातवः  
अ। अन्यपुरुषः/प्रथमपुरुषः  
आ। मध्यमपुरुषः  
इ। उत्तमपुरुषः  
ई। एकवचनम्  
उ। बहुवचनम्।

## Unit III (continued)

	२। क्रियापदानि - धातवः - एकवचन-बहुवचन-मात्रम् अ। गम् (गच्छ्) आ। पठ् इ। क्रीड् ई। वद्
३। अव्ययाः	तत्र, अत्र, कुत्र, यत्र, तदा, यदा, कदा, इदानीम्, शीघ्रम्, अपि, सह, एव, तु, किम्, च (१५)
४। अन्ये अकारान्त-कर्तृपदानि	अश्वः, बालकः, सूर्यः, मनुष्यः, हस्तः, अध्यापकः, इत्यादीनि (१०)
५। अनुवाद-अभ्यासः	अ। आङ्गल/तमिल् भाषायाः संस्कृते आ। संस्कृतात् आङ्गल/तमिल् भाषायाम्

## Unit IV

१। विभक्ति-अन्त प्रत्ययानां आदेशाः	अ। चतुर्थी विभक्ति-प्रत्ययस्य - अर्थम् इति आदेशः आ। पञ्चमी विभक्ति-प्रत्ययस्य - तः इति आदेशः
२। तृतीया विभक्तिः	अ। सह सार्धम् साकं इति अव्ययानां उपयोगः
३। प्रश्न-निर्माण-पदानि	किम्, कुत्र, कथं, किमर्थं, कुतः, कदा
४। क्रियापदानि - (द्वितीय-स्तरः)	वर्तमानकाले परस्मैपदिनः धातवः भू (भव्), कृ (कर्), अस्, धाव्, पठ्, आ-गच्छ् केवलम् एकवचनम् बहुवचनम् च
५। अनुवाद-अभ्यासः	अ। आङ्गल/तमिल् भाषायाः संस्कृते आ। संस्कृतात् आङ्गल/तमिल् भाषायाम्

## Unit V

१। विशेषण-विशेष्यौ

अ। शुक्ल - नील - पीत - रक्त - हरित - कपिश -  
कृष्ण वर्णा;।

आ। संख्या-वाचक-पदानि (० तः ९ पर्यन्तम् मात्रम्)

इ। सुन्दरः - सुन्दरी - सुन्दरम् ,

मधुरः - मधुरा - मधुरम् इत्यादयः।

२। विभक्तीनां पुनः परिचयः (द्वितीयस्तरः)

अकारन्त-शब्दः पुलिङ्गः/नपुंसकलिङ्गः

१। प्रथमा विभक्तिः

२। द्वितीया विभक्तिः

३। तृतीया विभक्तिः

४। चतुर्थी विभक्तिः

३। विभक्तीनां पुनः परिचयः (तृतीयस्तरः)

अकारन्त-शब्दः पुलिङ्गः/नपुंसकलिङ्गः

५। पञ्चमी विभक्तिः

६। षष्ठी विभक्तिः

७। सप्तमी विभक्तिः

८। सम्बोधन-प्रथमा विभक्तिः

४। सर्वनाम-पदानि (अन्यपुरुषः/प्रथमपुरुषः)

१। सः - एषः

२। सा - एषा

३। तत् - एतत्

प्रथमा विभक्तिः एकवचन-बहुवचन-मात्रम्

५। सर्वनामपदानि (उत्तमपुरुषः)

(मध्यमपुरुषः)

४। अस्मद्

प्रथमा विभक्तिः, षष्ठी विभक्तिः च

एकवचन-बहुवचन-मात्रम्।

६। अनुवाद-अभ्यासः

अ। आङ्गल/तमिल् भाषायाः संस्कृते

आ। संस्कृतात् आङ्गल/तमिल् भाषायाम्

Subject Code:U16S2

National College(Autonomous) Tiruchirapalli  
Language Programme Part I Sanskrit Semester II  
Syllabus - Paper II - Sanskrit - II

(For the students admitted from the academic year, June 2016 onwards)

Time: 3 Hours

Maximum Marks: 75

Unit I

क्रियापदानि

१। पुनश्चर्या

लट् लकारे (वर्तमानकाले)  
पूर्वस्मिन् षाण्मासे अभ्यस्तानां  
क्रियापदानां द्विवचनेन साकं  
पुनश्चर्या  
द्विवचन-परिचयः - उपयोगः च

२। लृट् लकारः - भविष्यत्कालः

१। गम् (गच्छ)

२। पठ्

३। वद्

३। लृट् लकारः - भविष्यत्कालः (अधिकम्)

४। पत्

५। लिख् (लेख)

६। क्रीड्

४। लृट् लकारः - भविष्यत्कालः (अधिकम्)

७। आ - गम् (गच्छ)

८। भू - भव

९। घाव्

५। लृट् लकारः - भविष्यत्कालः (अधिकम्)

१०। पा - पिब्

११। दृश् - पश्

१२। कृ - कर्

Unit II

२। सर्वनामशब्दाः

१। लृट् लकारे अभ्यस्तानां  
धातुरूपाणाम् अभ्यासः  
वाक्येषु उपयोगः  
अनुवाद-अभ्यासः च  
(संस्कृत-आङ्गल/तमिल्-संस्कृतेषु)  
१। अस्मद् शब्दः - पुनश्चर्या  
(त्रिषु वचनेषु)



### Unit III १। भोज्य-पदार्थ-नामानि

२। वार्तालापः

३। क्त-प्रत्यय-धातवः

२। युष्मद् शब्दः

(त्रिषु वचनेषु)

३। युष्मद्-शब्द-आधारित-

वाक्येषु लृट् लकार-क्रियापदानां

उपयोगः अनुवाद-अभ्यासः च

(संस्कृत-आङ्गल/तमिल्-संस्कृतेषु)

४। तद् शब्दः - त्रिषु वचनेषु

पुंलिङ्ग-मात्रम्।

५। सर्वनाम-शब्दान् (युष्मद्-तद्)

आहत्य वाक्येषु उपयोगः

अनुवाद-अभ्यासः।

(संस्कृत-आङ्गल/तमिल्-संस्कृतेषु)

धान्य-नामानि -

चणकः, मुद्गः, माषः, तण्डुलः,

जीरकम्, मरिचम्, लशुनम्

फल-नामानि -

जम्बीरम्, आमलकम्, दाडिमम्,

नारङ्गः, बदरम्, जम्बूफलम्, कदलीफलम्

शलाटुका-नामानि

आलुकम्, आर्द्रकम्, कन्दर्पः,

भोज्यपदार्थ-नामानि

ओदनम्, रोटिका, पोलिका

दुग्धम्, दधि, तक्रम्, नवनीतम्, घृतम्,

एतावता अभ्यस्त-शब्दानां वाक्येषु

उपयोगः - अनुवाद-अभ्यासः

(संस्कृत-आङ्गल/तमिल्-संस्कृतेषु)

गतः गता गतम्

पीतः पीता पीतम्

पठितः पठिता पठितम्

क्रीडितः क्रीडिता क्रीडितम्

धावितः धाविता धावितम्

पतितः पतिता पतितम्

क्त-प्रत्यय-धातवः

३। क्रियापदानि

४। तुमुन्नत-अव्ययाः

५। अनुवाद-अभ्यासः

#### Unit IV

१। कृषि-क्षेत्र-सम्बन्धीनि नामानि

२। काल-संबन्धीनि पदानि  
संख्यावाचकपदानि च

३। क्रियापदानि

४। नपुंसकलिङ्ग-कर्तृ-पदानि

५। अनुवाद-अभ्यासः

आगतः आगता आगतम्  
लिखितः लिखिता लिखितम्  
खादितः, खादिता, खादितम्  
लट् लकारे एव -

भक्ष्, खेल्, पाल्, तुल्,  
मार्, गण्, कथ्, क्षाल्,  
गन्तुम्, पातुम्, पठितुम्, क्रीडितुम्,  
धावितुम्, पतितुम्, लेखितुम्, भवितुम्,  
अर्चितुम्, खेलितुम्, चलितुम्, क्षालयितुम्,  
तुलयितुम्, मारयितुम्, गणयितुम्  
संस्कृतात् आङ्गले/तमिल् भाषायाम्,  
आङ्गलात् संस्कृते

कृषकः, कृषीवलः, बलीवर्दः, वृषभः  
सस्यम्, धान्यम्, तृणम्, क्षेत्रम्, हलः  
बीजम्, आलवालम्, मेघः, जलदः,  
खेटः, ग्रामः, क्रयः, विक्रयः, हट्टः,  
आपणः, आपणिकः, व्यवसायः- इत्यादीनि

a. प्रातः, मध्याह्नः, सायम्, रात्रिः

b. समयलेखनम् - सपाद-सार्ध-पादौन-  
पदानाम् उपयोगः

c. ऋतु(काल) नामानि

वसन्तः, ग्रीष्मः, वर्षाः, शरद्, हेमन्तः, शिशिर

d. संख्यावाचकपदानि - १ तः २५ पर्यन्तम्  
लट् लकारे -

क्री, वि-क्री, रुह् (रोह), वर्ष्, वप्  
रच्, कृष् (कर्ष), वस्, अर्च्

सस्यम्, धान्यम्, तृणम्, क्षेत्रम्, बीजम्,  
आलवालम्।

संस्कृतात् आङ्गले/तमिल् भाषायाम्,  
आङ्गलात् संस्कृते

## Unit V

१। आकारान्त-स्त्रीलिङ्ग-पदानि

a। माला शब्दः

(एकवचन - बहुवचनमात्रम्)

b। अन्यानि स्त्रीलिङ्गपदानि

रमा, शाला, पेटिका, शिखा,

निशा, दिशा, बाला, सभा,

भार्या, स्वसा, नासिका

गत्वा, पठित्वा, क्रीडित्वा, पीत्वा, धावित्वा,

लिखित्वा, भक्षयित्वा, खेलित्वा, धारयित्वा,

पतित्वा, कृत्वा, चलित्वा, क्षालयित्वा,

पालयित्वा, अर्चयित्वा

२। क्त्वा प्रत्यय-अन्त-अव्ययाः

लृट् लकारे (एकवचन-बहुवचन-मात्रम्)

धार्, कथ्, क्षाल्, पाल्, तोल्

३। क्रियापदानि

a. स्वरसन्धिः

b. गुणसन्धिः

c. वृद्धि-सन्धिः

४। सन्धि-प्रकरणम्

पाठ्य-पुस्तके दत्तानां पदानां परिचयः

संस्कृतात् आङ्गले/तमिल् भाषायां तथा

आङ्गलात् संस्कृते

५। अनुवाद-अभ्यासः

Prescribed book:

. Saral Sanskrit Sikshak Part I, Bharatiya Vidya Bhavan (lessons 6 to 9, and 1)  
Mumbai 400007.

Reference:

Sanskrit for beginners, Dr Narasimhachari, M, and Dr Ramaratnam, S,  
N & R Publications, Chennai 600004.

Subject Code: U16S3

National College (Autonomous) Tiruchirapalli

Language Course Part I Sanskrit Semester III

Paper III - Sanskrit III

(For the candidates admitted from the academic year June 2016 onwards)

Syllabus

Time: 3 Hours

Maximum Marks: 75

Unit I

1. क्रियापदानि कर्तृपदानि च - पुनश्चर्या

लट् लकारे लृट् लकारे च पठितानां

पूर्वस्मिन् षाण्मासद्वये अभयस्तानां

क्रियापदानां, कर्तृपदानां च पुनश्चर्या

2. शब्दाः(कर्तृपदानां परिचयः)

१। इकारान्तः पुल्लिङ्गः कवि शब्दः

तस्य केचन समानान्तशब्दाः च।

एकवचनं तथा बहुवचनम् एव।

हरिः, रविः, अरिः ऋषिः, पतिः, यतिः इत्यादयः।

२। सर्वनामशब्दः

दकारान्तः स्त्रीलिङ्गः तद् शब्दः

एकवचनं तथा बहुवचनम् एव।

३। इकारान्तः स्त्रीलिङ्गः मति शब्दः

तस्य एकवचनं तथा बहुवचनम् एव।

तस्य केचन समानान्तशब्दाः - रुचिः, शान्तिः

कीर्तिः, बुद्धिः, मुक्तिः इत्यादयः

४। उपर्युक्त-शब्दानां वाक्येषु उपयोगः

अनुवाद-अभ्यासः च (संस्कृत-तमिल/संस्कृत-

आङ्गल/आङ्गल-संस्कृतेषु)

Unit II

क्रियापदानि

१। जप्

१। लट् लकारः (वर्तमानकालः)

२। चर्

२। लट् लकारः (वर्तमानकालः) - अधिकम्

३। रक्ष्

४। हस्

५। वम्

६। नम्

७। दह्

३। लट् लकारः (वर्तमानकालः) -अधिकम्

८। तप्

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५। क्रियापदानां वाक्येषु उपयोगः अनुवाद-अभ्यासः च - संस्कृतात् आङ्गले/तमिल् भाषायां अथवा आङ्गलात् संस्कृते वा।

## Unit III

१। क्रियापदानि

उपर्युक्त-क्रियापदानां वाक्येषु प्रयोगः

संस्कृतात् आङ्गले/तमिल् भाषायां अथवा आङ्गलात् संस्कृते वा।

२। नूतन-शब्दानां परिचयः

अकारान्त-आकारान्त-इकारान्त कर्तृपदानि क्रियापदानि च

३। वार्तालाप-परिचयः

मिश्रित्य वाक्येषु उपयोगः अनुवाद-अभ्यासः च उपर्युक्त-कर्तृपद-क्रियापदानि उपयुज्य छात्रेषु वार्तालाप-अभ्यासः

४। लृट् लकारः (भविष्यत्कालः)  
नूतन-क्रियापदानि

१। अर्ज्

२। दण्ड्

३। चिन्त्

४। ज्वल्

५। लृट् लकारः (भविष्यत्कालः)  
नूतन-क्रियापदानि (अधिकम्)

५। तर्ज्

६। तर्क्

७। तप्

८। नट्

## Unit IV

१। लङ् लकार-परिचयः (भूतकालः)

१। भूतकालः नाम किम्?

भूतकालिक-क्रियापदानां परिचयः।

१। गम् (गच्छ्)

२। पा (पिब्)

४। पश्य्

२। लङ् लकार-परिचयः (भूतकालः) (अधिकम्)

५। वस्

६। पठ्

७। वद्

८। पत्

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३। बन्धु-वर्ग-नामानि

माता, जननी, पिता, जनकः, स्वसा  
भगिनी, सहोदरः, भ्राता, अनुजः, अग्रजः,  
अनुजा, अग्रजा, मातुलः, मातुलानी,  
जामाता, वधूः, वरः, मातामहः, मातामही,  
पितामहः, पितामही, पुत्रः, पुत्री, पौत्रः, पौत्री  
उपर्युक्त-पदानां वाक्येषु प्रयोगः  
अनुवाद-अभ्यासः(संस्कृतात् आङ्गले/तमिल्  
भाषायाम् , आङ्गलात् संस्कृते वा)

४। वाक्येषु उपयोगः

#### Unit V

१। गृहे उपयुक्तानां उपकरणानां  
नामानि

पर्यङ्कः, मञ्जूषा, तालकम्, कुञ्जिका,  
अङ्कनी, लेखनी, उत्पीठिका, आसनम्,  
गणकयन्त्रम्, दूरदर्शनम्, आकाशवाणी,  
दूरभाषणी, दीपः, विद्युत्, विद्युत्व्यजनम्,  
शीतकयन्त्रम्, शीतकपेटिका, अग्निपेटिका,  
वस्त्रम्।(अन्यानि मुख्यानि च)

२। वासरनामानि

सोमवासरः, मङ्गलवासरः, बुधवासरः,  
गुरुवासरः, शुक्रवासरः, शनिवासरः,  
भानुवासरः

३। पक्षनामानि

शुक्लपक्षः, कृष्णपक्षः

४। मास-नामानि

चैत्रः, वैशाखः, ज्येष्ठः, आषाढः, श्रावणः,  
भाद्रपदः, आश्वीनः, कार्तिकः, आग्रहायणः, पौषः,  
माघः, फाल्गुनः अथवा  
मेषः, ऋषभः, मिथुनः, कटकः, सिंहः,  
कन्या, तुला, वृश्चिकः, धनुः, मकरः, कुम्भः,  
मीनः ।

५। तिथिनामानि

प्रथमा, द्वितीया, तृतीया, चतुर्थी, पञ्चमी,  
षष्ठी, सप्तमी, अष्टमी, नवमी, दशमी,  
एकादशी, द्वादशी, त्रयोदशी, चतुर्दशी,  
अमावास्या (अमाः), पूर्णिमा (पौर्णमी)

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७। नवग्रहनामानि

सूर्य, चन्द्रः, कुजः, बुधः, गुरुः, शुकः, शनैश्वरः,  
राहुः, केतुः

८। संख्या-वाचकपदानि

षड्विंशतिः आरभ्य पञ्चाशत् पर्यन्तम्।(२६-५०)

Prescribed Book:

सरलसंस्कृतशिक्षकः भागः २, भारतीयविद्याभवनम्, कुलपति:मुन्शी मार्गः, मुम्बई, ४००००७

Reference:

1. Samskrit for Beginners, Dr M. Narasimhachari & Dr S. Ramaratnam, N&R Publications, Mylapore, Chennai 60004.
2. संस्कृत-व्यवहारसाहस्री, संस्कृत-भारती, माता मन्दिर् गली, झन्डेवाला, नव देहली ११००५५।

National College (Autonomous) Tiruchirapalli  
Language Course Part I Sanskrit Semester III  
Paper IV - Sanskrit IV

(For the candidates admitted from the academic year June 2016 onwards)

Syllabus

Time: 3 Hours

Maximum Marks: 75

Unit I

१। कर्तृपदानि, क्रियापदानि च  
पुनश्चर्या

लट् लकारे, लृट् लकारे, लङ् लकारे च  
पूर्वस्मिन् षाण्मासत्रये अभ्यस्तानां कर्तृपदानां  
क्रियापदानां च पुनश्चर्या।

२। शब्दाः (कर्तृपद-परिचयः)

१। उकारान्तः पुल्लिङ्गः गुरु शब्दः

केचन समानान्त-शब्दाः च।

एकवचनम् तथा बहुवचनम् केवलम्।

पशुः, मनुः, साधुः, शिशुः, प्रभुः इत्यदि शब्दाः

२। उकारान्तः स्त्रीलिङ्गः धेनु शब्दः

एकवचनम्, तथा बहुवचनम् केवलम्।

३। सर्वनामशब्दः -

दकारान्तः नपुंसकलिङ्गः तद् शब्दः

दकारान्तः पुल्लिङ्गः एतद् शब्दः

एकवचनम्, तथा बहुवचनम् केवलम्।

४। उपर्युक्त-कर्तृपदानां कर्मपदानां च वाक्येषु  
उपयोगः

५। अनुवाद-अभ्यासः (संस्कृतात् आङ्गले/तमिल्  
भाषायाम्, तथा आङ्गलात् संस्कृते च)

Unit II

क्रियापदानि

१। लट्/लृट् लकारौ  
नूतनक्रियापदानि

१। अञ्च्

२। दल्

३। नन्द्

४। यच्छ्

२। लट्/लृट् लकारौ  
नूतनक्रियापदानि

५। धृ (धरति)

६। धृ (धारयति)

७। नद् (नदति)

८। तृ (तर)



३। लट्/लृट् लकारौ नूतनक्रियापदानि

९। नश्

१०। निन्द्

११। पीड्

१२। पोष्

४। शरीर-अङ्ग-नामानि

शिरः, केशः, कर्णः, नासिका, नयनम्, मुखम्, दन्तः, ग्रीवा, कण्ठः, उरः, स्कन्धः, करः, बाहुः, हस्तः, अङ्गुली, नखः, स्मश्रुः, शिखा, उदरः, कटिः, जानुः, पादौ, अस्थि, मांसं, रुधिरः, मेघः। वस्त्रम्, निचोलः, ऊरुकम्, उष्णीषः, उपनेत्रम्, दण्डः, पादरक्षा, घटी, द्विचक्रिका, त्रिचक्रिका, कार्-यानम्, लोकयानम्, आकाशविमानम्, रेल-यानम्

५। प्रतिदिनं-उपयुक्तानि वस्तु नामानि

### Unit III

१। पर्यटन-स्थल-नामानि

१। धर्म-सम्बन्धीनि स्थलानि

२। आह्लादकर-संबन्धीनि स्थलानि

३। देशस्य चरित्र-चारित्र-संबन्धीनि स्थलानि

४। अन्वेषण-संबन्धीनि स्थलानि

५। विदेश-यात्रा

२। प्रतिदिनं गमनीयानि स्थलानि

देवालयः, कार्यालयः, विद्यालयः, धनकोषः, पुस्तकालयः, आपणः, चलनचित्रशाला, नाट्यशाला, महाविद्यालयः, विश्वविद्यालयः, मित्रगृहम्, स्नानगृहम्, शौचालयः, सुविद्यालयः,

### Unit IV

१। रचनालेखनम्

रचना-लेखन-प्रकारः

उपोद्घातः, रचना, समापनम् - विधयः

दश-वाक्येषु पर्यटनस्थानमेकमधिकृत्य लेखनम्

२। पत्रलेखनम्

पत्रम् नाम किम्?

पत्रलेखन-प्रकारः

पत्रलेखने उपयुक्ताः रीतयः

पत्र-आरम्भः, शरीरम्, समापनम्

contd.,page.3/-

३। पत्रलेखनम् (वैचित्र्यम्)

४। अनुच्छेद-अभ्यासः

#### Unit V

१। नूतन-कर्तृपदानि

२। व्यवहार-पदानि/वाक्यानि

३। कर्मकाराः

३। व्याकरणम्

3

१। मित्राय पत्रम्।

२। विद्यालयाय विरामपत्रम्।

३। जनकाय पत्रम्।

१। कथा-युक्तम् अनुच्छेदं पठित्वा  
उत्तर-लेखनम्।

२। वार्ता-संबन्धि-लेख-युक्तम् अनुच्छेदं  
पठित्वा उत्तर-लेखनम्।

मृगवर्गः - सिंहः, व्याघ्रः, भल्लूकः,

शृगालः, मूषकः, आखुः, सारमेयः, कुक्कुरः,

बिडालः, वानरः, उष्ट्रः, अश्वः, गजः, वृषभः,

अजः, मेषः, वराहः, धेनुः, गौः, महिषः, वत्सः,

हरिणः, शशकः

पक्षिवर्गः - काकः, कुक्कुटः, मयूरः, टिट्ठिभः,

गरुडः, शुकः, कपोतः,

जलचराः - मीनः, मत्स्यः, कूर्मः, तिमिङ्गलः,

शिष्टाचारः, मित्राणि, प्रयाणम्, छात्राः, परीक्षा,

शिक्षकः, महिला, वेश-भूषा, कार्यालयः,

आरोग्यम्, वाणिज्यम्, वातावरणम्, भोजनम्,

शुभाशयाः, संकीर्ण-पदानि।

घटकारः, कुविन्दः/तन्तुवायः, अयस्कारः,

सुवर्णकारः, रजकः, आपणिकः, वणिजः,

चर्मकारः, नापितः, संवाहकः, शाकटिकः, आरक्षकः

गोपालकः, अश्वपालकः, अजपालकः, पुरोहितः,

सन्धिप्रकरणम् -

प्रभेदाः - स्वरसन्धिः, व्यञ्जन-सन्धिः

विसर्गसन्धिः

स्वरे - सवर्णदीर्घः, गुणः, यण्, वृद्धिः,

अयवायावः, प्रकृतिभावः

#### Prescribed Books:

1. सरलसंस्कृतशिक्षकः, भागः २, भारतीयविद्याभवनम्, कुलपति मुन्शी मार्गः, मुम्बई ४००००७।

2. संस्कृत-व्यवहार-साहस्री 3. सन्देशसंस्कृतम्, -संस्कृतभारती, माता मन्दिर् गली, झण्डेवाला, नव देहली ११००५५

#### Reference:

1. Samskrit for Beginners, Dr M. Narasimhachari and Dr S. Ramaratnam, N & R Publications, Mylapore, Chennai 600004.

## ENGLISH FOR COMMUNICATION – U16E1

Semester: I

English Language Course I

Instruction Hours/Week: 6

Credit: 3

- UNIT I:**
1. At the College
  2. On the Campus
  3. Outside the Class
  4. At the Post office
  5. For Business and Pleasure
  6. Review

- UNIT II:**
7. Are you Smart ?
  8. Are You Creative?
  9. Is it too hard to improve?
  10. How to win ?
  11. View Points
  12. Snakes and Ladders
  13. Yourself

- UNIT III:**
1. Birbal story- The loyal gardener
  2. Hindu mythological story- The origin of coconut tree
  3. Achinese story: The generous student
  4. An Africal Story ; The Three Runners

- UNIT IV:**
5. The Golden place
  6. The one – hundreth prince
  7. The mouse Merchand

- UNIT V:**
8. When wishes come true – Rabindranath Tagore
  9. The World and after
  10. Julius caesar

**Text Books:** 1. Crystal Streams – A Prose collection by D.E. Benet. Published by New Century Book House (P) Ltd.  
2. Creative English for Communication (2nd edition) by Krishnasamy and Sriraman. Published by Macmillan

## ENGLISH THROUGH EXTENSIVE READING – U16E2

**SEMESTER : II**

**ENGLISH LANGUAGE COURSE : II**

**INSTRUCTION HOURS/WEEK : 4**

**CREDIT : 2**

### **UNIT I**

Excitement : Mack R. Douglas  
Tight Corners : E.V. Lucas

### **UNIT II**

Water – The Elixir of Life : C.V. Raman  
Tree Speaks : C. Rajagopalachari

### **UNIT III**

The Art of Telling Tales : April Hersey  
A Job Well Done : Ruskin Bond

### **UNIT IV**

The Panorama of India's Past : Jawaharlal Nehru  
The Origin of Grammar : Margaret Bryant & Janet

### **UNIT V**

Dangers of Drug Abuse : Hardin B. Jones  
Crime and Punishment : R.K. Narayan

**Text Book** : Dr. Ananthan , R. Effective Communication. Ed. Chennai : Anu Chithra Pub.2010.

**COMMUNICATIVE ENGLISH I – U16CE1**

**Semester : II**

**Communicative English Course : I**

**Instruction Hours/ Week : 2**

**Credit : 1**

**UNIT I**

Writing Stories

Grammar Components : Articles, Prepositions and Tenses

**UNIT II**

Precis Writing

Grammar Components : Non- Finite Verbs and Phrasal Verbs

**UNIT III**

Writing Letters

Grammar Components : Conjunctions and Interjections and Punctuation

**UNIT IV**

Reporting

Grammar Components : Reported Speech and Transformation of Sentences

**UNIT V**

Writing an Essay

Grammar Components : Sentence structure (S/V/O/C/A) and Simple, Compound and Complex sentences

**Text book :** Pillai, Radhakrishna G. English Grammar & Composition Ed. Chennai : Emerald Pub.2016

**ENGLISH FOR COMPETITIVE EXAMINATIONS – U16E3**

**SEMESTER : III**

**ENGLISH LANGUAGE COURSE : III**

**INSTRUCTION HOURS/WEEK : 6**

**CREDIT : 3**

**UNIT I:**

Basics of English( Revision)

(a)Parts of speech and Articles

(b)Active and passive voice

(c)Framing Questions

(d)Tag questions

(e)Indirect speech

(f)Tenses

**UNIT II:**

(a)Errors and how to avoid them

(b)Spotting errors

(c)Reconstructing passages

(d)Précis writing

**UNIT III:**

Reading comprehension

**UNIT IV:**

(a)Sentence completion,

(b) Spelling

(c)Vocabulary – Words often confused or Misused, Synonyms, Antonyms.

**UNIT V:**

Letter writing , Report writing ,Paragraph writing, Essay writing

**Text book : English for Competitive Examinations by R.P.Bhatnagar&Rajul Bhargava macmillanIndia Ltd. Delhi.**

## COMMUNICATIVE ENGLISH II – U16CE2

**SEMESTER : IV**

**COMMUNICATIVE ENGLISH COURSE : II**

**INSTRUCTION HOURS/WEEK : 2**

**CREDIT : 1**

### **UNIT I:**

Enriching Vocabulary – Register Development; who is who; Synonyms, Proverbs

### **UNIT II:**

Tense Forms with emphasis on differences between Present and Present Continuous; Past and Present Perfect , Framing questions, Auxiliaries, if clauses; conjunctions and linkers; Prepositions

### **UNIT III**

Pronunciation, Good Pronunciation habits, Phonetic Transcription, Greetings, Farewells commands etc.,

### **UNIT IV:**

Conversational Skills – Affirmative or Negative Language – idiomatic expressions, Phrases, Dialogue Writing,

### **UNIT V:**

- Writing Skills – Note- taking, note- making, e-mail, Describing an object, narrating a story.
- Circulars
- Notes - reminders, warnings, farewells, apology.
- Draft invitations – marriage, annual day, inaugural functions of associations, valediction, seminar, workshop.
- Draft Short messages- compliments, birthday wishes, notifications
- Draft Posters- Slogans, Announcements
- Draft Advertisements
- Dialogue writing

### **Text Book**

1. Communicative English by Department of English, National College( Autonomous), Trichy

## READING POETRY AND DRAMA – U16E4

**SEMESTER : IV**

**ENGLISH LANGUAGE COURSE : IV**

**INSTRUCTION HOURS/WEEK : 6**

**CREDIT : 2**

**POETRY:**

**UNIT I :** John Milton  
Oliver Goldsmith  
William Wordsworth

: On His Blindness  
: The Village School Master  
: The Solitary Reaper

**UNIT II :** P.B.Shelly  
John Keats  
Robert Browning

: Ozymandias  
: La Belle Dame Sans Merci  
: Incident of the French camp

**UNIT III :** John Masefield  
Robert Frost  
Evening  
John Drinkwater

: Laugh and Be Merry  
: Stopping by Woods On a Snowy  
: The Vagabond

**DRAMA:**

**UNIT IV:** Anton Chekov  
Lady Gregory

: A Marriage Proposal  
: The Rising of the Moon

**UNIT V:** W.St. John Tayleur  
William Shakespeare

: Reunion  
: Othello, The Moor of Venice – Act V

**Text Books :** 1)**An Introduction to Poetry** edited by A.G.Xavier; [Macmillan]

2)**A Book Plays:** A Group of Editors, Published by Orient Blackswan



## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>I – B.Sc., Zoology</b>	
Semester	<b>I</b>	
Course & Code	<b>Core course – (CC1)</b>	<b>Code: U16ZY1</b>
Course Title	<b>FAUNAL DIVERSITY (INVERTEBRATES)</b>	
Hours: 5	Credits : 5	Max Marks : 75

### UNIT - I : PROTOZOA

General characters and classification upto class level with examples. Detailed Study: *Paramecium*

General Topics: Protozoan parasites, locomotion in protozoan, and nutrition in protozoan

### UNIT - II : PORIFERA AND COELENTERATA

General characters and classification upto class level with examples for Porifera and Coelenterata Detailed study: *Obelia*.

General topics: Canal system in sponges (Porifera), Coral and coral reefs, and Polymorphism in Hydrozoa (Coelenterates)

### UNIT - III : PLATYHELMINTHES AND NEMATODA

General characters and classification upto class level with examples for Platyhelminthes and Nematoda

Detailed study : *Fasciola hepatica*

General topics: Parasitic adaptations of Nematodes and Platyhelminthes, Economic importance of Nematodes and Platyhelminthes.

### UNIT - IV : ANNELIDA AND ARTHROPODA

General characters and classification up to class level with examples for Annelida and Arthropoda.

Detailed study: *Panaeus*

General topics : Adaptive Radiation in Annelida, Larval forms of crustacean and their significance, Beneficial and harmful insects.

### UNIT - V : MOLLUSCA AND ECHINODERMATA

General characters and classification up to class level with examples for Mollusca and Echinodermata.

Detailed study : *Pila*

General topics: Economic importance of molluscs, Larval forms of Echinoderms, Water-vascular system of Starfish.

### Reference Books:

1. Ayyar, C.K. and T.N. Ananthakrishnan, 1992. A Manual of Zoology, Vol-I (Invertebrata) Parts I & II, Viswanathan Pvt. Ltd.,
2. Barrington, E.J.W. 1979, Invertebrates Structure and Function. Ed ELBS and Nelson.
3. Hyman, L.H., 1940-1955, The Invertebrates, Vol – I to VII McGraw Hill Book Co.
4. Jordon, E.L. and P.S. Verma 1995, Invertebrate Zoology, 12<sup>th</sup> Edn. S.Chand & Co.
5. Kotpal, R.L., S.K. Agarwal, R.P.R.Khetarpal. 1989. Modern Text Book of Zoology, Rostogi Publications.
6. Nair.N.C., S.Leelavathy, N.Sundarapandiyam, T.Murugan and N.Arumugam (2014). A Text book of Invertebrates. SARAS Publication, Nagercoil.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>I – B.Sc., Zoology</b>	
Semester(s)	<b>I &amp; II</b>	
Course & Code	<b>Core course – (CC 2)</b>	<b>Code: U16ZY2P</b>
Course Title	<b>MAJOR PRACTICAL – I FAUNAL DIVERSITY (INVERTEBRATES &amp; CHORDATES)</b>	
Hours: 6	Credits : 6	Max Marks : 75

### **Invertebrata**

#### **Dissection**

Earthworm : Nervous system

Prawn : Nervous system

#### **Mounting**

Earthworm : Body setae, Penial setae

Prawn : Appendages

#### **Spotters and slides**

Protozoa : Paramecium

Porifera : Sycon

Coelenterata : Obelia (entire), Physalia, Obelia medusa, Porpita, Sea anemone, Aurelia.

Platyhelminthes : Liver fluke, Planaria, Tapeworm, and Scolex

Nemathelminthes: Ascaris (Male and Female).

Annelida : Nereis, Parapodium, Heteronereis, Trochophore larva, Arenicola, Leech.

Arthropoda : Penaeus, Sacculina on crab, Peripatus, Limulus,  
Alima larva, Artemia, Cyclops.

Molluscs : Pila

Echinodermata : Starfish

### **Chordata**

#### **Mounting**

Shark : Placoid scales.

#### **Spotters:**

Prochordata : Amphioxus, Balanoglossus.

Fishes : Catla catla, Shark, Echeneis, Hippocampus, Exocoetus.

Amphibia : Bufo, Hyla, Ichthyophis.

Reptilia : Crocodile, Naja naja, Tortoise, Monitor Lizard,

Aves : Pigeon, Types of Feathers.

Mammalia : Rabbit, Bat

Dentition : Rabbit, Man.

A record of lab work should be maintained and submitted at the time of practical exam.

### **Reference Books:**

1. P.S. Verma and P.C. Srivastava 2007. Advanced Practical in Zoology (S. Chand & Co.)
2. S.S. Lal 2004. Practical Zoology : Chordates (Rastogi Publications)

## SYLLABUS

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PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>I – B.Sc., Zoology</b>	
Semester	<b>II</b>	
Course & Code	<b>Core course – (CC3)</b>	<b>Code: U16ZY3</b>
Course Title	<b>FAUNAL DIVERSITY (CHORDATA)</b>	
Hours: 5	Credits : 5	Max Marks : 75

### UNIT - I : PROCHORDATA

General characters and classification of chordates up to order level with examples. Detailed study : Amphioxus.

General topics : Retrogressive metamorphosis in Ascidia, Affinities of Balanoglossus.

### UNIT - II : PISCES

General characters and classification upto sub class with examples. Detailed study : Shark (Excluding endoskeleton)

General topics: Migration in fishes, Accessory respiratory organs in fishes.

### UNIT - III : AMPHIBIA AND REPTILIA

General characters and classification up to order with examples. Detailed study : Frog (Excluding endoskeleton)

General topics : Parental care in Amphibia, Identification of poisonous and non-poisonous snakes of South India, biting mechanism and first aid for snake bite.

### UNIT - IV : AVES

General characters and classification up to order with examples.

Detailed study : Pigeon (Excluding endoskeleton)

General topics : Migration in birds, Flight adaptations in birds.

### UNIT - V : MAMMALIA

General characters and classification up to sub class with examples.

Detailed study : Rabbit (Excluding endoskeleton)

General topics : Aquatic mammals, Prototheria and its affinities.

### Reference Books :

1. Ekambaranathan Ayyar, I, 1993 – Outlines of Zoology – Vol – I Viswanathan Pvt. Ltd.
2. Kardong, K.V. (2005) Vertebrates Comparative Anatomy, Function and evolution. IV Edition. McGraw3 Hill Higher Education.
3. Kent, G.C. and Carr R.K. (2000). Comparative Anatomy of the Vertebrates. IX Edition. The McGraw3Hill Companies.
4. Young, J.Z. (2004). The life of vertebrates. III Ed ition. Oxford university press.
5. Hall B.K. and Hallgrimsson B. (2008). Strickberger' s Evolution. IV Edition. Jones and Bartlett Publish ers, Inc.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., Zoology</b>	
Semester	<b>III</b>	
Course & Code	<b>Core course – (CC4)</b>	<b>Code: U16ZY4</b>
Course Title	<b>CELL BIOLOGY</b>	
Hours: 4	Credits : 4	Max Marks : 75

### UNIT – I

Cytological techniques: Teasing, Smear preparation, Squash preparation, whole mounting and microtomy (fixation, dehydration, clearing, embedding, sectioning, staining (Acidic, Basic and Neutral stains), mounting and labeling). Types of microtome. Prokaryotes and Eukaryotes. Plasma membrane : Structure and functions.

### UNIT – II

Endoplasmic reticulum: Structure, Types and Functions.

Golgi complex: Origin, Ultra structure and functions.

Lysosomes: Origin, Ultra structure and functions

### UNIT – III

Mitochondria : Origin, Ultra structure and functions.

Ribosomes : Structure and functions.

### UNIT – IV

Nucleus : Ultra structure and functions.

Chromosomes : Ultra structure, Classification and functions, Polytene chromosomes.

DNA : Molecular structure, types, functions and replication.

RNA : Types and structure.

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### UNIT – V

Cell cycle, Differences between mitosis and meiosis.

Genetic code and Protein synthesis

Properties of cancer cells

### Reference Books:

1. De Roberties, E.P.P. and E.M.F. De Roberties 1987. Cell and Molecular Biology
2. Power, C.B., 1989. Essentials of Cytology. Himalaya Publishing House.
3. Verma, P.S. and V.K. Agarval.2009. Cell biology, genetics, molecular biology , evolution and ecology. S. Chand & Co.
4. Tomar & Singh, 1999. Cell Biology. Rastogi Publication, Meerut.
5. Meyyan R.P. 2005. Cell Biology, Saras Publications.
6. Darner, Lodish and Baltimore 1990. Molecular Cell Biology, II Ed.
7. Watson *et al.*, 1987. Molecular Biology of the Gene.
8. Shukla 2005. Histological Techniques

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., Zoology</b>	
Semester	<b>III &amp; IV</b>	
Course & Code	<b>Core Course – (CC5)</b>	<b>Code: U16ZY5P</b>
Course Title	<b>MAJOR PRACTICAL – II</b> (Pertaining to Cell Biology, Physiology and Biochemistry )	
Hours: 3+2	Credits : 5	Max Marks : 75

### Cell Biology

1. Onion root tip – squash preparation and study of mitosis.
2. Spotters : Columnar, Ciliated, Squamous epithelium, Cardiac, Striated, Non-striated Muscle, Nerve cell, Blood of Man and Frog, Compound microscope, Centrifuge, Micrometer, Camera Lucida, Microtome.

### Physiology

1. Enumeration of RBC and WBC.
2. Qualitative tests for ammonia, urea and uric acid.
3. Spotters: Haemoglobinometer, Kymograph, Sphygmomanometer.

### Biochemistry

1. Qualitative tests for proteins, carbohydrates and lipids
2. pH measurement of various samples using pH meter and pH paper

A record of lab work should be maintained and submitted at the time of the practical examinations.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., Allied Zoology ( For Botany Students)</b>	
Semester	<b>III</b>	
Course & Code	<b>Second Allied Course – (2AC1)</b>	<b>Code: U16AZY1</b>
Course Title	<b>BIOLOGY OF INVERTEBRATES AND CHORDATES</b>	
Hours: 5	Credits : 3	Max Marks : 75

### UNIT – I

General characters and outline classification of Invertebrates.

Detailed study of *Paramoecium*.

### UNIT – II

*Fasciola hepatica*: External features, digestive system, respiratory system, circulatory system, nervous system, reproductive system and Life history.

**Earthworm**: External features, digestive system, respiratory system, circulatory system nervous system and reproductive system

### UNIT – III

*Panaeus*: External features, digestive system, respiratory system, circulatory system nervous system and reproductive system

**Star fish**. External features, digestive system and water vascular system.

### UNIT – IV

General characters of Chordates, Outline Classification of Chordate up to Class.

**Shark and Frog**: External features, digestive system, respiratory system, circulatory system, urinogenital system and brain.

### UNIT – V

**Pigeon and Rabbit**.: External features, digestive system, respiratory system, circulatory system, urinogenital system and brain.

### References:

1. Ekambaranatha Ayyar, M. 1988. Outlines of Zoology. Viswanathan Publications.
2. Ekambaranatha Ayyar, M. 1988. A Manual of Zoology, Vol. I & II. Viswanathan Publications.
3. Nair, N.C. 2006. A Text Book of Invertebrates, Saras Publications, 3<sup>rd</sup> Ed.
3. Jordan, E.L. 2000. Invertebrate Zoology. S.Chand and Co.
4. Jordan, E.L. 2000. Chordate Zoology. S.Chand and Co.
5. Arumugam. N. Outlines of Zoology, 1998. Saras Publications.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., Allied Zoology ( For Botany Students)</b>	
Semester	<b>III &amp; IV</b>	
Course & Code	<b>Second Allied Course – (2AC2)</b>	<b>Code: U16AZY2P</b>
Course Title	<b>ALLIED PRACTICAL</b> (Pertaining to Biology of Invertebrates & Chordates and Economic Zoology)	
Hours: 3+5	Credits : 3	Max Marks : 75

### 1. Dissections

Earthworm	:	Nervous system
Frog	:	General Anatomy (Virtual laboratory)

### 2. Mountings

Earthworm	:	Body and Penial setae
Shark	:	Placoid scale

### 3. Spotters

Paramecium, Simple sponge - Ascon, Obelia colony, Sea anemone, Ascaris, *Fasciola hepatica*, Taenia solium, Earthworm, Leech, Prawn, Scorpion, Grass hopper, Fresh water mussel, Pila, Starfish, Amphioxus, Shark, Catla, Frog, Calotes, Snake, Pigeon, Rat and Bat.

4. Species of animals used in Vermiculture, Apiculture, Lac-culture, Sericulture, Aquaculture and Poultry farming.

5. Products: Honey, Bee's Wax, Silk, Cod liver oil, pearl, eggs of different poultry birds.

A record of lab work should be maintained and submitted at the time of practical exam

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	II – B.Sc., Zoology	
Semester	IV	
Course & Code	Core Course – (CC6)	Code: U16ZY6
Course Title	PHYSIOLOGY AND BIOCHEMISTRY	
Hours: 5	Credits : 4	Max Marks : 75

### UNIT – I

Nutrition : Types, Digestion in Man.

Respiration : Transport of O<sub>2</sub> and CO<sub>2</sub> in man

Circulation : Blood composition, Types of heart, Origin and Conduction of heart beat in man, Blood pressure.

### UNIT – II

Excretion : Types of nitrogenous wastes, Structure of mammalian kidney and Urine formation.

Muscle physiology : Types of muscles, Ultra structure of muscle fibre, Physiology of muscle contraction.

### UNIT – III

Nerve physiology: Neuron, Types, Neurotransmitters, Impulse transmission, Synapse, Synaptic transmission, Reflex action.

Endocrine physiology : Endocrine glands in man, Secretion and Disorders.

### UNIT – IV

Classification: Carbohydrates, Proteins and Lipids

Metabolism: Carbohydrates, Proteins and Lipids.

Calorific values, Balanced diet.

### UNIT – V

Enzymes: Classification, Characteristics, Mode of action, Theories, Factors affecting enzyme action.

Vitamins : Types, Sources, Functions and Deficiency diseases.

### References:

1. Berry A.K. 1998. A text book of Animal Physiology. Emkay Publications, New Delhi – 51.
2. Hoar, W.S. 1983. General and Comparative Physiology. Printice Hall of India.
3. Nagabushanam R. 1991. Animal Physiology. S. Chand & Co.
4. Agarwal, R.A.A.K. Srivastava and Kaushal Kumar, 2005. Animal Physiology and Biochemistry. S. Chand & Co New Delhi.
5. Harper, H.A. 1993. Review of Physiological Chemistry. Muruzen Ascian Ed.
6. Lehninger L., 1990. Biochemistry. W. H. Freeman & Co.
7. Veerakumari. L. 2008. Biochemistry, MPJ Publications.



## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., Allied Zoology ( For Botany Students)</b>	
Semester	<b>IV</b>	
Course & Code	<b>Second Allied Course – (2AC3)</b>	<b>Code: U16AZY3</b>
Course Title	<b>ECONOMIC ZOOLOGY</b>	
Hours: 2	Credits : 3	Max Marks : 75

### UNIT – I

Vermiculture: Species of earthworm, rearing technology, management, economic importance.

### UNIT – II

Apiculture: Species of honey bees. Types of bee hives, Care and management, Honey extraction, Nutritive and medicinal value of honey.

### UNIT – III

Sericulture : Types, Rearing techniques, moriculture. Diseases: Muscardine, Pebrine, Flacherie and Grasserie. Life cycle of silk worm (*Bombyx mori*). Economic importance of silk.

### UNIT – IV

Fish culture: Catla, Rohu, Live feed culture (Rotifers), Induced breeding, Fish diseases (any three). Fish byproducts.

### UNIT – V

Poultry farming: Types of poultry, management, poultry nutrition, diseases and their prevention, Economics of poultry production.

### References:

1. Shukla, G.S. and V.B. Upadhyay 2003 Economic Zoology, Rastogi publications.
2. Ahsan, J. and S.P. Shiha 2005 A hand book of Economic Zoology, S. Chand & Co.
3. Sardar Singh – Bees keeping in India.
4. Santhanam – 1991. Aquaculture
5. Arumugam, N. 2008. Aquaculture, Saras Publications.
6. Sundarraj, V. 1997. Aquaculture, TANUVAS.
7. Singh – Live stock and poultry production.
8. Rama Rao, V., 2004, Poultry Science, Mangal Deep Publications.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., (Other than Zoology Students)</b>	
Semester	<b>IV</b>	
Course & Code	<b>Non Major Elective course – (NME:1)</b>	<b>Code: U16NMZY1</b>
Course Title	<b>COMMUNICABLE DISEASES</b>	
Hours: 2	Credits : 2	Max Marks : 75

### UNIT – I

Air borne diseases: Measles, Mumps, Small pox, Tuberculosis, Pneumonia, Diphtheria, Meningitis – Symptoms, Prophylaxis and Control measures.

### UNIT – II

Food and water borne diseases: Cholera, Botulism, Typhoid, Amoebiasis, Tetanus - Symptoms, Prophylaxis and Control measures.

### UNIT – III

Insect borne diseases: Yellow fever, Dengue fever, Malaria, Elephantiasis, Sleeping sickness - Symptoms, Prophylaxis and Control measures.

### UNIT – IV

Sexually transmitted diseases: Gonorrhoea, Vaginitis, Syphilis - Symptoms, Prophylaxis and Control measures.

### UNIT – V

Viral hepatitis, Influenza, Polio, Rabies; Cold sores and AIDS - Symptoms, Prophylaxis and Control measures.

### Reference Books:

1. M.J. Pelezar and R.D. Reid. 1993. Microbiology, McGraw Hill Pub.
2. Larry McKane and Judy Kandel. 2000. Microbiology. McGraw Hill Pub.
3. R.C. Dubey and D.K. Maheswari. 2005. A text book of Microbiology, S.Chand & Co. Ltd. New Delhi.
4. Mani. A. Narayanan, L.M. Selvaraj A.M. and Arumugam, N. 1996. Microbiology. Saras Publications.
5. Ananthanarayanan, R. & C.K. Jayaram Panicker, 1990. Text Book of Microbiology. Orient Longman.
6. Sharma, P.D. 1998. Microbiology, Rastoji Publications.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>V</b>	
Course & Code	<b>Core course – (CC7)</b>	<b>Code: U16ZY7</b>
Course Title	<b>DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY</b>	
Hours: 6	Credits : 6	Max Marks : 75

### UNIT – I

Fertilization; External and internal fertilization, sperm – egg interaction, Physiological changes. Cleavage; Patterns of cleavage – radial, spiral, and bilateral. Types – meroblastic, holoblastic and superficial. Factors affecting cleavage, Blastulation.

### UNIT – II

Gastrulation in frog, Morphogenic movements, Fate maps, Organizer, Development of Eye, Foetal membranes in chick, Placentation in mammals.

### UNIT – III

Stem cells : Definition, Types, Unique properties, Proliferation and Differentiation. Totipotent, Pluripotent, Multipotent and Unipotent.  
Stepwise developmental changes in human embryo, Test tube baby.

### UNIT – IV

Scope of immunology – Immunity: Innate, acquired, passive and active. Lymphoid organs: Structure and function of Primary: thymus, bone marrow, Bursa. Secondary: Spleen, tonsil, lymph node, Payer's patches. MHC: Types and functions.

### UNIT – V

Antigens: Structure, types, properties, haptens and adjuvant.  
Antibodies: Structure of immunoglobulin, types of immunoglobulin, biological properties, humoral immunity and cell mediated immunity, ELISA.

### References:

1. Arumugam, N. 2005. A Text Book of Embryology, Saras Publications, Nagarcoil.
2. Balinsky, B.I. 1981. An introduction to Embryology. W.B. Saunders company.
3. Berry. A.K. 2007. An introduction to Embryology. Emkay publications, New Delhi.
4. Berry. A.K. 2005. A text book of Immunology. Emkay publications, New Delhi-
5. Chakravarthy. A.K. 1996. Immunology, Tata McGraw Hill Publishing Co Ltd.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>V</b>	
Course & Code	<b>Core course – (CC8)</b>	<b>Code: U16ZY8</b>
Course Title	<b>MICROBIOLOGY AND BIOTECHNOLOGY</b>	
Hours: 6	Credits : 6	Max Marks : 75

### UNIT – I

Introduction: History and scope of microbiology, General structure of microbes (Bacteria, viruses, algae and fungi), Outline classification, Bacterial growth culture media, bacterial growth curve.

### UNIT – II

Food microbiology: Food poisoning, Food spoilage, Food preservation.

Industrial microbiology: Production of antibiotics (penicillin).

Soil microbiology: Role of soil microbes in Nitrogen fixation.

Medical microbiology: Diseases caused by Bacteria - Cholera, Tuberculosis.

Viruses- AIDS, Poliomyelitis. Causative organisms, symptoms, impact on the host and control measures.

### UNIT – III

Biotechnology: - Definition, Scope. **Vectors:** Plasmids- PBR322, Cosmids PJB 8, SV-40. Principles and methods of gene cloning, application.

### UNIT – IV

Transgenic plants, herbicide, insecticide and virus resistant plants. Transgenic animals mice, cattle, fishes and poultry. Socio economic issues of Biotechnology .

### UNIT – V

PCR, DNA finger printing, methodology and application, methods of gene therapy, gene silencing, biosensors – Biochips, Recombinant vaccines.

### References:

1. Ananthanarayanan, R. and Jayaram Panickar, C.K. 1999. A Text Book of Microbiology. Orient Longman.
2. Mani. A. Narayanan, L.M. Selvaraj A.M. and Arumugam, N. 1996- Microbiology. Saras Publications.
3. Sharma P.D. 1995. Microbiology, Rastogi & Company, Meerut.
4. Balasubramanian, D. 1996. Concepts of Biotechnology. University Press (India) Ltd. Hyderabad.
5. Arumugam, N. 2005. Biotechnology. Saras Publications.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>V</b>	
Course & Code	<b>Major Based Elective course – (EC1)</b>	<b>Code: U16ZY9E</b>
Course Title	<b>ECONOMIC ENTOMOLOGY</b>	
Hours: 5	Credits : 4	Max Marks : 75

### UNIT – I

Characteristic features of class Insecta, Classification with suitable examples.

### UNIT – II

Destructive insects: Bionomics and life cycle of the common pests of Paddy and Coconut. Common pest of Brinjal and pests of stored products.

### UNIT – III

Beneficial Insects:

Economic importance of Honeybee, Silkworm and Lac-insect.

Insects as pollinators, predators, parasites, weed killers, soil builders and scavengers.

### UNIT – IV

Household insect pests: Mosquito, Cockroach, Housefly, Termites, damages caused and their control measures.

### UNIT – V

Insect Pest Management: Insect pest control- Natural, applied, mechanical, cultural, chemical and biological control. Integrated pest management (IPM).

### References:

1. Chapman R.F., 1993. The Insects Structure and Functions. ELBS London.
2. Chandler A.C. and Read C.P. 1961. Introduction to Parasitology. John Wiley and Sons, New York.
3. David, B.V. and Muralirangam, N.C. and Meera Muralirangam.1992. Harmful and beneficial Insects. Popular Book Depot.
4. David, B.V 1992. Pest Management and Pesticides. Indian Scenario, Namrutha Publications.
5. Krishnan. N.T. 1993. Economic Entomology. JJ Publications, Madurai.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>II – B.Sc., Zoology</b>	
Semester	<b>V</b>	
Course & Code	<b>Major Based Elective Course –(EC2)</b>	<b>Code: U16ZY10E</b>
Course Title	<b>AQUACULTURE</b>	
Hours: 5	Credits : 4	Max Marks: 75

### UNIT – I

Scope of Aquaculture

Water quality management: O<sub>2</sub>, CO<sub>2</sub>, Salinity, pH, Biological Oxygen Demand, Planktons, Temperature and Turbidity, Aquatic weed.

### UNIT – II

Fish culture : *Catla catla* , *Labeo rohita* (Rohu), *Chanos chanos* (Milk fish), Methods of fish farming, Fish farm design, Selection of site, Types of ponds, Fish feed. Fish diseases and control.

### UNIT – III

Ornamental fresh water fish culture: Aquarium design, Common cultivable species: *Carassius auratus* (goldfish), Angel fish (*Pterophyllum scalare*), *Betta splendens* (Fighter fish), Fish live feed, Maintenance. Commercial importance.

### UNIT – IV

Oyster culture (Edible): biology of edible oyster (*Crossostrea madrasensis*), needs for oyster culter, essential condition for oyster culture, farming operation, Economic importance.

Pearl culture: Types of pearls, pearl producing animals, mechanism of pearl formation, Freshwater pearl culture.

### UNIT – V

Prawn culture (Marine): Seed collection, culture methods, common cultivable species, common diseases, commercial importance.

Government organizations: ICAR, MPEDA, CIBA, FSI and CMFRI.

### References

1. Arumugam.N. 2008. Aquaculture, Saras Publications.
2. Rath, R.,K. 2000. Freshwater Aquaculture. Scientific Publishers, PO No 91, Jodhpur. India
3. Jhingran, AVG, 1991, Fish and Fisheries of India, Hindustan Publishing Co.
4. Baradach, JE, JH Ryther and WO McLarney, 1972, Aquaculture. The farming and Husbandary of Fresh water and Marine Organisms. Wiley Interscience, New York.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	III – B.Sc., Zoology	
Semester	V & VI	
Course & Code	Core Course – (CC9)	Code: U16ZY11P
Course Title	MAJOR PRACTICAL – III (Pertaining to Developmental Biology & Immunology and Microbiology and Biotechnology)	
Hours: 3+3	Credits : 6	Max Marks : 75

### Developmental Biology

1. Observation of the structure of live spermatozoa of Calotes / Rat.
2. Observation of prepared micro slides.

**Spotters:** (a). Egg, cleavage, blastula and yolk plug stages in frog.  
(b). Egg, 24, 48, and 72 hrs developmental stages in chicks

### Immunology

1. ABO Blood grouping, Rh Type.
2. Vidal Test-Agglutination (Demonstration).
2. Observation of lymphoid organs in rat (Chart, Virtual)
3. Spotters: Immuno electrophoresis (from picture), Lymphoid organs in rat.

### Microbiology

1. Fixing and staining of bacteria using simple stain.
2. Bacteria culture (demonstration)
3. Differentiation of bacteria in a smear using gram staining.
3. Spotters: Autoclave, Petri plate, Micropipette, Laminar flow, Inoculation loop.

### Biotechnology

1. Isolation of DNA (Demonstration only)
2. Spotters: Bioreactor, Plasmid (PBR<sup>322</sup>, SV<sup>40</sup>), PCR. Transgenic animals: fish, cow, goat, rat.

A record of lab work should be maintained and submitted at the time of the practical examination.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc. Zoology</b>	
Semester	<b>V &amp; VI</b>	
Course & Code	<b>Core Course – (CC10)</b>	<b>Code: U16ZY12P</b>
Course Title	<b>MAJOR PRACTICAL – IV</b> (Pertaining to Genetics and Evolution, Environmental Biology and management, Biophysics and Biostatistics)	
Hours: 3+3	Credits : 6	Max Marks : 75

### **Genetics:**

1. Drosophila –Identification of Sex, Mutant forms (from pictures), Genetic importance.
2. Human Karyotypes: Normal, Down's, Klinefelter's and Turner's syndromes.

### **Evolution:**

1. Fossils: Trilobite, Nautilus.
2. Mimicry: Leaf insects, Stick insects, Monarch and Viceroy butterfly
3. Colouration: Chameleon, Lycodon.

### **Environmental Biology:**

1. Estimation of Dissolved oxygen.
2. Mounting and Identification of Plankton (Fresh water or marine)
3. Spotters: Animal association (parasitism, mutualism and commensalisms), Inter tidal fauna (rocky, sandy, and deep sea), Secchi disc, Thermometer, Barometer, Luxmeter, Sedgwick Rafter Cell.
4. Food web.

### **Biodiversity:** Field visit

### **Biophysics:**

1. Spotters: Spectrophotometer, pH meter and Electrophoretic unit.

### **Biostatistics:**

1. Construction of Bar and Pie diagram.
2. Calculation of Mean, Median and Mode, Standard deviation and Standard error.

A record of lab work should be maintained along with tour report and submitted at the time of the practical examination.



## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., (Other than Zoology Students)</b>	
Semester	<b>V</b>	
Course & Code	<b>Non Major Elective course – (NME-II)</b>	<b>Code: U16NMZY2</b>
Course Title	<b>VERMICULTURE</b>	
Hours: 3	Credits : 2	Max Marks : 75

### UNIT – I

Vermiculture – definition, scope and importance, common species for culture. Taxonomic position and diversity of earthworms, Life cycle, growth of *Lampito mauritti*, *Perionyx excavatus*. Food preference- Culture practices – Optimal conditions for vermiculture – temperature, pH, soil type, organic matter, protection from sun light, rain and predators.

### UNIT – II

Environmental requirements, culture methods – wormery – breeding techniques, indoor and out door cultures – monoculture and polyculture –. Outline and ecological classification – Epigeic, Endogeic and Anecic species.

### UNIT – III

Applications of vermiculture – vermiculture Biotechnology, vermiculture composting, use of vermicastings and vermivash in organic farming: horticulture, earthworms for management of municipal, selected biomedical solid wastes as feed, bait for capture, culture fisheries, forest regeneration. Medicinal importance.

### UNIT – IV

Products of vermiculture, quality control, packing, transport and marketing

### UNIT – V

Restorative roles of earthworms –. Future perspective – Predator and pathogen control in wormeries- Potentials and constraints of vermiculture in India.

### References:

1. Sultan Ahmed Ismail, 2005. The Earthworm Book. Second Revised Edition. Other India Press, Goa, India.
2. Tripathi, G. Vermiresource Technology, 2003, Discovery Publishing House, New Delhi.
3. Mary Violet Christy, A. Vermitechnology, 2008, MJP Publishers.
4. Arvind Kumar, Verms & Vermitechnology, 2005. APH Publishing Cooperation.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>VI</b>	
Course & Code	<b>Core course – (CC11)</b>	<b>Code: U16ZY13</b>
Course Title	<b>GENETICS AND EVOLUTION</b>	
Hours: 5	Credits : 5	Max Marks : 75

### UNIT – I

Human Chromosome: Karyotype, Barr Bodies, Chromosomal aberration and syndromes. Linkage, Crossing over: Definition and Mechanism, Cytological evidence of Crossing over, Drosophila as an example. Chromosomal map.

### UNIT – II

Microbial genetics: DNA as the genetic material, Recombination in bacteria: Transformation, Conjugation, Sexduction, Transduction, Recombination in bacteriophage, Mechanism of recombination, Lytic and Lysogenic cycles.

### UNIT – III

Molecular genetics : Fine structure of gene, Cistron, Recon and Muton, Gene expression and regulation in Prokaryotes, Operon model, Lac and Trp Operon, Gene regulation in Eukaryotes. Britton and Davidson model. Gene amplification. Genetic basis of Cancer.

### UNIT – IV

Theories: Lamarckism, Darwinism, Modern synthetic theory of evolution.

### UNIT – V

Mimicry and animal colouration, Speciation, Isolating mechanisms, Geological Timescale, Origin and evolution of man.

### Text Books:

1. Verma, P.S. and Agarval, V.K. 1997. Genetics . S.Chand & Co., New Delhi

### References:

1. Lewin, B. 2009. Gene X. Wiley Eastern Ltd., New Delhi.
2. Strickberger, M.W. 2002. Genetics. Printice Hall of Inda, New Delhi.
3. Rothwell, N.V. 1979. Human Genetics. Printice Hall of Inda, New Delhi.
4. Arumugam, N. 1989. Organic Evolution. Saras Publication. Nagarcoil
5. Strickberger, M.W. 2000. Evolution. Jones and Barlett Publishers.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>VI</b>	
Course & Code	<b>Core course – (CC12)</b>	<b>Code: U16ZY14</b>
Course Title	<b>ENVIRONMENTAL BIOLOGY AND MANAGEMENT</b>	
Hours: 6	Credits : 6	Max Marks : 75

### UNIT – I

Environmental Biology: Definition, Scope. Abiotic factors : Water, Soil, Temperature, Light. Biotic factors. Animal relationship; Symbiosis , Commensalism, Mutualism , Antagonism, Antibiosis, parasitism, Predation and Competition.

### UNIT – II

Ecosystem: Definition, Structure, Pond ecosystem, Primary & Secondary productions. Food chain, Food web, Trophic levels, Energy flow, Pyramid of biomass, Pyramid of energy. Biogeochemical cycle: Nitrogen and Phosphorous.

### UNIT – III

Community ecology: Characteristics, Ecological succession.

Population ecology: Definition, Density, Estimation, Natality & Mortality, Age distribution, Age pyramids, Population growth, Population equilibrium.

### UNIT – IV

Pollution and Management: Types, Sources, Effects, Air, Water, Land, Noise, Thermal, Pesticide, Radioactive, Green House effect, Ozone and its importance. Global warming, Acid rain, Bio accumulation, Bio magnification, Bio remediation.

### UNIT – V

Biodiversity: Concept, Types and Components, Global “Biodiversity hotspots”, IUCN species categories – extinct, threatened, near threatened, and least concern.

### References:

1. Clarke, G.L. 1954. Elements of Ecology, John Wiley & Sons. N.Y.
2. Kendeigh, S.C., 1961. Animal Ecology. Prentice Hall.
3. Odum, E.P., 1971. Fundamentals of Ecology. W.B. Saunders Company, Philadelphia.
4. Rastogi, V.B. and M.S. Jayaraj, 1989. Animal Ecology and Distribution of Animals.
5. Verma, P.S. and V.K. Agarwal, 1996. Principles of Ecology. S. Chand & Co New Delhi.
6. Bharucha Erach. The Biodiversity of India. Mapin Publishing Pvt.. Ltd., Ahmedabad.
7. Krishnamurthy, K.V. 2003. Introduction to Biodiversity. Oxford and IBH.

## SYLLABUS

**(For Candidates to be admitted from 2016 June Onwards)**

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>VI</b>	
Course & Code	<b>Core course – (CC13)</b>	<b>Code: U16ZY15</b>
Course Title	<b>BIOPHYSICS AND BIOSTATISTICS</b>	
Hours: 5	Credits : 5	Max Marks : 75

### UNIT – I

Colloids: Description, Types, Properties.

Donnan Equilibrium, Tyndall effect, Surface tension, Brownian movement, Filtration, Osmosis, Dialysis, Adsorption.

### UNIT – II

Components of Light: Beer and Lambert's law of light absorption.

Spectrophotometer, Laws of thermodynamics.

### UNIT – III

Biostatistics:

Data: Measurement of data, Primary and Secondary data,

Types of variables: Continuous and discontinuous variables, Qualitative and quantitative variables.

Presentation of data: Tabulation of data, Histogram, Polygon, Pie diagram.

### UNIT – IV

Definition, illustration and significance: Mean, Median, Mode, Standard deviation, Standard Error, Variance and Co Variance.

### UNIT – V

Definition, illustration and significance: Chi square, t-test, Simple Correlation and regression.

### References:

1. Daniel, M. 1992 – Basic Biophysics and Biologists. Wiley International, New Delhi.
2. Das, D. 1996. Biophysics and Biological Chemistry. Academic Publishers, Calcutta.
3. Snedecor, G.W. and W.G. Cochran 1967. Statistical methods, Oxford & IBH Publishing. New Delhi.
4. Zar, J.H. 1974. Bio statistical analysis. Prentice Hall Inc., New Jersey, USA.

## SYLLABUS

(For Candidates to be admitted from 2016 June Onwards)

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

CLASS	<b>III – B.Sc., Zoology</b>	
Semester	<b>VI</b>	
Course & Code	<b>Major based Elective course – (EC3)</b>	<b>Code: U16ZY16E</b>
Course Title	<b>WILDLIFE BIOLOGY AND NANOBIOLOGY</b>	
Hours: 5	Credits : 4	Max Marks : 75

### UNIT – I

Wildlife concept: Importance of Wildlife conservation:-ecological, ethical, educational, scientific, commercial, aesthetic, and recreational. Conservation methods:- In situ conservation-sanctuaries, national parks, biosphere reserves, Ex situ conservation-captive breeding, modern zoo, safari, nocturnal zoo.

### UNIT – II

Conservation priorities: IUCN classification - extinct, critically endangered, endangered, vulnerable, conservation dependent, low risk, data deficient, not evaluated. Flagship species, Umbrella species, Hotspots, Important Bird Areas, Tiger Reserves. Protected areas of Tamil Nadu

### UNIT – III

Conservation project: A. Tiger project- Tiger species, distribution, threats, conservation action taken, B. Elephant project: Elephants species, distribution, threats, conservation action taken. C. Crocodile Project-crocodile species, distribution, threats, conservation action taken.

### UNIT – IV

Origins of concepts of Nano, Basic and Basis: size of Nano, The meaning of Nanotechnology, Four Generations of Nanotechnology Development, Technology of General Applicability, Multi-purpose Technology, Exponential Proliferation. Applications of Nanotechnology: nanomedicine, chemistry and environment, energy, information and communication, heavy industry, consumer goods.

### UNIT – V

Nanobiology:

Basic concepts and applications: drug delivery, cancer diagnosis and therapy, surgery, In vivo therapy, Neuro-electronic Interfaces, cell Repair Machines.

Biosensors: definition, principles of detection, optical biosensor, electrochemical biosensor, nanobiosensor, DNA sensors

### References

1. Sutherland W.J.2000.The conservation hand book: research, management and policy Blackwell Science Ltd.
2. Martin and Bateson, 2007. Measuring Behaviour. Cambridge University Press.

## SYLLABUS

**(For Candidates to be admitted from 2016 June Onwards)**

PG & RESEARCH DEPARTMENT OF ZOOLOGY, NATIONAL COLLEGE (AUTONOMOUS)

3. Andrawartha, H.C. and L.C. Birch. 1974. The distribution and abundance of animals. The University of Chicago Press, London.
4. Agarwal, V.P. 1980. Forests in India. Oxford and IBH Publishing Co. New Delhi.
5. Davis, M. 1981. Infectious diseases of wild mammals. The IOWA state.
6. Giles, R.H. 1984. Wild life management techniques. The wild life society, Washington and Natraj Publishers, Dehra Dun.
7. Saharia, V.B. 1982. Wild life in India. Nataraj Publishers, Dehra Dun.
8. Foster, L.E. 2006. Medical Nanotechnology: science, innovation and Opportunity. Pearson Education. Upper Saddle River.
9. Ratner, M. and Ratner, D. 2002. Nanotechnology: A gentle introduction to the Next Big Idea. Pearson Education. Upper Saddle River.
10. Shanmugam.S. 2010. Nanotechnology. MJP Publishers. 274pp.

**SEMESTER – II**

**COURSE CODE:**

**U16SBE1**

**PART – IV: COMPUTER APPLICATIONS – I - OFFICE AUTOMATION**

**HOURS: 2**

**CREDITS: 2**

**UNIT I:**

MS- Word- Introduction to Computers - Hardware - Software, Operating System: Windows XP -MS-Paint, Notepad, WordPad, Introduction to MS-Word, Creating, Editing and Formatting Document - Working with Drawing objects - Text Manipulation

**UNIT II:**

Working with Tables – Columns – Labels - Plotting, editing and Filling drawing objectsBookmark – Header & Footer - Checking and Correcting a document - Creating Labels – Envelops – Mail Merge – Formatted output and Report generation Printing Documents, Working with Internet.

**UNIT III:**

Ms – Excel - Ms – Excel: Introduction – Data Entry – Cell Formatting - Plotting Graphs – Workbook Features – Library Functions

**UNIT IV:**

Conditional Functions and Data Sorting – Limit the data on a worksheet - Data Validation – Data consolidation - Chart creation - Checking and Correcting Data - Tracking and Managing Changes- Advanced Features

**UNIT V:**

MS – PowerPoint- Introduction - Creating, Editing and Formatting Presentation – Applying Transition and Animation Effects - Applying Design Templates - Viewing and Setting up a Slide Show - Navigating among Different Views - Ms Outlook: Introduction to Folder List – Address Book.

**TEXTBOOKS**

1. Jill Murphy, Microsoft Office Word- Comprehensive Course, Labyrinth Publications, 2003.
2. McGraw-Hill/Irwin-Deborah Hinkle, Microsoft Office 2003 PowerPoint: A Professional Approach, Comprehensive w/ Student CD, New Delhi, 2003.
3. Nellai Kannan, C., MS-Office, Nels Publications, Tamil Nadu, 2002.

## Semester III

Hours/Week: 2

Skill Based Elective II

Java Script & ASP

Credit:2 (U16SBE2)

### Objective:

- To explain the JavaScript Role in the Web page development.
- To implement the concepts of Variable, Functions, Data Types, Operators, Decision making and Repetition Statements, Frames and Forms of JavaScript.

### UNIT – I

Introduction to Java Script: JavaScript's Role on the Web – A First JavaScript Program – Working with Variables, Functions: Variables – Defining Functions – Calling Functions – Understanding JavaScript Objects – Object Methods – Variable Scope

### UNIT – II

Windows: The Window Object Model – Opening and closing Windows – Frames and Other Objects: Creating Frames – Using the TARGET Attribute – Nesting Frames – The NOFRAMES Tag

### UNIT – III

Forms: Overview of Forms – The <FORM> Tag – Form Elements: Input Fields – Selection Lists – Multiline Text Fields – Validating a User's Input to a Form

### UNIT – IV

Introduction to Active Server pages – Advantages – Processing ASP Scripts with forms variables & Constants – Subroutines.

### UNIT – V

ASP Objects: Response – Request, Applications , Session, Server & ASP Error Objects.

### Text Book:

1. Don Gosselin, "JavaScript Comprehensive" – Vikas Publishing house.

UNIT I: CHAPTER 1& 2

UNIT II: CHAPTER 5

UNIT III: CHAPTER 6

2. N. P. Gopalan and J. Akilandeswari, Web Technology – A Developer's Perspective, PHI Pvt Ltd., 2011.

Unit IV: Chapter 11.1 -11.8

Unit V: Chapter 12.1, 12.2,12.4 – 12.6 and 12.9.

### Reference Books:

1. Steve Suehring, "JavaScript Step by Step", 2nd Edition, Microsoft Corporation

2. Ivan Bayross, HTML, DHTML, Java Script, Perl, CGI,BPB, Third Revis.



## Semester III

**Skill Based Elective III  
(U16SBE3P)**

**HTML, Java Script and ASP Lab**

**Hours/Week: 2  
Credit:2**

### **Objective:**

- To improve the students in developing the web page designing concept of using java script

### **HTML Lab**

1. (a) Creation of Vertical Frameset.  
(b) Creation of Horizontal Frameset.
2. Sending Mail.
3. Insertion of Image.
4. Application form Creation.
5. Creating an Advertisement for a Company.

### **Java Script Lab**

1. Functions.
2. Frames.
3. Validation.

### **ASP**

1. Create an ASP file to display the message “Have a Good Weekend” if it is a Saturday otherwise “Hang in there, the week will get better”.
2. Write an program to get the name and favorite ice cream flavor. Respond with the price of the corresponding ice cream.
3. Create an advertisement for a bookshop using Ad Rotator component.
4. Write a program to manipulate cookies with the information between HTTP sessions such as i. Last Date visited ii. Last Time visited iii. Number of visits

**SEMESTER – I**  
**U16ES**

**COURSE CODE:**

**PART – IV: ENVIRONMENTAL STUDIES**

**HOURS: 2**

**CREDITS: 2**

**UNIT I:**

Environment and Natural Resources: Definition, scope, importance of Environmental Studies - Need for public awareness. Natural resources — classification - Associated problems a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification • Role of an individual in conservation of natural resources • Equitable use of resources for sustainable lifestyles.

**UNIT II:**

Ecosystems • Concept of an ecosystem • Structure and function of an ecosystem • Producers, consumers and decomposers • Energy flow in the ecosystem • Ecological succession • Food chains, food webs and ecological pyramids • Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**UNIT III:**

Biodiversity and its conservation • Introduction — Definition: genetic, species and ecosystem diversity • Biogeographical classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values • Biodiversity at global, National and local levels • India as a mega-diversity nation • Hot-spots of biodiversity • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts • Endangered and endemic species of India • Conservation of biodiversity In-situ and Ex-situ conservation of biodiversity

**UNIT IV:**

Environmental Pollution Definition • Cause, effects and control measures of a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards • Solid waste Management : Causes, effects and control measures of urban and industrial wastes • Role of an individual in prevention of pollution • Pollution case studies • Disaster management floods, earthquake, cyclone and landslides.

**UNIT V:**

Social Issues and the Environment • From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation, rain water harvesting, watershed management • Resettlement and rehabilitation of people; its problems and concerns. Case Studies • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies • Wasteland reclamation • Consumerism and waste products • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and control of Pollution)

Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness.

## TEXTBOOKS

1. Ekambaranatha Ayyar.M. and T.N. Ananthkrishnan, 1992. Manual of Zoology Vol. 1 [Invertebrata], parts I and II.S. Viswanathan (Printers and Publishers) Pvt. Ltd; Madras.
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Pubi. Ltd. Bikaner.
3. Sharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad.
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.
5. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai,
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment (R)
9. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press.
10. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
11. Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press
12. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi.
13. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition.
14. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
15. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
16. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA.
17. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Pubi. Co. Pvt. Ltd.
18. Sharma B.K., 2001. Environmental Chemistry. Geol Pubi. House, Meerut
19. Survey of the Environment, The Hindu (M)
20. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
21. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R)
22. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co.Philadelphia, USA  
(M) Magazine (R) Reference (TB) Textbook

**SEMESTER – IV**

**COURSE CODE:**

**U16VE**

**PART – IV: VALUE EDUCATION**

**HOURS: 1**

**CREDITS: 2**

**UNIT I:**

PHILOSOPHY OF LIFE Human Life on Earth ( Kural 629), Purpose of Life ( Kural 46) Meaning and Philosophy of Life( Kural 131, 226) The Law of Nature (Kural 374) Glorifying All form of Life in this Universe (Kural 322, 327) – Protecting Nature /Universe (Kural 16, 20, 1038)

**UNIT II:**

INDIVIDUAL QUALITIES Basic Culture (Kural 72, 431) Thought Analysis (Kural 282, 467, 666) Regulating desire (Kural 367), Guarding against anger (Kural 158, 305, 306, 314), To get rid of Anxiety (Kural 629), The Rewards of Blessing (Kural 3), Benevolence of Friendship (Kural 786), Love and Charity (Kural 76), Self – tranquility/Peace (Kural 318)

**UNIT III:**

SOCIAL VALUES (INDIVIDUAL AND SOCIAL WELFARE) Family (Kural 45), Peace in Family (Kural 1025), Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) , The Pride of Womanhood (Kural 56) Five responsibilities/duties of Man : a) to himself, b) to his family, c) to his environment, d) to his society, e) to the Universe in his lives (Kural 43, 981), Thriftness (Thrift)/Economics (Kural 754), Health (Kural 298), Education (Kural 400), Governance (Kural 691), People’s responsibility/ duties of the community (Kural 37), World peace (Kural 572)

**UNIT IV:**

MIND CULTURE Mind Culture (Kural 457) Life and Mind - Bio - magnetism, Universal Magnetism (God – Realization and Self Realization) - Genetic Centre – Thought Action – Short term Memory – Expansiveness – Thought – Waves, Channelising the Mind, Stages - Meditation (Kural 261, 266, 270), Spiritual Value (Kural 423)

**UNIT V:**

TENDING PERSONAL HEALTH Structure of the body, the three forces of the body, life body relation, natural causes and unnatural causes for diseases (Kural 941), Methods in Curing diseases (Kural 948, 949) The Five units, simple physical exercises.

**TEXTBOOKS**

1. Philosophy of Universal Magnetism (Bio-magnetism, Universal Magnetism) The World Community Service Centre Vethatri Publications (for Unit IV)
2. Pope, G.U., Dr. Rev., Thirukkural with English Translation, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613004 (for All Units)
3. Value Education for Health, Happiness and Harmony, The World Community Service Centre Vethatri Publications (for All Units)

**U16SS**

**PART – IV: SOFT SKILLS**

**HOURS: 2**

**CREDITS: 2**

**UNIT I:**

Know Thyself / Understanding Self Introduction to soft skills self discovery – Developing positive attitude – Improving perceptions – Forming values.

**UNIT II:**

Interpersonal Skills/ Understanding Others Developing interpersonal relationship –Team building –group dynamics –Net working- Improved work relationship

**UNIT III:**

Communication Skills/ Communication with others Art of Listening –Art of reading –Art of speaking –Art of writing –Art of writing emails-e mail etiquette

**UNIT IV:**

Corporate Skills/ Working with Others Developing body language –Practising etiquette and mannerism – Time management – Stress management.

**UNIT V:**

Selling Self/ Job Hunting Writing resume /cv-interview skills – Group discussion –Mock interview Mock GD –Goal setting –Career planning

**TEXT BOOKS**

1. Meena. K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills: A Road Map to Success) P.R. Publishers & Distributors, No, B-20 &21, V.M.M Complex, Chatiram Bus Stand, Tiruchirapalli -620 002. (Phone No: 0431-2702824: Mobile No: 94433 70597, 98430 7442) Alex K. (2012)
2. Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi -110 055. Mobile No: 94425 14814(Dr.K.Alex)

**REFERENCE BOOKS**

1. Developing the leader within you John C Maxwell
2. Good to Great by Jim Collins
3. The Seven habits of highly effective people Stephen Covey
4. Emotional Intelligence Daniel Goleman
5. You can Win Shive Khera

Principle

centred

leadership

Stephen

Covey

**SEMESTER – VI**

**COURSE CODE:**

**U16GS**

**PART – V: GENDER STUDIES**

**HOURS: 1**

**CREDITS: 1**

**UNIT I:**

Concepts of Gender: Sex-Gender-Biological Determinism- Patriarchy- Feminism -Gender Discrimination -Gender Division of Labour -Gender Stereotyping-Gender Sensitivity - Gender Equity —Equality-Gender Mainstreaming Empowerment

**UNIT II:**

Women's Studies Vs Gender Studies: UGC's Guidelines - VII to XI Plans- Gender Studies: Beijing Conference and CEDAW-Exclusiveness and Inclusiveness.

**UNIT III:**

Areas of Gender Discrimination: Family Sex Ratio-Literacy -Health -Governance Religion Work Vs Employment- Market - Media - Politics Law Domestic Violence — Sexual Harassment — State Policies and Planning

**UNIT IV:**

Women Development and Gender Empowerment: Initiatives International Women's Decade - International Women's Year - National Policy for Empowerment of Women - Women Empowerment Year 2001- Mainstreaming Global Policies.

**UNIT V:**

Women's Movements and Safeguarding Mechanism:— In India National / State Commission for Women (NCW) - All Women Police Station Family Court- Domestic Violence Act - Prevention of Sexual Harassment at Work Place Supreme Court Guidelines - Maternity Benefit Act - PNDT Act - Hindu Succession Act 2003 Eve Teasing Prevention Act - Self Help Groups 73 and 74 Amendment for PRIS.

**TEXTBOOKS**

1. Bhasin Kamala, Understanding Gender: Gender Basics, New Delhi: Women Unlimited 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics, New Delhi: Women Unlimited, 2004
3. Bhasin Kamala, What is Patriarchy? : Gender Basics, New Delhi: Women Unlimited, 1993
4. Pernau Margrit Ahmad Imtiaz, Reifeld Hermut (ed.,) Family and Gender: Changing Values in Germany and India, New Delhi: Sage Publications, 2003
5. Agarwal Bina, Humphries Jane and Robeyns Ingrid (ed.,)
6. Capabilities, Freedom, and Equality: Amartya Sen's Work from a Gender Perspective, New Delhi: Oxford University Press, 2006
7. Rajadurai.S.V, Geetha.V, Themes in Caste Gender and Religion, Tiruchirappalli: Bharathidasan University, 2007 Misra Geetanjali, Chandiramani Radhika (ed.,)

8. Sexuality, Gender and Rights: Exploring Theory and Practice in South and Southeast Asia, New Delhi: Sage Publication, 2005 Rao Anupama (ed.,)
9. Gender & Caste: Issues in Contemporary Indian Feminism, New Delhi: Kali for Women, 2003
10. Saha Chandana, Gender Equity and Gender Equality: Study of Girl Child in Rajasthan, Jaipur: Rawat Publications, 2003
11. Krishna Sumi, (ed.,) Livelihood and Gender Equity in Community Resource Management New Delhi: Sage Publication, 2004
12. Wharton .S Amy, The Sociology of Gender: An Introduction to Theory and Research, USA: Blackwell Publishing, 2005.
13. Mohanty Manoranjan (ed.,) Class, Caste, Gender: Readings in Indian Government and Politics- 5, New Delhi: Sage Publications, 2004.
14. Arya Sadhna, Women, Gender Equality and the State, New Delhi: Deep & Deep Publications, 2000.