JAYARAJ ANNAPACKIAM COLLEGE FOR WOMEN (AUTONOMOUS)

A Unit of the Sisters of St. Anne of Tiruchirappalli

Accredited with 'A' Grade (3rd Cycle) by NAAC

DST - FIST Supported College Since 2015

(Affiliated to Mother Teresa Women's University, Kodaikanal)

PERIYAKULAM – 625 601, THENI DT.
TAMIL NADU.

B.SC. ZOOLOGY

2017 - 2020

DEPARTMENT OF ZOOLOGY

PROGRAMME OUTCOMES - U.G.

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES - U.G.

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO - 1	Identify and document the fauna and flora, evaluate the association of life sciences with other disciplines of sciences and comprehend advance knowledge in specific areas of Zoology.	PO - 1 PO - 2 PO - 4 PO - 5
PSO - 2	Acquire in depth knowledge in the concepts of cell Biology, Genetics, Biological Chemistry, Developmental Biology, Immunology, Microbiology, Biochemistry, Physiology, Biostatistics, Environmental Biology, Evolution, Biotechnology and Genetic Engineering.	PO - 1 PO - 2 PO - 5
PSO - 3	Survey the human life processes and demonstrate their ability to analyze the clinical samples and to diagnose the health ailments and aspire for healthy living	PO - 3
PSO - 4	Apply the knowledge and understanding of Zoology to one's own life and profession and become entrepreneur.	PO - 6
PSO - 5	Equip themselves to fetch career opportunities in teaching, research and industry and extend the knowledge and skill to the neighbourhood.	PO - 3 PO - 6

U.G. COURSE PATTERN (2017 - 2020)

Sem.	Part	Code	Title of the paper	Hours	Credit
I	I	17GT1GS01/ 17GH1GS01	Tamil – I/ Hindi	5	3
	II	17GE1GSA1/ 17GE1GSB1	English - I	5	3
	III	17ZO1MC01	Invertebrata - I	5	4
		17ZO1MC02	Invertebrata - II	4	3
		17ZO1CP01	Practical - I Invertebrata - Lab	2	1
		17CH1AC01	Allied Chemistry - I	3	3
		17CH1AP01	Allied Practical - I: Volumetric Analysis	2	1
	IV	17VE1GS01	Value Education	2	2
		17AE1SK01	SBE - I Communication Skill	2	2
			Total	**30**	**22**
II	I	17GT2GS02/ 17GH2GS02	Tamil-II/ Hindi	5	3
	II	17GE2GSA2/ 17GE2GSB2	English - II	6	3
	III	17ZO2MC03	Chordata - I	5	4
		17ZO2MC04	Chordata - II	5	3
		17ZO2CP02	Practical - II Chordata - Lab	2	1
		17CH2AC02	Allied Chemistry - II	3	3
		17CH2AP02	Allied Practical - II: Organic Analysis	2	1
	IV	17ZO2SK02	SBE - II Apiculture	2	2
			Total	**30**	**20**
III	I	17GT3GS03/ 17GH3GS03	Tamil-III/ Hindi	5	3
	II	17GE3GSA3/ 17GE3GSB3	English - III	6	3
	III	17ZO3MC05	Cell Biology	4	4
		17ZO3MC06	Genetics	4	3
		17ZO3CP03	Practical - III Cell Biology and Genetics- Lab	2	1
		17BO3AC01	Allied Botany - I	3	3
		17BO3AP01	Allied Botany - I - Lab	2	1
	IV	17ES3GS01	Environmental Studies	2	2
		17AE3SK03	SBE - III Office Automation - Lab	2	2
			Total	**30**	**22**
IV	I	17GT4GS04/ 17GH4GS04	Tamil-IV/ Hindi	5	4
	II	17GE4GSA4/ 17GE4GSB4	English - 1V	6	4
	III	17ZO4MC07	Biochemistry	6	5
		17ZO4CP04	Practical-IV Biochemistry and Evolution-Lab	2	1
		17BO4AC02	Allied Botany - II	3	3
		17BO4AP02	Allied Botany - II - Lab	2	1
		17ZO4CE1A/ 17ZO4CE1B	Evolution/ Dietetics	4	3
	IV	17ZO4SK04	SBE - IV Food and Nutrition	2	2
			Total	**30**	**23**

Sem.	Part	Code	Title of the paper	Hours	Credit
V	III	17ZO5MC08	Immunology	5	5
		17ZO5MC09	Microbiology	5	5
		17ZO5MC10	Molecular Biology	5	4
		17ZO5MC11	Biostatistics and Bioinformatics	5	4
		17ZO5CP05	Practical - V Immunology, Microbiology and Biostatistics - Lab	4	2
		17ZO5CE2A/ 17ZO5CE2B/ 17ZO5CE2C/ 17ZO5CE2D	Genetic Engineering/ Biotechnology/Home Aquarium/Economic Entomology	4	3
	IV	17AE5NE01/ 17NC6NE01	NME - I Aptitude building - I/ Organization and Health Programme in NCC	2	2
			Total	**30**	**25**
VI	III	17ZO6MC12	Environmental Biology	6	6
		17ZO6MC13	Developmental biology	7	6
		17ZO6MC14	Physiology	7	6
		17ZO6CP06	Practical - VI Environmental Biology, Developmental biology and Physiology - Lab	4	2
		17ZO6CE3A/ 17ZO6CE3B/ 17ZO6CE3C/ 17ZO6CE3D	Clinical Lab Technology/ Sericulture/Poultry Science/Dairy Farming	4	3
	IV	17AE6NE02/ 17NC6NE02	NME - II Aptitude building - II/ National Integration and Personality Development	2	2
		17ZO6SS01	Self Study: Basic Health Education	-	2*
			Total	**30**	**25+2***
I-IV	V	17NP4GS01	NSS, NCC, P. Ed.	-	1
IV-V		17EX5GS01	Extension	-	2
			Total		3
			Total for all Semesters	**180**	**140+2***

*Extra Credit

ALLIED ZOOLOGY

Sem.	Part	Code	Title of the paper	Hours	Credit
I	III	17ZO1AC01	Allied Zoology - I	3	3
		17ZO1AP01	Allied Zoology - I - Lab	2	1
II	III	17ZO2AC02	Allied Zoology - II	3	3
		17ZO2AP02	Allied Zoology - II - Lab	2	1

NON MAJOR ELECTIVE

Sem.	Part	Code	Title of Paper	Hours	Credits
V	IV	17AE5NE01	NME - I	2	2
VI	IV	17AE6NE02	NME - II	2	2

SKILL BASED ELECTIVE

Sem.	Part	Code	Title of Paper	Hours	Credits
I	IV	17AE1SK01	SBE - I Communication skill	2	2
II	IV	17ZO2SK02	SBE - II Apiculture	2	2
III	IV	17AE3SK03	SBE - III Office Automation	2	2
IV	IV	17ZO4SK04	SBE - IV Food and Nutrition	2	2

EXTERNAL UG QUESTION PATTERN FOR ZOOLOGY MAJOR AND ALLIED

Time: 3 hours **Marks: 60**

PART - A

Answer all the questions 10 x 1 = 10

PART- B

Five either or questions (one from each unit) 5 x 4 = 20

PART - C

Answer any three out of five 3 x 10 = 30

PART - I Tamil - தற்கால இலக்கியம்

பருவம்: ஒன்று **நேரம்: 5**

குறியீடு: 17GT1GS01 **புள்ளி: 3**

நோக்கம்:

- ❖ தற்கால இலக்கியக் கவிஞர்களைப் பற்றி அறிந்து கொள்வர்.
- ❖ இலக்கிய வரலாற்றை அறிந்து கொள்வர்
- ❖ வாழ்க்கையில் ஏற்படும் துன்பங்களை அகற்றி, வெற்றி பெறும் வழிமுறைகளைத் தெரிந்து கொள்வர்.
- ❖ கட்டுரைகள் வழி பன்முகத் தகவல்களை அறிந்து கொள்வர்.
- ❖ எழுத்து இலக்கணங்களை அறிந்து கொள்வர்.

அலகு 1: மரபுக் கவிதை

1. பாரதியார் - செந்தமிழ் நாடு
2. பாரதிதாசன் - வாழ்வில் உயர்வு கொள்!
3. குவிமணி - ஒற்றுமையே உயிர் நிலை
4. நாமக்கல் கவிஞர் - தேறிய தெளிவு

அலகு 2: புதுக்கவிதை

1. நா.காமராசன் - கடல்
2. வைரமுத்து - நம்பிக்கை ஊன்றி நட
3. சிற்பி - மூல ஒலி
4. கோவை பழநிசாமி - பெண்மையே...

அலகு 3: உரைநடை

1. டாக்டர்.எம்.எஸ். உதயமூர்த்தி - வெற்றிக்கு முதல்படி

அலகு 4: கட்டுரைகள்

1. கண்டேன் கொள்ளிப் பிசாசை-பிலோ இருதயநாத்
2. சுய முன்னேற்றக் கட்டுரை-துளைகளில்லாப் புல்லாங்குழல்-வெ.இறையன்பு
3. அறிவியல் கட்டுரை-மருந்துகளிடம் எச்சரிக்கைமுனைவர் க. பூரணச்சந்திரன் (தொகுப்பாசிரியர்)
4. வரலாற்றுக் கட்டுரை-உழுதொழில் (ந.மு.வேங்கடசாமி நாட்டார்)
5. இலக்கியக் கட்டுரை-பாரதியார் போற்றும் புதுமைப் பெண் (நிர்மலா மோகன்)

அலகு 5: இலக்கணம், இலக்கிய வரலாறு

1. இலக்கணம்: - எழுத்தும், சொல்லும்

   எழுத்து - முதலெழுத்து, சார்பெழுத்து

   சொல் - பெயர்ச்சொல், வினைச்சொல், இடைச்சொல், உரிச்சொல்

2. எம். ஆர். அடைக்கலச்சாமி - இலக்கிய வரலாறு:

   (தற்கால இலக்கியம், மரபுக்கவிதை, புதுக்கவிதை, உரைநடை தொடர்பான இலக்கிய வரலாறு)

பாடநூல்கள்:

1. தொகுப்பாசிரியர் கவிஞர் பத்மதேவன் - ‘பாரதியார் கவிதைகள் ‘
காளீஸ்வரி பதிப்பகம் சென்னை - 17
இரண்டாம் பதிப்பு 2009.

2. தொகுப்பு: கீர்த்தி - ‘பாரதிதாசன் கவிதைகள்’
அருணா பப்ளிகேஷன்ஸ் சென்னை
முதல் பதிப்பு -2008.

3. கவிமணி - மலரும் மாலையும்
பூம்புகார் பதிப்பகம்,சென்னை.முதல்
பதிப்பு, 2002.

4. நாமக்கல் கவிஞர் - தமிழன் இதயம் கவிதைகள்’
முல்லை நிலையம்
சென்னை முதல் பதிப்பு - 2000

5. நா.காமராசன் - கருப்பு மலர்கள்,திருமகள் நிலையம்,
வெங்கட நாராயணா சாலை
தி.நகர்,சென்னை - 600 017
முதல் பதிப்பு - ஏப்ரல் - 1971

6. வைரமுத்து கவிதைகள் - ‘திருமகள் நிலையம்’,
16, வெங்கட்நாராயணா சாலை,
சென்னை - 17.
பத்தாம் பதிப்பு - 2009.

7. சிற்பி - சிற்பி கவிதைகள்
நியூ செஞ்சுரி புக் ஹவுஸ்
சென்னை. முதல் பதிப்பு - 2011.

8. கோவை பழநிசாமி - விளக்குகள் எரியாத வீதி
மனோண்மணி பதிப்பகம்,கோவை.
முதல் பதிப்பு - 2006

9. டாக்டர்.எம்.எஸ.உதயமூர்த்தி - வெற்றிக்கு முதல்படி
கங்கை புத்தக நிலையம்
சென்னை - 600041
முதல் பதிப்பு - 1993

10. வெ. இறையன்பு - ‘உள்ளொளிப் பயணம்’
நியூசெஞ்சுரி புக் ஹவுஸ்
சென்னை - 98
மூன்றாம் பதிப்பு - 2007

11. பூரணச்சந்திரன் - அறிவியல் கட்டுரைகள்
அறிவுப் பதிப்பகம்,சென்னை-600014
முதல் பதிப்பு - 2006

12. ந.மு.வேங்கடசாமிநாட்டார் - நாவலர் நாட்டார் தமிழ் உரைகள்
தமிழ் மண் பரிப்பகம், சென்னை-600017
முதல் பதிப்பு - 2007

13. முனைவர். நிர்மலா மோகன் - ‘இலக்கிய மலர்கள்’
மீனாட்சி புத்தக நிலையம், மதுரை - 1
முதல் பதிப்பு - 2004.

14. எம். ஆர். அடைக்கலச்சாமி - ‘இலக்கிய வரலாறு’
ராசி பதிப்பகம், சென்னை - 73.
41ஆம் பதிப்பு - 2011.

LANGUAGE THROUGH LITERATURE - I

STREAM -A

Semester: I **Hours: 5**

Code : 17GE1GSA1 **Credits: 3**

COURSE OUTCOMES:

- Develop and integrate the use of four language skills i.e. Reading, Listening, Speaking and Writing
- Analyze and interpret texts written in English, evaluating and assessing the results in written or oral arguments using appropriate support.
- Develop critical thinking capabilities.
- Become proficient in English for global competency.
- Improve and extend the communication strategies in the language.

UNIT I: PROSE **2 hours**

How to be a Doctor - Stephen Leacock

Fifteen Years - R.K.Narayan

UNIT II: POETRY **1 hour**

The Lotus - Toru Dutt

Solitude - Alexander Pope

Mending Wall - Robert Frost

UNIT III: SHORT STORY **1 hour**

The Model Millionaire - Oscar Wilde

Mrs. Packletide's Tiger - Saki

UNIT IV: ONE ACT PLAYS

Monkey's Paws - W.W.Jacobs

UNIT V: COMPOSITION AND GRAMMAR **1 hour**

One Word Substitutes

Foreign Words and Phrases

Jumbled Sentences

Reading Comprehension

Tenses, Articles.

COURSE BOOK:

- 'Limelight-1', SSK Publishers and Distributors, Chennai, 2016
- Savarimuttu,J.S Rohan, and Petricia Alphine Nirmala. *English Grammar and usage –An ideal Companion For Advanced Learners .* Chennai: New Century Book House (P) Ltd, 2016.Print.

LANGUAGE THROUGH LITERATURE - I - 17GE1GSA1

QUESTION PATTERN

STREAM – A

Time: 3 hours		**Marks: 60**
I.	Choose the best answer (from units I & II)	10x1=10
II.	Answer any two of the following in a paragraph of 100 words each (two out of 4 from units I & II)	2x5=10
III.	Answer any two of the following in an essay of 300 words each (two out of 4 from units I, II, III & IV)	2x10=20
IV.	Rearrange the jumbled sentences (from Unit V)	5
V.	Give one word substitutes / foreign words for the following (from Unit V from the prescribed book)	5
VI.	Read the passage and answer the following questions. (from Unit V)	5
VII.	Fill in the blanks with suitable tenses and articles (from Unit V)	5

LANGUAGE THROUGH LITERATURE-I

STREAM – B

Semester: I **Hours: 5**

Code : 17GE1GSB1 **Credits: 3**

COURSE OUTCOMES

- Get exposed to a range of contexts where the language is used to meet a variety of real life communication needs.
- Learn good English to prosper in professional and personal lives
- Become proficient in English for global competency
- Enhance language through a task- based and learner- centric syllabus
- Carry out all the LSRW skills

UNIT I: PROSE 1 hour

Stephen Leacock	-	With the Photographer
Catherine Lim	-	Eggs
M.K.Gandhi	-	Voluntary Poverty

UNIT II: POETRY 1 hour

Alfred Noyes	-	The Highway Man
William Wordsworth	-	The Solitary Reaper
W.B.Yeats	-	The Ballad of Father Gilligan

UNIT III: SHORT STORY 1 hour

Guy de Maupassant	-	Simon's Papa
Lafcadio Hearn	-	The Living God

UNIT IV: COMMUNICATIVE EXPRESSIONS 1 hour

Greeting

Introducing

Seeking Permission

Expressing Gratitude

UNIT V: GRAMMAR & COMPOSITION 1 hour

Parts of speech (P.No. 1to6)

Articles (P.No. 67-71)

Letter Writing (Leave Application & Letter of Complaints)

BOOKS FOR REFERENCE:

- Savarimuttu,J.S Rohan, and Petricia Alphine Nirmala. *English Grammar and usage – An ideal Companion For Advanced Learners .* Chennai: New Century Book House (P) Ltd, 2016. Print.
- G.Radhakrisna Pillai, and K.Rajeevan. *Spoken English forYou.* Chennai: Emerald Publishers, 2012. Print.

LANGUAGE THROUGH LITERATURE – I – 17GE1GSB1

QUESTION PATTERN

Stream – B

Time: 3 hours **Marks : 60**

I.	Choose the best Answer (from units I & II)	10x1=10
II.	Answer any two of the following in a paragraph of 100 words each (two out of four from units I, II & III)	2x5=10
III.	Answer any two of the following in an essay of 300 words each (two out of four from units I, II, & III)	2x10=20
IV.	Matching the expressions. (from unit IV)	5
V.	1. Fill in the blanks. (from unit V -5 marks for identification of Parts of Speech and 5- marks for Articles)	10x1=10
	2. Letter writing (from unit V)	5

INVERTEBRATA - I

Semester: I **Hours: 5**

Code : 17ZO1MC01 **Credit: 4**

COURSE OUTCOMES:

- Discuss the basic principles of taxonomy, nomenclature and the levels of structural organization of animals.
- Describe the functions of gemmules, spicules in poriferans and canal system in sponges.
- Gain knowledge on corals, coral reefs and polymorphism.
- Acquire clear knowledge on salient features of helminthes.
- List out the common helminth parasites of human and domestic animals.

UNIT I

Principles of Taxonomy - Binomial Nomenclature - Classification of Animal Kingdom. Levels of organization- Grades of organization, symmetry and coelom.

Protozoa: General characters and classification up to classes with the salient features of the following examples: *Amoeba*, *Trypanosoma* and *Euglena*. Type study - *Paramecium*. Structure, life cycle and control measures of *Entamoeba* and *Plasmodium*. Nutrition in Protozoa. **(15 Hours)**

UNIT II

Porifera: General characters and classification up to classes with the salient features of the following examples: *Chalina* and *Hyalonema.* Type study - Ascon and Sycon. Canal system in sponges, Reproduction in sponges. **(15 Hours)**

UNIT III

Coelenterata: General characters and classification up to classes with the salient features of the following examples: *Physalia*, *Aurelia* and Sea Anemone. Type study *Obelia*. Corals and coral reefs, Polymorphism in Hydrozoa. **(15 Hours)**

UNIT IV

Platyhelminthes: General characters and classification up to classes with the salient features of the following examples: Planaria and Tapeworm. Type study - Liver fluke. **(15 Hours)**

UNIT V

Aschelminthes: General characters and classification up to classes with the salient features of the following examples: *Wuchereria bancrofti*, *Enterobius vermicularis, Ancylostoma duodenale* and *Dracunculus medinensis*. Type study- Ascaris. Parasitic adaptations of Helminthes. **(15 Hours)**

COURSE BOOK:

Nair N.C., Dr. S. Leelavathy, N. Soundara Pandian, Dr. T. Murugan, N. Arumugam. (2010). A text book of Invertebrates. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE :

1. Ayyar, E.K. and T.N. Ananthakrishnan, (1992). Manual of Zoology Vol. I (Invertebrata), Parts I & II. S. Viswanathan (Printers and Publishers) Pvt Ltd., Madras.
2. Dhami, P.S. and J.K. Dhami (1979).Invertebrate Zoology - R.Chand and Co.
3. Hickman, C.P. Jr., F.M.Hickman and L.S. Roberts (1984). Integrated Principles of Zoology, 7th Edition, Times Merror/Mosby College Publication. St. Louis.
4. Ismail, S.A., (1997). Vermicology: The Biology of Earthworm, Orient Longrnan, India, Jain, A.P. (2002). Biology of the invertebrates, 4th edn. Tata McGraw Hill Publishing Company Ltd.
5. Jordan, E.K. and P.S. Verma, (1993). Invertebrate Zoology, 12th Edition, S. Chand & Co Ltd., Ram Nagar, New Delhi.
6. Nair N.C., Dr. S. Leelavathy, N. Soundara Pandian, Dr. T. Murugan, N. Arumugam. (2010). A Text book of Invertebrate s. Saras Publication, Nagercoil.
7. Kotpal, R.L., (1988-1992). (All Series) Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca,Echinodermata, Aves - Rastogi Publications, Meerut - 250 002.

INVERTEBRATA - II

Semester: I **Hours: 4**

Code : 17ZO1MC02 **Credit: 3**

COURSE OUTCOMES:

- Describe the structure, arrangement and functions of body system of Annelids.
- Gain knowledge on the importance of Arthropods and the phylogenetic significance of Peripatus and Limulus.
- Acquire knowledge on social life and the economic importance of honey bee, silk worm and lac insect.
- Exhibit their expertise in oyster culture and pearl culture techniques.
- Understand the water vascular system in Echinoderms and the phylogenetic significance of its larval forms.

UNIT I

Annelida: General characters and classification up to classes with the salient features of the following examples Leech, *Nereis* and *Chaetopterus*. Type study - Earthworm. Trochophore larva and its significance. Metamerism. **(12 Hours)**

UNIT II

Arthropoda I : General characters and classification up to classes with the salient features of the following examples: Spider, Millipede, Centipede and Sacculina. Type study Prawn - External morphology - Appendages- Digestive system- Sense organs- Reproductive system . Larval forms of Crustaceans and their significance. Phylogenetic significance of Peripatus and Limulus. Economic importance of insects. **(12 Hours)**

UNIT III

Arthropoda II : Mouth parts of insects. Beneficial insects- Honey bee, Lac insects and Silkworm. Arthropod vectors- Mosquitos, Housefly, Bedbug, Head louse, Fleas, Ticks and Mites. Social life in insects- Ants, Termites and Bees. Pest of Paddy (*Leptocoryza varicornis*), Coconut (*Oryctes rhinocerus*), Cotton (*Earias fabia*) and Sugarcane (*Pyrilla perpusilla*) . **(12 Hours)**

UNIT IV

Mollusca: General characters and classification up to classes with the salient features of the following examples: Chiton, Fresh water mussel and Octopus. Type study: Pila- External morphology - Pallial complex- Digestive system- Sense organs- Reproductive system. Foot in Mollusca, Oyster culture and Pearl industry in India. **(12 Hours)**

UNIT V

Echinodermata: General characters and classification up to classes with the salient features of the following examples: Brittle star, Sea Urchin, Sea Cucumber, Sea Lily. Type study: Star fish- External morphology - Pedicellaria- Digestive system- Water vascular system- Sense organs- Reproductive system. Water vascular system in Echinoderms, Larval forms of Echinoderms and their phylogenetic significance. **(12 Hours)**

COURSE BOOK:

Nair N.C., Dr. S. Leelavathy, N. Soundara Pandian, Dr. T. Murugan, N. Arumugam. (2012). A TEXT BOOK of Invertebrates. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Adam Sedgewick .(1990) . A students text books of Zoology - Vol I and III - Central Book Depot, Alahabad.
2. Ayyar, E.K. and T.N. Ananthakrishnan. (1992). Manual of Zoology Vol. I (Invertebrata), Parts I & II. S. Viswanathan (Printers and Publishers) Pvt Ltd., Madras, 991p.
3. Dhami, P.S. and J.K. Dhami. (1979). Invertebrate Zoology R. Chand and Co.
4. Hickman, C.P. Jr., F.M. Hickman and L.S. Roberts. (1984). Integrated Principles of Zoology, 7th Edition, Times Merror/Mosby College Publication. St. Louis. 1065pp.
5. Ismail, S.A.,. (1997). Vermicology: The Biology of Earthworm, Orient Longrnan, India, 92 pp.
6. Jain, A.P. (2002). Biology of the invertebrates, 4th edn. Tata McGraw Hill Publishing Company Ltd.
7. Jordan .E.L. and P.S. Verma. (1988). Invertebrate Zoology. S. Chand and Co Ltd., Ram Nagar, Delhi.
8. Jordan, E.K. and P.S. Verma. (1993). Invertebrate Zoology, 12th Edition, S. Chand & Co Ltd., Ram Nagar, New Delhi, 1050 pp.
9. Kotpal, R.L.,.(1988-1992).(All Series) Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata, Aves - Rastogi Publications, Meerut - 250 002.
10. Kotpal, R.L.,.(2004). Modern text book of Zoology-Invertebrates, 9th edn. Rastogi Publications, Shivaji Road, Meerut.

PRACTICAL - I - INVERTEBRATA - LAB

Semester: I **Hours: 2**

Code : 17ZO1CP01 **Credit: 1**

COURSE OUTCOMES:

- Compare the general biology of few Invertebrates.
- Locate the invertebrate animals in their specific taxonomic position.
- Mount the body setae of earthworm and compare the mouth parts of honey bee and mosquito.

DISSECTION

Earthworm:

External characters

Cockroach:

External characters

Digestive system

Nervous system

MOUNTING

Earthworm: Body setae

Mouth parts Honey bee, Cockroach and Mosquito

Honey bee sting

SPOTTERS

Amoeba, Euglena, Paramecium, Tubipora, Obelia, Sea Anemone, Liver fluke, Tapeworm, Planaria, *Ascaris* (Male and female), *Nereis*, *Peripatus*, Limulus, Centipede, Prawn, Nauplius larva, Zoea larva, Chiton, Octopus, Sepia, Sea cucumber, Sea urchin, Starfish.

ALLIED CHEMISTRY - I (I B. Sc. ZOOLOGY)

Semester: I **Hours: 3**

Code : 17CH1AC01 **Credits: 3**

COURSE OUTCOMES:

- Explain the periodicity of elements and the fundamentals in chemistry
- Describe about atomic structure and chemical bonding
- Classify carbohydrates, proteins, amino acids and to illustrate their structure and properties
- Classify vitamins and recognize about their deficiency diseases
- Evaluate the empirical and molecular formulae for the given organic compound
- Categorize the types of polymers and demonstrate the application of commercially available polymers

UNIT I: PERIODIC TABLE:

Modern periodic table - groups and periods - classification of elements on the basis of electronic configuration - properties of elements - atomic radii - ionic radii - size of atoms and ions - ionization energy - electronegativity **(9 Hours)**

UNIT II: STRUCTURE OF ATOM:

Bohr model of an atom - merits and demerits - Sommerfield modification - wave nature - de Broglie's equation - difference between orbit and orbital - shapes of atomic orbitals

BONDING:

VB theory - s-s, s-p and p-p overlap - application to the formation of simple molecules like hydrogen and oxygen - MO theory - MO diagram for H_2, O_2 and F_2 - difference between VB theory and MO theory **(9 Hours)**

UNIT III: CARBOHYDRATES:

Definition - classification- sources - structure of glucose, fructose, sucrose, cellulose - tests for carbohydrates

AMINO ACIDS: Classification - uses

PROTEINS: Color reactions of proteins

VITAMINS: Classification - sources - deficiency diseases **(9 Hours)**

UNIT IV: DEDUCING MOLECULAR FORMULA:

Detection of nitrogen in organic compounds (Lassigne's test) - definition of empirical formula, molecular formula and structural formula - calculation of empirical and molecular formula from their percentage composition - difference between EF,MF, and SF **(9 Hours)**

UNIT V: POLYMER CHEMISTRY:

Definition - classification of polymers - rubber - natural rubber - vulcanization - synthetic rubbers - preparation and uses of buna rubbers and neoprene- **Plastics** - thermoplastics and thermosetting plastics - distinction and uses. **Resins** - definition - preparation and uses of bakelite **(9 Hours)**

COURSE BOOKS:

Study material prepared by the Department of Chemistry

BOOKS FOR REFERENCE:

1. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007
2. P.L. Soni , Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Sons, 20th edition, 2006
3. B.R. Puri, L.R. Sharma and S. Pathania, Physical Chemistry, Vishal Publishing Co, 41st edition, 2004

ALLIED PRACTICAL I: VOLUMETRIC ANALYSIS

(Examination at the end of I Semester)

Semester: I **Hours: 2**

Code : 17CH1AP01 **Credits: 1**

COURSE OUTCOMES:

- Gain practical knowledge about various types of titrations and indicators
- Apply the skills to do the volumetric titration in double burette method
- Demonstrate the principles of titrimetry
- Analyze titrimetric data systematically
- Estimate the amount of substance in a given solution.

I. ACIDIMETRY AND ALKALIMETRY

1. Estimation of NaOH
2. Estimation of Na_2CO_3
3. Estimation of HCl
4. Estimation of oxalic acid

II. PERMANGANIMETRY

1. Estimation of ferrous sulphate
2. Estimation of ferrous ammonium sulphate
3. Estimation of oxalic acid

III. IODOMETRY

1. Estimation of potassium dichromate (demonstration only)

BOOK FOR REFERENCE:

Practical guide prepared by the Chemistry Department

VALUE EDUCATION

Semester: I **Hours: 2**

Code : 17VE1GS01 **Credit: 2**

COURSE OUTCOMES:

- Develop positive attitude towards life
- Internalize human values and sense one's personal identity and growth
- Face challenges in life positively with a knowledge on life coping skills
- Uphold the dignity of women
- Contribute more for women development and women empowerment

UNIT I

Values in Life- Personal, Social, Values in love and marriage, Spiritual and Professional - Life values - societal concerns and challenges. **(6 Hours)**

UNIT II

Life oriented skills - Self identity - self - esteem, self - concept, self - acceptance - Positive thinking - Positive attitude - Time management **(6 Hours)**

UNIT III

Motivation - Goal setting - Goal, its focus and importance - Success - obstacles to success - overcoming obstacles - Problem solving - Decision making - decision making process. **(6 Hours)**

UNIT IV

Women in society - Sex differences and sexual discrimination in society traditional bases of sexual identity - Actual Difference between the sexes - Social consequences of women's employment in modern society. **(6 Hours)**

UNIT V

Women in the Indian society - Status of women in independent India - problems of women in modern India - Rights and protection given to women by the constitution of India - Strategies for the Protection of women's rights and Rehabilitation of Women - Future Prospects **(6 Hours)**

COURSE BOOK:

- Value Education: Course Material Prepared by the Department of Foundation Courses. JAC

BOOKS FOR REFERENCE:

1. Dr. Xavier Alpphonse S.J., *"We Shall Overcome" - A Text book on Life Coping Skills,* ICRDCE Publication, Chennai, 2011
2. அருள்நிதி ஆ.மு. தாமோதரன் முதுநிலை பேராசிரியர் - இயேசு காட்டும் யோகம். அன்பு நெறி வெளியீடு திண்டுக்கல்.
3. Dennis K. Kelly, ''Achieving Unlimited Success'', Indra Publishing House, Bhopal, 2009
4. Felix Koikara, SDB., ''Live Your Values''-Teacher's Guide, Don Bosco Youth Animation Centre, Ennore, Madras, 1990
5. Elizabeth B. Hurlock, 'Personality Development, TMH Publications, New Delhi, 2004.

CONTINUOUS INTERNAL ASSESSMENT

Components	Marks
Mid Semester	30
End Semester	30
Case Study Report	20
Book/Film Review	20
Total	**100**

QUESTION PATTERN (MID AND END SEMESTER EXAM)

Three essay type questions on any current issues or challenges facing society. [3x10=30]
{Issues and current trends related to women, national importance, societal, environment or value crisis among youth}

PORTIONS FOR INTERNAL TESTS:

I & II Units - Mid Semester

III, IV & V Units - End Semester

COMMUNICATION SKILLS

Semester: I **Hours: 2**

Code : 17AE1SK01 **Credits: 2**

COURSE OUT COMES:

- Develop the four language skills
- Prepare, organize and deliver an effective oral presentation.
- Create suitable situations for role play, debate and group discussion.
- Practice in writing resume and letters.
- Utilize the concept, methodology and components of an Interview

UNIT I - PERSONAL OMMUNICATION

Intra-Personal Communication

Inter-Personal Communication

UNIT II - COMMUNICATION IN AN EDUCATIONAL ENVIRONMENT

Letter Writing

Situational Conversations

Group Discussion

UNIT III - COMMUNICATION FOR CAREER

Facing Interviews

Team Work

UNIT IV- COMMUNICATION IN A GATHERING

Presentation Skills

UNIT V - PUBLIC SPEECH

Welcome Speech

Vote of Thanks

Felicitations

Feedback

COMMUNICATION SKILLS -17AE1SK01

QUESTION PATTERN

Time: 1 Hour **Marks: 30**

I.	Write short notes on any two of the following (From Unit - I, III & IV)	2x5=10
II.	Letter Writing. (From Unit-II)	1x5=5
III.	Situational Conversation/Group Discussion. (From Unit - II)	1x5=5
IV.	Welcome Speech/Vote of Thanks. (From Unit - V)	1x5=5
V.	Felicitations/Feedback. (From Unit - V)	1x5=5

PART - I Tamil

இடைக்கால இலக்கியம்

பருவம்: இரண்டு **நேரம் : 5**

குறியீடு: 17GT2GS02 **புள்ளி : 3**

நோக்கம்:

- ❖ சைவ, வைணவ அடியார்களின் பக்தியைப் பற்றி அறிந்து கொள்வர்.
- ❖ அடியார்களின் வழி இறைவனின் அருள் தன்மையைப் புரிந்து கொள்வர்.
- ❖ செய்யுள் எழுதும் முறையைக் கற்றுக் கொள்வர்.
- ❖ வெற்றிச்சிறப்பைப் போற்றும் முறையைத் தெரிந்து கொள்வர்.
- ❖ செய்யுள் வழி உரைநடையையும், புதின மரபையும் கற்றுக் கொள்வர்.

அலகு 1: சைவம்

1. திருஞானசம்பந்தர் - திருமாகறல்

1. காலையொடுதுந்துபிகள் ...
2. துஞ்சுநறு நீலமிருள்...

2. திருநாவுக்கரசர் - திருக்கொண்டீச்சரம்

1. வரைகிலேன் புலன்கள் ...
2. தொண்டனேன் பிறந்து ...

3. சுந்தரர் - திருக்காளத்தி

1. நீறார் மேனியனே...
2. தளிர் போல் மெல்லடியாள்...

4. மாணிக்கவாசகர் - திருவாசகம்

குயிற் பத்து

அலகு 2: வைணவம்:

1. மதுரகவியாழ்வார்- 'கண்ணினுண் சிறுத்தாம்பு' - 10 பாசுரங்கள்
2. குலசேகர ஆழ்வார் - பெருமாள் திருமொழி
   வித்துவக்கோட்டு அம்மானையே வேண்டி நிற்றல் (688 முதல் 697 வரை)

அலகு 3: சிற்றிலக்கியங்கள்

1. கலிங்கத்துப்பரணி - போர் பாடியது

1. அலைகடல் போல கிளம்பின படைகள். பா.எண். 405 - 407
2. தம் நிழலைக் கண்டு தாமே பயந்து ஓடினர். பா.எண். 451 - 455
3. கலிங்கம் வென்றான் கருணாகரன். பா.எண். 469 - 472

2. நந்திக் கலம்பகம்

1. முரசு அழைக்கிறது. பா.எண்.9
2. களிறைக் கண்டனர் கண்டபடி எண்ணினர். பா.எண். 18 - 20
3. புருவமேறினால் புவியே பணியும். பா.எண். 30

அலகு 4: நாவல்

சொப்பன பூமியில் - திலகவதி

அலகு 5:

இலக்கணம்: யாப்பின் உறுப்புக்கள்

இலக்கிய வரலாறு - பக்தி இலக்கியம், சிற்றிலக்கியம் தொடர்பான பகுதிகள்

நாவலின் தோற்றமும் வளர்ச்சியும்.

பாடநூல்கள்:

1. தமிழ்த்துறை வெளியீடு - இடைக்கால இலக்கியம்,
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி, பெரியகுளம்
2. எம்.ஆர்.அடைக்கலசாமி - தமிழ் இலக்கிய வரலாறு, ராசி பதிப்பகம்,
   சென்னை - 73, 41 ஆம் பதிப்பு.
3. திலகவதி - சொப்பன பூமியில் , அம்ருதா பதிப்பகம், சக்தி நகர்,
   போரூர், சென்னை - 116, மூன்றாம் பதிப்பு - 200

LANGUAGE THROUGH LITERATURE - II

STREAM – A

Semester: II **Hours: 6**

Code : 17GE2GSA2 **Credits: 3**

COURSE OUTCOMES:

- Impart effective communication skills to the learners.
- Read and understand language and descriptions of topics from a variety of texts.
- Discuss and respond to the content of a text orally and in writing.
- Write effective and coherent paragraphs.
- Learn how to use the correct use of vocabulary.

UNIT I: PROSE **1 hour**

A.P.J Abdul Kalam	-	My Visions for India
A.J.Cronin	-	The Best Investment I Ever Made

UNIT II: POETRY **1 hour**

Rabindranath Tagore	-	Where the Mind is Without Fear
George Herbert	-	The Pulley

UNIT III: SHORT STORY **1 hour**

Guy de Maupassant	-	The Necklace
Leo Tolstoy	-	Little Girls Wiser than Men
R.K. Narayan	-	An Astrologer's Day

UNIT IV: ONE ACT PLAYS **1 hour**

Norman MckInnel	-	The Bishop's Candlesticks
G.B. Shaw	-	A Meeting in a Forest

UNIT V: GRAMMAR & CREATIVE WRITING **2 hours**

Concord

Active voice and Passive voice

Question Tag

Speech Writing

Advertisement Writing

Report Writing

COURSE BOOK::

- Limelight-2. SSK Publishers and Distributors, Chennai: 2016.
- Savarimuttu,J.S Rohan,G.Petricia Alphine Nirmala. English Grammar and usage – An ideal Companion For Advanced Learners .New Century Book House (P) Ltd, Chennai,2016.

LANGUAGE THROUGH LITERATURE - II - 17GE2GSA2

QUESTION PATTERN

STREAM – A

Time: 3 hours	**Marks : 60**
I. Choose the best answer (from units I & II)	10x1=10
II. Answer any two of the following in a paragraph of 100 words each (two out of four from units I & II)	2x5=10
III. Answer any two of the following in an essay of 300 words each (two out of four from units I, II, III & IV)	2x10=20
IV. Fill in the blanks (from Concord)	2
V. Rewrite the following sentences as directed (from Voice)	3
V. Add Question Tags for the following	5
VI. Speech writing	5
VII. Advertisement writing (OR) Report writing	5

LANGUAGE THROUGH LITERATURE - II

STREAM -B

Semester: II **Hours: 6**

Code : 17GE2GSB2 **Credits: 3**

COURSE OUTCOMES

- Select texts, expose to a range of contexts where the language is used to meet a variety of real life and communication needs.
- equip the students in the relevant English language skills necessary for success in various competitive examination.
- train the students to use the language potentials in language skills
- Enhance language through a task- based and learner- centric syllabus
- Carry out all the LSRW skills

UNIT I: PROSE 2 hours

Jawaharlal Nehru - The Ganga

Bernard Shaw - How I became a public Speaker

UNIT II: POETRY 1 hour

John Masefield - Laugh and be Merry

Rupert Brooke - Menelaus and Helen

UNIT III: SHORT STORY 1 hour

Oscar Wilde - The Selfish Giant

H.H Munro (Saki) - The Story Teller

UNIT IV: COMMUNICATIVE EXPRESSIONS 1 hour

Offering Help

Apologizing

Making Suggestions

Expressing Likes and Dislikes

UNIT V: COMPOSITION AND GRAMMAR 1 hour

1. Comprehension
2. Tense
3. Concord

BOOKS FOR REFERENCE:

- Savarimuttu,J.S Rohan,G.Petricia Alphine Nirmala. *English Grammar and usage – An ideal Companion for Advanced Learners* .New Century Book House (P) Ltd, Chennai, 2016.

LANGUAGE THROUGH LITERATURE - II - 17GE2GSB2

QUESTION PATTERN

Stream-B

Time: 3 hours **Marks: 60**

I. Choose the best Answer. (from Units I & II)	10 x1=10
II. Answer any two of the following in a paragraph of 100 words each (two out of four from Units I, II & III)	2x5=10
III. Answer any two of the following in an essay of 300 words each (two out of four from Units I, II & III)	2x10=20
IV. Matching the expressions. (from Unit IV)	5
V. a) Read the passage and answer the following questions. (from Unit V)	5
b) Fill in the blanks with suitable tense. (from Unit V)	10

CHORDATA - I

Semester: II **Hours: 5**

Code : 17ZO2MC03 **Credit: 4**

COURSE OUTCOMES:

- Comprehend the structural and functional organization of chordates.
- Trace the phylogenetic significance of lower chordates.
- Outline the morphology and functions of organ systems in Amphioxus.
- Understand the classification of Agnatha and the morphological characters of Petromyzon.
- Classify fishes and realize the economic importance of fishes.

UNIT I

Introduction to Chordata: General characters and classification up to classes with examples. **Prochordata**: General characters and classification up to orders with examples.

Hemichordata: Type study: ***Balanoglossus*** - External morphology, digestive system, circulatory system, respiratory system, reproductive system, Significance of Tornaria larva. **(15 Hours)**

UNIT II

Urochordata: Type study: *Ascidian* - External morphology, digestive system, circulatory system, respiratory system, reproductive system, Retrogressive Metamorphosis, Significance of Ascidian tadpole larva. **(15 Hours)**

UNIT III

Cephalochordata: Type study: *Amphioxus* - External morphology, digestive system, circulatory system, respiratory system, reproductive system. **(15 Hours)**

UNIT IV

Agnatha: Introduction, Classification, Key characters of Ostracodermi and Cyclostomata

Type study: *Petromyzon*- External morphology, breeding and migration, metamorphosis, Ammocoetes larva. **(15 Hours)**

UNIT V

Pisces: General characters and classification up to classes with examples - Torpedo, Anguilla, Hippocampus, Echeneis, Latimeria.

Type study: *Scoliodon* - External morphology - placoid scales - digestive system respiratory system - circulatory system - sense organs - urinogenital system.

General topics: Parental care in fishes, Migration of fishes, Economic importance of fishes. **(15 Hours)**

COURSE BOOK:

Arumugam, N., Thangamani, A. ,Prasanna Kumar, S., and Narayanan, L.M.(2013), A text book of Chordates, Saras publication, Nagercoil.

BOOKS FOR REFERENCE :

1. Ekambaranatha Ayyar, M.. (1971). A manual of zoology. part-II (Chordate) S. Viswanathan Printers and Publishers Pvt. Ltd.,Chennai.
2. Ekambaranatha Ayyar, M. and T.N. Anathakirshnan.(1985). A manual of zoology. Vol-II (Chordate)Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
3. Jordan, K.L. and P.S. Verma.(1998). Chordate of zoology (11th Edition).S. Chand and Company Ltd, New Delhi.
4. Kardong, K, (2002). Vertebrates: Comparative Anatomy, Function and Evolution. Tata McGraw Hill Publishing Company Ltd, Chennai.
5. Kotal, R.L. (2005). Morden text book of zoology-Vertebrates. Rastogi Publications, Meerut.
6. Dhami P.S and Dhami J.K. (1972). Chordate of Zoology R. Chand and Company Ltd, New Delhi.

CHORDATA - II

Semester: II **Hours: 5**

Code : 17ZO2MC04 **Credit: 3**

COURSE OUTCOMES:

- ❖ Elucidate the functional aspects of different systems and parental care in Amphibians.
- ❖ Identify poisonous and non-poisonous snakes of South India and acquire knowledge of first aid for snake bite.
- ❖ Acquire knowledge about the exoskeleton of birds and understand the mechanism of flight.
- ❖ Classify and relate different systems of mammals.
- ❖ Appreciate the flight mechanism of birds and adaptations of aquatic mammals.

UNIT I

Amphibia: General characters and classification up to orders

Examples - Rana, Bufo, Salamander, Icthyostega.

Type study: Frog - External morphology, digestive system, circulatory system and respiratory system.

General topic: Parental care in Amphibians. **(15 Hours)**

UNIT II

Reptilia: General characters and classification up to orders

Examples- Calotes, Crocodile.

Type study: Calotes - External morphology, digestive system, circulatory system and respiratory system.

General Topics:

(i) Identification of poisonous and non- poisonous snakes of south India.

(ii) Poison apparatus - biting mechanism - venom - anti venom - first aid for snake bite. **(15 Hours)**

UNIT III

Aves: General characters and classification up to sub classes. Examples - Pigeon, Peacock, Parakeet, King fisher, Woodpecker.

Type study: Pigeon - External morphology - exoskeleton - flight muscles, digestive system, circulatory system and respiratory system and urinogenital system. **(15 Hours)**

UNIT IV

Mammalia: General characters and classification up to subclasses. Examples - Echidna, Manis, Kangaroo, Bat.

Type Study: Rabbit -External morphology - the structure of skin, coelom, dentition, digestive system, respiratory system, structure of heart , structure of brain and urinogenital system. **(15 Hours)**

UNIT V

Migration of birds, Flight adaptation in birds, Archaeopteryx and its phylogenetic significance. Egg laying mammals, Stomach in mammals, Adaptations of aquatic mammals. **(15 Hours)**

COURSE BOOK:

Arumugam, N., Thangamani, A., Prasanna Kumar, S. and Narayanan, L.M. (2010), A text book of Chordates, Saras Publication, Nagarcoil.

BOOKS FOR REFERENCE :

1. Ekambaranatha Ayyar, M..(1971). A manual of zoology. Part-II (Chordata) S.Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
2. Ekambaranatha Ayyar, M. and T.N. Anathakirshnan. (1985). A manual of Zoology. Vol- II (Chordata) S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
3. Jordan, K.L. and P.S. Verma. (1998). Chordate Zoology (11th Edition).S. Chand and Company Ltd, New Delhi.
4. Kardong, K, (2002). Vertebrates: Comparative Anatomy, Function and Evolution. Tata Mc Graw Hill Publishing Company Ltd, Chennai.
5. Kotpal, R.L. (2005). Modern TEXT BOOK of zoology-Vertabrates Rastogi Publications, Meerut.
6. Dhami P.S and Dhami J.K. (1972). Chordate Zoology R. Chand and Company Ltd, New Delhi.

PRACTICAL - II CHORDATA -LAB

Semester: II **Hours: 2**

Code : 17ZO2CP02 **Credit: 1**

COURSE OUTCOMES:

- Identify and Compare the general biology of few chordates.
- Describe the structure of placoid scales in shark.
- Report on beak and feet adaptations of birds.

1. MOUNTING

1. Shark - Placoid Scales
2. Identification of any 5 local edible fishes.
3. Study of any three venomous and non venomous snakes using chart.
4. Feet and Beak adaptations of any three birds.
5. Collection and submission of feathers of any three birds.
6. **Spotters**

Balanoglossus, Amphioxus, *Ascidian*, *Torpedo, Hippocampus, Echeneis, Rana, Bufo, Calotes, Draco, Pigeon, Peacock, Parakeet, Kingfisher, Woodpecker, Echidna, Macropus, Bat, Sperm whale* and *Hippopotamus.*

ALLIED CHEMISTRY - II

Semester: II **Hours: 3**

Code : 17CH2AC02 **Credits: 3**

COURSE OUTCOMES:

- Gain knowledge on the chemistry of compounds used in day to day life
- Explain the principles of catalysis and surface chemistry
- Predict some important organic and inorganic compounds
- Outline about electrochemistry and corrosion
- Describe chromatographic techniques for separation

UNIT I: CHEMISTRY IN THE SERVICE OF MANKIND

Antibiotics: definition - classification based on specificity and their gram staining methods- **antipyretics:** definition - preparation and uses of aspirin and paracetamol - **analgesics:** definition, types and examples - **antiseptics and disinfectants:** definition, uses and examples - **insecticides and pesticides**- definition preparation and uses of DDT and BHC **(9 Hours)**

UNIT II: SURFACE CHEMISTRY

Adsorption - definition - difference between adsorption and absorption - types of adsorption - difference between physisorption and chemisorption -Freundlich adsorption isotherm - applications of adsorption.

CATALYSIS

General characteristics of a catalyst - types of catalysis - homogeneous catalysis, heterogeneous catalysis, acid-base catalysis, enzyme catalysis, auto catalysis - definitions and examples - catalytic poisoning - promoters - industrial applications of catalyst **(9 Hours)**

UNIT III: CHROMATOGRAPHY

Definition - classification - thin layer chromatography (TLC), Column chromatography and paper chromatography - applications of chromatography **(9 Hours)**

UNIT IV: PREPARATION AND USES OF SOME INORGANIC COMPOUNDS

Green vitriol - blue vitriol - epsom salt - gypsum salt - plaster of paris

PREPARATION AND USES OF SOME ORGANIC COMPOUNDS

Chloroform- westron - freon- benzene - acetone **(9 Hours)**

UNIT V: ELECTROCHEMISTRY AND CORROSION

pH definition - simple calculation - buffer solution : definition, example - corrosion - definition and its prevention - galvanizing, tinning, cathodic protection- use of lacquers- paints and inhibitors **(9 Hours)**

COURSE BOOK:

Study material prepared by Department of Chemistry

BOOKS FOR REFERENCE:

1. B.R. Puri, L.R. Sharma and S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 41st edition, 2004
2. P.L. Soni and H.M Chawla, Text Book of Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007
3. P.L. Soni and Mohan Katyal, Text Book of Inorganic Chemistry, Sultan Chand and Sons, 20th Edition, 2006

ALLIED PRACTICAL II: ORGANIC ANALYSIS

(Examination at the end of II Semester)

Semester: II **Hours: 2**

Code : 14CH2AP02 **Credit: 1**

COURSE OUTCOMES:

- Explain the chemistry of common reactions of organic substances
- Analyze various organic compounds using documented procedures
- Identify the special element, nitrogen
- Apply the techniques of organic qualitative analysis
- Apply skills on systematic microscale analysis

FUNCTIONAL GROUPS:

Primary amines, Amides, Carbonyl compounds, Carbohydrates, Esters, Acids and Phenols (Preparation of solid derivative not required)

Report should contain the following

1. Aliphatic / Aromatic
2. Saturated / unsaturated
3. Presence / absence of special element nitrogen
4. Functional group

BOOKS FOR REFERENCE:

Practical guide prepared by the Chemistry Department

APICULTURE

Semester: II **Hours: 2**

Code : 17ZO2SK02 **Credits: 2**

COURSE OUTCOMES:

- Describe the anatomy and life cycle of the honeybee.
- Acquire skill on bee keeping and aspire to be entrepreneurs.
- Appreciate the nutritive and medicinal value of honey.
- Categorise the enemies of honey bees and their control.
- Understand the prevention and control of swarming, robbing and fighting.

UNIT I

Introduction and Scope of Apiculture, classification of bees: Rock bee - Indian bee - little bee and Dammer bee. **Bee colony:** distinctive features and identification of queen - drones and workers - functions of the members, Life history of *Apis indica.* Artificial feeding. **(6 Hours)**

UNIT II

Bee keeping: primitive methods: wall type - movable type - bamboo. Modern methods - Newton hive and other appliances used in apiaries. **(6 Hours)**

UNIT III

Honey bee products: Honey: extraction of honey - properties - chemical composition - nutritive value - medicinal value. Bee wax, Bee venom, Pollen, Propolis, Royal jelly - Salient features and uses. **(6 Hours)**

UNIT IV

Enemies of bees : Greater wax moth - lesser wax moth - ants - wasps - lice - beetles and birds - prevention and their control measures. **(6 Hours)**

UNIT V

Swarming and Absconding: Reasons - prevention and control measures. Robbing and fighting - prevention and control,

Queen rearing : Need, methods of queen rearing and introduction of queen.

(6 Hours)

STUDY MATERIAL:

Dr. Gracy Kutty T. I and Sr. Iruthaya Kalai Selvam., (2009). Apiculture.

BOOKS FOR REFERENCE :

1. Fenemore P. G and Alka Prakash., (2000). Applied Entomology. New Age International (P) Ltd Publishers, New Delhi.
2. Johnson J., (2005). Apiculture. Olympic Grafix, Marthandam
3. Ravindranathan K.R. (2005). A text book of economic Zoology, Dominant Publishers and Distributors, New Delhi.
4. Avinash Khanna. (2007). Applied zoology and Biotechnology. Mangalam Publishers and Distributors, New Delhi.
5. Kotpal. (1981). Arthropoda. Rastogi Publishers.

பொதுத்தமிழ் - காப்பிய இலக்கியம்

பருவம்: மூன்று **நேரம்: 5**

குறியீடு: 17GT3GS03 **புள்ளி: 3**

நோக்கம்:

- ❖ காப்பிய இலக்கியங்களின் சிறப்புக்களை அறிந்து கொள்வர்.
- ❖ ஐம்பெரும் காப்பியங்கள், பிறகாப்பியங்களின் பக்திச்சிறப்புக்களை உணர்ந்து கொள்வர்.
- ❖ அகப்புற இலக்கியச் செய்திகளை அறிந்து கொள்வர்.
- ❖ வணிகச் செய்திகளைத் தெரிந்து கொள்வர்.
- ❖ தமிழிலக்கியத்தில் காணலாகும் அறவியல், அறிவியல் செய்திகளைத் தெரிந்து கொள்வர்.

அலகு 1

சிலப்பதிகாரம்	-	ஊர்சூழ் வரி
மணிமேகலை	-	உலக அறவி புக்க காதை
சீவகசிந்தாமணி	-	முக்தி இலம்பகம் (185 - 189) 11 பாடல்கள் சீலம், தானம்

அலகு 2

கம்பராமாயணம்	-	கிட்கிந்தா காண்டம் - ஆறு செல் படலம் 10 பாடல்கள்
தேம்பாவணி	-	மகவருள் படலம் - சூசை கைகளில் குழந்தைநாதன்
சீறாப்புராணம்	-	பாந்தள் வதைப் படலம்

அலகு 3

பொருளிலக்கணம்	-	அகத்திணை, புறத்திணை
இலக்கிய வரலாறு	-	காப்பியம் தொடர்பான இலக்கிய வரலாறு

அலகு 4

வணிகத் தமிழ் - சங்க இலக்கியங்கள் உணர்த்தும் வணிகச் செய்திகள் பக்.75-84

வணிகக் கலைச் சொல்லாக்கம் - 50 சொற்கள்

அலகு 5

அறிவியல் தமிழ் - தமிழில் அறிவியல் - பக். 27 - 40

பாட நூல்:

தமிழ்த்துறை வெளியீடு, ஜெயராஜ் அன்னபாக்கியம் மகளிர் தன்னாட்சிக் கல்லூரி, பெரியகுளம்.

பார்வை நூல்கள்:

1 பா. சரவணன் (தொ.ஆ) - சிலப்பதிகாரம், சந்தியா பதிப்பகம், சென்னை-83, 2-ஆம் பதிப்பு - 1998.

2 இராம - லட்சுமணன் (தொ.ஆ) - மணிமேகலை, உமா பதிப்பகம், சென்னை-1, 2-ஆம் பதிப்பு - ஜனவரி - 1997.

3 திரு புலவர்.அரசு (உ.ஆ) - சீவகசிந்தாமணி, கழக வெளியீடு. 1967.

4 பேரா.அ.ச.ஞானசம்பந்தன் (ப.ஆ) - கம்பராமாயணம், நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை - 98.

5 ந.ம.மரியஅருட்பிரகாசம் (உ.ஆ) - தேம்பாவணி, மாவிகா அச்சகம், நொபிலி வளாகம், கோ.புதூர், மதுரை.

6 செய்குதம்பி பாவலர் (உ.ஆ) - சீறாப்புராணம், யுனிவர்சல் பிரிண்டர்ஸ், வடக்கு உஸ்மான் சாலை, சென்னை - 1. டிசம்பர் - 2014.

7 ச. திருஞானசம்பந்தம் (தொ.ஆ) - யாப்பருங்கலக்காரிகை, கதிர் பதிப்பகம், திருவையாறு, முதற் பதிப்பு. 2007

8 எம்.ஆர். அடைக்கலசாமி - இலக்கிய வரலாறு, ராசி பதிப்பகம், முதற்பதிப்பு. 1960. சென்னை- 73.

9 மணவை முஸ்தபா - காலம் தேடும் தமிழ், மீரா பதிப்பகம், சென்னை-40. 1993.

10 பொ. மா. பழனிச்சாமி - இலக்கியக் கதிர், நியூ செஞ்சுரி புக்ஹவுஸ், சென்னை-40. முதற்பதிப்பு 2010.

11 நாராயண வேலுப் பிள்ளை - உரைநடைத் தமிழ் - ஐம்பெருங் காப்பியங்கள், நர்மதா பதிப்பகம், சென்னை - 1, முதற்பதிப்பு 1999.

LANGUAGE THROUGH LITERATURE - III

STREAM - A

Semester: III **Hours: 6**

Code : 17GE3GSA3 **Credits: 3**

COURSE OUTCOMES:

- Enhance critical thinking and writing.
- understand and appreciate poetry as a literary art
- Impart effective communication skills to the learners.
- Be familiar with various writers of prose, poetry and one-act plays.
- Strengthen their writing skill.

UNIT I: PROSE **30 Hours**

Indian Women	-	Dr. S. Radhakrishnan
India Through a Traveller's Eyes	-	Pearl S. Buck

UNIT II: POETRY **30 Hours**

Lochinvar	-	Sir Walter Scott
On His Blindness	-	John Milton
Time and Love	-	William Shakespeare

UNIT III: SHORT STORY **15 Hours**

After Twenty Years	-	O'Henry
The Tiger in the Tunnel	-	Ruskin Bond
Karma	-	Kushwant Singh

UNIT IV: ONE ACT PLAYS

Hijack	-	Charles Well

UNIT V: COMPOSITION AND GRAMMAR **15 Hours**

Direct and Indirect Speech

Degrees of Comparison

Punctuation

Interviewing

Resume Writing

E-mail Writing

COURSE BOOKS:

- 'Limelight-3', SSK Publishers and Distributors, Chennai, 2016.
- Savarimuttu,J.S Rohan, and Petricia Alphine Nirmala. *English Grammar and usage – An ideal Companion For Advanced Learners.* Chennai: New Century Book House (P) Ltd, 2016. Print.

LANGUAGE THROUGH LITERATURE - III - 17GE3GSA3

QUESTION PATTERN

STREAM A

Time: 3 Hours **Marks: 60**

I. Choose the best answer 10x1=10
(From Unit I & II)

II. Answer any two of the following in a paragraph of 100 words each 2x5=10
(Two out of 4 from Unit I & II)

III. Answer any two of the following in an essay of 300 words each 2x10=20
(Two out of 4 from Unit I, II, III & IV)

IV. Rewrite as directed (From Unit V)

a) Direct/ Indirect speech. 2x1=2

b) Degrees of Comparison 3x1=3

V. Rewrite with right punctuation 5x1=5
(From Unit V)

VI. Answer the following (From Unit V) 2x5=10

1. Resume writing
2. Email writing

LANGUAGE THROUGH LITERATURE - III

STREAM B

Semester: III **Hours: 6**

Code : 17GE3GSB3 **Credits: 3**

COURSE OUTCOMES:

- Use language for aesthetic effect.
- Arrange and apply activities to improve their skills.
- Develop a positive attitude towards language learning.
- Bring out oral practice effectively.
- Interact and facilitate language learning process.

UNIT I: PROSE **30 Hours**

My Greatest Olympic Prize	-	Jesse Owens
When You Dread Failure	-	A. J. Cronin

UNIT II: POETRY **15 Hours**

Good Bye Party To Miss Pushpa T.S	-	Nissim Ezekiel
A Bird Came Down the Walk	-	Emily Dickson

UNIT III: ONE - ACT PLAY **15 Hours**

Bishop's Candle Sticks	-	Norman Mckinnel
Never Never Nest	-	Cedric Mount
The Pie and the Tart	-	Hugh Chesterton

UNIT IV: COMMUNICATION SKILLS **15 Hours**

CONVERSATIONS:

1. At a bank
2. In the library
3. Reservation status
4. At the sweet shop
5. At the poly clinic
6. On the bus

UNIT V: COMPOSITION **15 Hours**

1. Writing Advertisement
2. Story Completion

GRAMMAR

1. Question with answers 'Yes' or 'No'.
2. Active Voice & Passive Voice

BOOKS FOR REFERENCE:

1. Siva, Anthony, Dr. Gunasekaran. "Six One-Act Plays". Chennai: Pavai Publications, Royapettah, 2009.
2. Kaleem, Nafeesa. "Six One Act-Plays". Chennai: Anu Chitra Publications, West Mambalam, 1985.
3. Effective Communication in English. Board Of Editors, 2013.
4. Savarimuttu,J.S Rohan, and Petricia Alphine Nirmala. *English Grammar and usage – An ideal Companion For Advanced Learners .* Chennai: New Century Book House (P) Ltd, 2016.Print.

LANGUAGE THROUGH LITERATURE - III - 17GE3GSB3

STREAM B

QUESTION PATTERN

Time: 3 Hours	**Marks: 60**
1. Choose the best answer (from Unit I & II)	10 x1=10
2. Match the following (from Unit I based on vocabulary)	5 x 1=5
3. Answer any two of the following in a paragraph of 100 words each. (Two out of 4 from unit I, II &III)	2 x 5=10
4. Answer any two of the following in an essay of 300 words each (Two out of 4 from unit I, II &III)	2 x 10=20
5. Answer any one of the following questions. (One out of 3 from unit IV)	5
6. Answer any one of the following questions.(unit-V)	5
a) Writing Advertisement Or b) Story Completion	
7. Rewrite as directed: (unit-V)	
a) Questions with answers ' Yes'/ 'No'.	3X1=3
b) Active Voice and Passive Voice.	2X1=2

CELL BIOLOGY

Semester: III **Hours: 4**

Code : 17ZO3MC05 **Credits: 4**

COURSE OUTCOMES:

- Distinguish between prokaryotes and eukaryotes.
- Analyse the functions of cell organelles.
- Underline the structure of chromosomes, cilia and flagella.
- Discuss the process of mitosis and meiosis.
- Debate the causes and treatment of cancer.

UNIT I

Introduction - Cell theory, Protoplasm theory, Germplasm theory and Organismal theory. Scope of cell biology, Difference between Eukaryotic and Prokaryotic cells. Microscopy - Detailed study of Compound, Phase contrast and Electron microscopy. **(12 Hours)**

UNIT II

Structure and functions of Plasma membrane, Endoplasmic reticulum, Ribosome, Golgi complex, Lysosome. **(12 Hours)**

UNIT III

Structure and functions of Mitochondria, Nucleus, Chromosomes - Structure and Types of chromosomes, Polytene and Lamp brush chromosomes, Centrosome, Vacuole, Cilia and Flagella. **(12 Hours)**

UNIT IV

Cell cycle, cell division - Amitosis, mitosis, mitotic apparatus. Meiosis, significance of meiosis, synaptonemal complex. **(12 Hours)**

UNIT V

Cancer - characteristic features, origin, progression, types, causes, diagnosis, treatment and oncogenes. Effect of radiation on cells. Aging - Senescence. Cytological techniques in brief - fixation and staining. **(12 Hours)**

COURSE BOOK:

Arumugam N., (2016). Cell Biology. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. De Robertis E. D. P., (2001). Cell and Molecular Biology. International Edition, 8th Edition, M. Varghese Company, Bombay.
2. Powar C. B., (1993). Cell Biology. 3rd Edition, Himalaya Publishing House, Bombay.
3. Rostogi. S.C., (2005). Cell Biology. New Age International Publishers Pvt. Ltd., New Delhi.
4. Singh and Tomar, (2012). Cell Biology. Rostogi Publications, Meerut, India.
5. Gupta M. L., Jangir M.L., (2004). Cell Biology (Fundamentals and Applications). Updesh Purohit for Agrobios (India), Jodhpur.
6. Verma P.S Agarwal, (2006). Cytology, S. Chand and Company Ltd., New Delhi.
7. Loewy G and Philip Siekevitz, (1978). Cell structure and function, 2nd edition, Amerind Publishing Co. Pvt. Ltd., New Delhi.
8. Gerald Karp, (1999). Cell and Molecular Biology (Concepts and experiments). 2nd edition, John Wiley and sons, Inc.
9. Norman Cohen, (1997). Cell structure, function and metabolism. CBS Publishers, New Delhi.
10. Ranajit Sen, (2004). Principles and management of cancer. B.I. Publications, Pvt. Ltd., New Delhi.

GENETICS

Semester: III **Hours: 4**

Code : 17ZO3MC06 **Credits: 3**

COURSE OUTCOMES:

- Gain Knowledge on Mendelian inheritance and interactions of genes.
- Express the concepts of linkage and multiple alleles.
- Describe the basics of gene mapping and crossing over.
- Emphasize the central dogma of genes, its expression and regulation.
- Understand the genetic defects, mutation and syndromes.

UNIT I

Genetic terminology - Alleles, homozygote, heterozygote, hybrid, genotype, phenotype, back cross, test cross and reciprocal cross. Monohybrid experiment - Law of dominance, Law of segregation, Dihybrid experiment - Law of independent Assortment. Interaction of genes - Complete dominance, Incomplete dominance, Co-dominance, Complementary genes, Supplementary genes, Duplicate genes. Epistasis - Dominant Epistasis, Recessive epistasis and Biochemical basis of epistasis, Lethal genes, Pleiotropism, Penetrance and Expressivity. **(12 Hours)**

UNIT II

Multiple alleles - ABO blood group and Rh blood group, Coat colour in rabbits. Multiple genes - Eye colour in Drosophila, Skin colour in Man, Transgressive variation. Linkage - Linkage in Drosophila, Types of Linkage, Coupling and repulsion, Cis arrangement and Trans arrangement, Linkage groups, Theories of Linkage and Factors affecting linkage. **(12 Hours)**

UNIT III

Crossing over - Theories of crossing over, significance and mechanism of crossing over, factors affecting crossing over, crossing over in Drosophila. Chromosome map - procedure for the chromosome mapping, construction of map in Drosophila, factors affecting the mapping. Sex determination in Man and Drosophila. **(12 Hours)**

UNIT IV

Sex linked inheritance - Types, X-linked inheritance - colour blindness, haemophilia, Y - linked inheritance. Extra chromosomal inheritance. Human chromosomes - karyotype, preparation of karyotype and application of karyotyping, pedigree analysis, Eugenics, Euthenics, Euphenics and Genetic Counselling. Inborn errors of metabolism - Phenylketonuria, Alkaptonuria and Albinism. **(12 Hours)**

UNIT V

Mutation: Chromosomal mutation - deletion, duplication, inversion, translocation. Genomatic mutation - Aneuploidy and Euploidy. Syndromes - Down's syndrome, Turner's syndrome, Klinefelter's syndrome. Gene mutation - Spontaneous mutation, Induced mutation, Point mutation, Missense mutation, Nonsense mutation, Silent mutation, Transversion, Transition, Base analogue mutation, Frame shift mutation, Back mutation, Molecular basis of mutation, Hot spot, Detection of mutation, Mutagens. **(12 Hours)**

COURSE BOOK:

Meyyan R.P., (2010). Genetics, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Verma P.S., Agarwal V. K and Norman S. Cohn, (1989). Principles of Genetics. S. Chand and company Ltd, Ram nagar, New Delhi.
2. Gardner, E.J., Michael J. Simmons, Peter Sunstad, D., (1991). Principles of Genetics. 8th edition, John Wiley and Sons, INC.
3. Benjamin Lewin, (2004). Genes VIII. Pearson Prentice Hall, Pearson Education, Inc.
4. Strickberger M.W., (1985). Genetics. 3rd Edition, Macmillan Publishing Co., New Delhi.
5. Daniel L. Haartl and Elizabeth W. Jones, (2001). Genetics. 5th edition, Jones and Bartlett Publishers, Sudbury.
6. Charlotte J. Avers, (1980). Genetics. D.Van Nostrand and Company, New York.
7. Gurbachans Miglani, (2015). Narosa Publishing, Daryaganj, New Delhi.
8. Benjamin Lewin, (2000). Genes VII. 7th edition, Oxford University Press Inc., New York.
9. Verma, P.S. and Agarwal, A.K., (2012). Genetics. 9th edition, Rajendra Ravindra Printer's Pvt. Ltd., New Delhi.
10. Gardner A. and Davies T., (2010). Human genetics. 2nd edition, Viva books private limited, Ansari Road, Daraganj.
11. Dipak Kumar Kar Sona Halder, (2009). Cell Biology, Genetics, Molecular Biology. New Central Book Agency (p) Ltd., Chintamoni Das Lane.
12. Alice Marcus, (2009). Genetics. HJP Publisher, Chennai.
13. Gupta P.K., (2011). Molecular Biology and Genetic Engineering. Rastogi Publications, Meerut.

PRACTICAL - III CELL BIOLOGY AND GENETICS - LAB

Semester: III **Hours: 2**

Code : 17ZO3CP03 **Credit: 1**

COURSE OUTCOMES:

- Compare the principles and working mechanisms of microscopes.
- Illustrate different stages of mitosis.
- Prepare slide to observe the polytene chromosomes.
- Survey the inheritance of Mendelian traits among students.

CELL BIOLOGY:

1. Compound Microscope.
2. Study of mitosis in Onion root tip cells.
3. Polytene Chromosome in Chironomous larva.
4. Human blood smear.
5. Spotters: Mitochondria, Nucleus, Endoplasmic reticulum and Golgi apparatus.

GENETICS:

1. Verification of Mendel's Laws by using coins / beads.
    a. Monohybrid cross and Monohybrid test cross.
    b. Dihybrid cross and Dihybrid test cross.
2. Study of Mendelian traits among the students.
3. Identification of the following using charts and models:
    a. DNA structure
    b. DNA replication
    c. Down's syndrome
    d. Turner's syndrome
    e. Klinefelter's syndrome.

ALLIED BOTANY - I

Semester: III **Hours: 3**

Code : 17BO3AC01 **Credits: 3**

COURSE OUTCOMES:

- Discuss the structure and functions of plant cells.
- Evaluate the economic importance of algae and their role in day today life and environment.
- Develop technical skill in identifying the Fungal distribution in the soil/ environment.
- Identify bryophytes sample collected from the field.
- Identify the various plant diseases and their impact on agriculture.

UNIT I

Histology - Ultra structure of plant cell. Tissues: Meristematic tissues, Theories on differentiation of meristems. Permanent tissues: Simple tissues - Parenchyma, Collenchyma, Sclerenchyma. Compound tissues - Xylem and Phloem. Internal structure of young dicot stem, root and leaf. Internal structure of monocot stem and root. **(9 Hours)**

UNIT II

Phycology - General features and economic importance of algae. Volvox - General structure, Reproduction - Asexual and Sexual and Life history. Sargassum - General morphology, Thallus structure, Internal structure of Stipe, Leaf and Cryptoblasts, Reproduction - Vegetative and Sexual method, Economic importance and life cycle. **(9 Hours)**

UNIT III

Mycology - General features and Economic importance of Fungi. Rhizopus - General morphology, Reproduction - Vegetative and Asexual method, Economic importance. Saccharomyces (yeast) - General structure, Nutrition, Reproduction - Vegetative, Asexual and Sexual method, Life cycle - Haplobiontic, Diplobiontic and Haplo - diplontic and Economic importance. Lichens - General characters and economic importance. **(9 Hours)**

UNIT IV

Bryophytes - General characters of Bryophytes. Funaria - General morphology, Structure of gametophyte, internal structure of stem and leaf. Reproduction - Vegetative and Sexual method, Sporophyte - Foot, Seta and Capsule, Germination of spore, Life cycle. **(9 Hours)**

UNIT V

Plant Pathology - Introduction, detailed study on the symptoms, Causal organisms, Dissemination and Control measures of Tikka disease of groundnut, Bunchy top of banana, Citrus canker, Red rot of sugarcane and Blast of rice disease. **(9 Hours)**

COURSE BOOK:

Annie Ragland., Kumarasan, (2013). A text book of Plant Diversity. Volume II, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Vashishta B. R., Sinha A. K. And Singh V. P., (2002). Botany for Degree students Algae. S. Chand and Company, Ltd., New Delhi.
2. Vashishta B. R.and Sinha A. K., (2003). Botany for Degree students Fungi. S. Chand and Company, Ltd., New Delhi.

ALLIED BOTANY - I - LAB

Semester: III **Hours: 2**

Code : 17BO3AP01 **Credit: 1**

COURSE OUTCOMES:

- Perceive and explain the importance of mineral nutrients in plants.
- Assess the evolutionary significances of dicots and monocots.
- Achieve practical skills in processing, preservation and culture of marine algae.
- Gain knowledge on the basic principles related to plant disease.

1. **Histology** - Observation of simple permanent tissues - Parenchyma, Collenchyma and Sclerenchyma - Ultra structure of Plant Cell.
2. **Sectioning and Mounting** - Dicot Stem (Tridax), Monocot stem (Asparagus) and Root (Canna). Observation of T.S of Dicot Leaf and Root.
3. **Phycology** - Observation of Volvox daughter colony. T.S of Stipe and Male conceptacle of Sargassum.
4. **Mycology** - Observation of Structure of Saccharomyces (Yeast)
5. **Bryophyte** - Collection of Moss - Funaria, Observation - L.S of Antheridial branch, Archegonial branch and Capsule.

SPOTTERS:

1. Funaria - Habit
2. Sargassum - Habit

PLANT PATHOLOGY:

1. Tikka disease of groundnut
2. Bunchy top of banana
3. Citrus canker
4. Red Rot of sugarcane
5. Blast of rice disease

ENVIRONMENTAL STUDIES

Semester: III **Hours: 2**

Code : 17ES3GS01 **Credits: 2**

COURSE OUTCOMES:

- Recall the components of our planet earth.
- Elucidate and understand the importance of Natural resources.
- Summarise the energy status of the environment.
- Acquire knowledge on the conservation of our environment.
- Analyse the significance of water and climate towards sustainable development.

UNIT I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance - Need for public awareness **(2 Hours)**

UNIT II: NATURAL RESOURCES

Classification of Resources: Renewable and non - renewable resources - Forest resources, water resources, mineral resources, food resources, energy resources, Land resources - associated problems; Role of an individual in conservation of natural resources - Equitable use of sources for sustainable life styles. **(8 Hours)**

UNIT III: ECOSYSTEMS

Concept of an ecosystem - Structure and function of an ecosystem - producers, consumers and decomposers - Energy flow in the ecosystem - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the following Eco system: Forest, grass land, desert and aquatic. **(6 Hours)**

UNIT IV: ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, Role of an individual in prevention of pollution.

(8 Hours)

UNIT V: SOCIAL ISSUES AND THE ENVIRONMENTS

From unsustainable to sustainable development - Urban problems related to energy Water conservation, rain water harvesting, water shed management, Resettlement and rehabilitation of people, its problem and concerns, case studies, Environmental ethics, Climate change, global warming, acid rain and ozone layer depletion, nuclear accidents and holocaust, case studies. Waste land reclamation. Environmental protection act, air act, water act, wild life protection act.

(6 Hours)

FIELD WORK

Visit to local area to document environmental assets- river/forest/ grassland/hill/ mountain.

COURSE BOOK:

Murugeshan, R., (2007). Environmental science and Engineering, Millenium publication, Madurai.

UNIT I : Section - 1.1 & 1.2

UNIT II : Section - 1.3 to 1.37

UNIT III : Section - 2.1 to 2.7 & 2.10 to 2.27

UNIT IV : Section - 3.1 to 3.37

UNIT V : Section - 4.1 to 4.17

Note: Tamil Version for Tamil Literature and History Tamil Medium Students.

OFFICE AUTOMATION-LAB (Stream C)

Semester: III **Hours: 2**

Code : 17AE3SK03 **Credits: 2**

LEARNING OUTCOME:

- Explain the basic concepts of M.S. Word.
- Acquaint the use of options in Word.
- Use PowerPoint options to prepare slide shows.
- Use the Statistical function in M.S. Excel.
- Realize the need of computer word option to write dissertation, projects, thesis and blogs.

UNIT I: MS - WORD

1. Starting MS - Word and typing Text, Number and Symbols.
2. Formatting a Text (Bold, Italic, Underline, Alignment)
3. Page Setup (Applying Page numbers, Header and Footer, Orientation)
4. Applying Drop cap
5. Inserting and Editing Pictures and applying Watermark
6. Creating Table

UNIT II: MS - POWERPOINT

1. Starting MS - Power point and Creating a new presentation
2. Applying layouts to slides
3. Formatting the Text
4. Inserting Pictures into slides
5. Applying transitions and Animations to Slides

UNIT III: MS - EXCEL

1. Starting MS - Excel and Entering Data
2. Sorting and Filtering the Data
3. Applying the Statistical functions:Maximum,Minimum,Result
4. Applying Mathematical functions:Total,Average,Round
5. Creating the Charts
    a. Column
    b. Line
    c. Pie
    d. Bar

BOOKS FOR REFERENCE:

1. ‘‘Comdex 9-in-1 DTP Course Kit’’, Vikas Gupta, Dreamtech Press 2011 Edition.
2. ‘‘Comdex 14-in-1 Computer Course Kit’’, Vikas Gupta, Dreamtech Press 2008.

பொதுத்தமிழ் - பழந்தமிழ் இலக்கியம்

பருவம்: நான்கு **நேரம்: 5**

குறியீடு: 17GT4GS04 **புள்ளி: 4**

நோக்கம்:

- ❖ பழந்தமிழ் இலக்கிய வளங்களை அறிந்து கொள்வர்.
- ❖ பழந்தமிழ் இலக்கியங்களின் சமூகநிலையைப் புரிந்து கொள்வர்.
- ❖ பழந்தமிழ் இலக்கியத்தின் தனித்தன்மையை அறிந்து கொள்வர்.
- ❖ பழந்தமிழ் இலக்கியத்தில் காணப்படும் நயங்களைத் தெரிந்து கொள்வர்.
- ❖ பழந்தமிழ் இலக்கிய ஆசிரியர்களை அடையாளம் காண்பர்.

அலகு 1: சங்க இலக்கியங்கள் - எட்டுத்தொகை

1. நற்றிணை (2 பாடல்கள்)

"சுரும்புண விரிந்த கருங்கால்..." - குறிஞ்சி

"தொல்கவின் தொலையத்..." - பாலை

2. குறுந்தொகை (4 பாடல்கள்)

"மாசறக் கழீஇய..." - குறிஞ்சி
"ஐயவி யன்ன சிறுவீ..." - மருதம்
"கடும்புனல் தொடுத்த..." - நெய்தல்
"முட்டு வேன்கொல்.." - பாலை

3. கலித்தொகை (1 பாடல்)

"வேங்கை தொலைத்த வெறிபொறி....."- குறிஞ்சிக்கலி தோழிகூற்று

4. அகநானூறு (2 பாடல்கள்)

"வயங்கு வெள்....." குறிஞ்சி

'கார்பயம் பொழிந்த....." முல்லை

5. புறநானூறு (2 பாடல்கள்)

"கழிந்தது பொழிந்தென....."

"பன்மீன் இமைக்கும்....."

அலகு 2: பத்துப்பாட்டு

முல்லைப்பாட்டு முழுவதும்

அலகு 3: நீதி நூல்கள்

1. திருக்குறள் : அறத்துப்பால் - பொறையுடைமை, அழுக்காறாமை

2. நாலடியார் : அறத்துப்பால்

துறவு: "விளக்குப்புக....."

ஈகை: "இல்லா விடத்தும்....."

அலகு 4: இலக்கணம்

வல்லெழுத்து மிகும் இடம், மிகா இடம்

இலக்கிய வரலாறு

சங்க காலம், சங்கம் மருவிய காலம் தொடர்பான இலக்கிய வரலாறு.

அலகு 5: வணிகத்தமிழ் -அறிவியல் தமிழ்

கடல் நாகரிகம் - கடல் வாணிபம் - பக்: 233-241

உடல் அறிவியல் - பக்: 75-88

பாடநூல் :

தமிழ்த்துறை வெளியீடு, ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி. பெரியகுளம்.

பார்வைநூல்கள்:

1. வ.த. இராமசுப்பிரமணியம் (உ.ஆ) - நற்றிணை, திருமகள் நிலையம், சென்னை-17. முதற்பதிப்பு - 2009.
2. புலவர் துரைஇராசாராம் (உ.ஆ) - குறுந்தொகை, முதற்பதிப்பு 2008. திருமகள் நிலையம், சென்னை - 17.
3. முனைவர்.அ.விசுவநாதன் (உ.ஆ) - கலித்தொகை, நியூசெஞ்சுரி புக்ஹவுஸ், சென்னை - 98. முதற்பதிப்பு 2007.
4. வ.த. இராமசுப்பிரமணியம் (உ.ஆ) - அகநானூறு, திருமகள் நிலையம், சென்னை -17. முதற்பதிப்பு 2009.
5. வ.த. இராமசுப்பிரமணியம் (உ.ஆ) - புறநானூறு, திருமகள் நிலையம், சென்னை - 17. முதற்பதிப்பு 2008.
6. முனைவர்.இரா.மோகன் (உ.ஆ) - பத்துப்பாட்டு, பாவைபிரிண்டர்ஸ், சென்னை 14, முதற்பதிப்பு - 2004.
7. எஸ். கௌமாரீஸ்வரி (ப.ஆ) - திருக்குறள் பரிமேலழகர் உரை சாரதா பதிப்பகம், சென்னை - 600 014, முதற்பதிப்பு - 2002.
8. எஸ். கௌமாரீஸ்வரி (ப.ஆ) - பதினெண்கீழ்க்கணக்கு நூல்கள் சாரதா பதிப்பகம், சென்னை - 14, முதற்பதிப்பு - மார்ச் - 2009.
9. எம்மார். அடைக்கலசாமி - தமிழ் இலக்கிய வரலாறு ராசிபதிப்பகம், சென்னை - 73, பதிப்பு 35. 2002.
10. மாத்தளை சோமு - வியக்கவைக்கும் தமிழர் அறிவியல், உதகம், திருச்சி முதற்பதிப்பு 2005.
11. மணவை முஸ்தபா - காலம் தேடும் தமிழ், மீரா பதிப்பகம், சென்னை - 40, 1993.

LANGUAGE THROUGH LITERATURE - IV

STREAM A

Semester: IV **Hours: 6**

Code : 17GE4GSA4 **Credits: 4**

COURSE OUTCOMES:

- Employ knowledge of literary traditions to produce imaginative writing
- Analyze and interpret literature
- Develop their English language skills continuously
- Develop their appreciation for the purpose and pleasure of poetry and drama
- Conduct self-evaluation about their own language learning processes

UNIT I: PROSE **30 Hours**

1. Character is Destiny - S.Radhakrishnan
2. Why the Sea is Salt - Great Legends

UNIT II: POETRY **30 Hours**

1. La Belle Dame Sans Merci - John Keats
2. The Last Ride Together - Robert Browning.
3. Goodbye Party for Miss. Puspha T.S - Nissim Ezekiel

UNIT III: SHORT STORY **15 Hours**

1. Valiant Vicky - Flora Annie Steel
2. The Conjurer's Revenge - Stephen Leacock

UNIT IV: ONE ACT PLAYS

1. Mother's Day - J.B. Priestly
2. The Game of Chess - Kenneth Sawyer Goodman

UNIT V: WRITING SKILLS **15 Hours**

1. Minutes Writing
2. Book Review
3. Essay Writing
4. Prepositions
5. Conjunction

COURSE BOOKS:

1. Limelight - 4 (An Anthology of Prose, Short Story and One Act Plays)
2. Savarimuttu,J.S Rohan, and Petricia Alphine Nirmala. *English Grammar and usage – An ideal Companion For Advanced Learners.* Chennai: New Century Book House (P) Ltd, 2016.Print.

LANGUAGE THROUGH LITERATURE - IV-17GE4GSA4

STREAM A

QUESTION PATTERN

Time: 3 Hours **Marks: 60**

I. Choose the best answer 10X1=10

(From Unit I and II)

II. Answer any two of the following in a Paragraph of 100 words each. 2X5=10

(Two out of four from Unit I, & II)

III. Answer any two of the following in an essay of 300 words each. 2X10=20

(Two out of four from Unit I , II, III & IV)

IV. Answer any two of the following questions from unit V 2x5=10

1. Minutes Writing
2. Book Review
3. Essay Writing

V. Fill in the blanks.

1. Prepositions 5x1=5
2. Conjunction 5x1=5

LANGUAGE THROUGH LITERATURE - IV

STREAM B

Semester: IV **Hours: 6**

Code : 17GE4GSB4 **Credits: 4**

COURSE OUTCOMES:

- Read and understand language and description of topics from a variety of texts.
- Write describing impressions, feelings and experiences and to write about familiar topics.
- Understand familiar topics and be able to understand speech on a variety of subjects such as work, school, leisure and the main points when listening to current affairs.
- Talk about familiar topics and to give explanations and reasons for opinions, past actions and future plans.
- Understand and apply in everyday contexts, including the use of nouns, adjectives, verbs, prepositions, tenses, sentence structure and phrases.

UNIT I: PROSE **30 Hours**

1. C. Rajagopalachari - First Anniversary of Gandhiji's Death
2. J.C. Hill - Good Manners
3. James Thurber - University Days

UNIT II: POETRY **15 Hours**

1. Sarojini Naidu - Conquest
2. D.H. Lawrence - Money Madness
3. Robert Frost - Mending Wall

UNIT III: DRAMA **15 Hours**

Select Scenes from "The Merchant of Venice" by William Shakespeare.

1. The Opening Scene
2. The Casket Scene
3. The Trial Scene

UNIT IV: GRAMMAR **15 Hours**

1. Question Tag
2. Negative Sentences

UNIT V: COMMUNICATION SKILLS **15 Hours**

Information Transfer and E Language Communication

COURSE BOOKS:

1. "Variety of English for Effective Communication" - Book IV - Ed. Dr. A. Shanmugakani, Madurai: Manimekala Publishing House, 2012.
2. Savarimuttu, J.S Rohan, and Petricia Alphine Nirmala. *English Grammar and usage – An ideal Companion For Advanced Learners.* Chennai: New Century Book House (P) Ltd, 2016. Print.

LANGUAGE THROUGH LITERATURE - IV - 17GE4GSB4

STREAM B

QUESTION PATTERN

Time: 3 Hours **Marks: 60**

I. Choose the best answer 10x1=10

(From Unit I and II)

II. Match the Following 5x1=5

(Vocabulary items from Unit I)

III. Answer any two of the following in a Paragraph of 100 words each. 2x5=10

(Two out of four from Unit I, II & III)

IV. Answer any two of the following in an essay of 300 words each 2x10=20

(Two out of four from Unit I, II & III)

V. Rewrite the following as directed. (From Unit IV)

1. Question Tag 2X1=2
2. Negative Sentences 3X1=3

VI. Answer the following questions 2x5=10

(From unit V)

a) Interpreting charts and making observations.

b) Reading passage and putting the information in graphic form.

BIOCHEMISTRY

Semester: IV **Hours: 6**

Code : 17ZO4MC07 **Credits: 5**

COURSE OUTCOMES:

- Apply appropriate biochemical techniques and carry out experiments to conduct project works.
- Describe the structure, function, metabolic pathways and the regulation of biological and biochemical processes of carbohydrates.
- Explain the structure, metabolism and biochemical importance of proteins.
- Restate the significance of lipids in the life processes that occur within living cells.
- Analyse the importance of enzymes as a biological catalyst and deploy knowledge in identifying deficiency diseases of vitamins.

UNIT I

P^H, Buffers, Oxidation and reduction, Acidosis and alkalosis. Biochemical techniques: Principle and applications - P^H meter, Colorimeter, Centrifuge, Chromatography and Electrophoresis. **(12 Hours)**

UNIT II

Carbohydrates - Structure and classification - Monosaccharides, Disaccharides, Polysaccharides and Mucopolysaccharides (with two examples each). Properties of carbohydrate, Biological significance of carbohydrates. Metabolism - Types and phases of metabolism, Glycolysis, Kreb's cycle, Blood sugar level - Glycosuria, Diabetes mellitus. Hormonal control of carbohydrate metabolism. **(20 Hours)**

UNIT III

Amino acids - structure and classification. Chemical bonds involved in protein structure, Structure of protein - Linderstrom - Lang's structure of protein, Properties and Biological significance of Proteins. Metabolism - Deamination, Transamination, Decarboxylation, Transmethylation of amino acids, Urea cycle.

(20 Hours)

UNIT IV

Fatty acids - saturated fatty acids and unsaturated fatty acids. Lipid - Structure and classification - simple, compound lipid - phospholipids (lecithin and cephalin), Glycolipids (sulphatide) and derived lipids - steroids (cholesterol). Properties and biological significance of lipids. Metabolism - Oxidation of Palmitic acid. Formation of ketone bodies. **(20 Hours)**

UNIT V

Enzymes - Classification, properties of enzyme, mechanism of enzyme action, factors affecting enzyme activity, Biological significance of enzymes, Enzyme inhibition, Coenzymes and Isozymes. Vitamins - Sources and functions of water soluble and fat soluble vitamins. **(18 Hours)**

COURSE BOOK:

Dulsy Fatima R., Meyyan P., Prasanna Kumar S., Narayanan M., Nallasingam K and Arumugam N., (2017). Elements of Biochemistry. Saras Publications, ARP Camp Road, Kottar, Nagercoil, Kanyakumari Dt..

BOOKS FOR REFERENCE:

1. Ambika Shanmugam, (2006). Fundamentals of Biochemistry for medical Students. 7th edition, Nagaraj and Company Pvt. Ltd., Perungudi, Chennai.
2. Berg J.M., Tymczko J.L. and Styer L., (2012). Biochemistry. 3rd edition. W.H. Freeman and Company, NewYork.
3. Cox M.M. and Nelson D.L., (2011). Principles of Biochemistry. 5th edition. W.H. Freeman and Company, New York.
4. Gupta S.N., (2011). Biochemistry. Rastogi Publications, Meerut, India.
5. Harbans Lal and Rajesh Pandey, (2011). text book of Biochemistry. 3rd edition. CBS Publishers and Distributors Pvt. Ltd., New Delhi, India.
6. Jain J. L., Jain S. and Jain N., (2010). Fundamentals of Biochemistry. Multicolour Edition. S. Chand and Company Ltd., New Delhi.
7. Lehninger A. L., (1984). Principles of Biochemistry. Kalyani Publishers, Ludhiana.
8. Rao. A.V.S.S. R. and Suryalakhsmi. A., (2009). text book of Biochemistry. 11th edition. UBS Publishers Distributers Pvt. Ltd., New Delhi.
9. Rodney Boyer, (2007). Modern Experimental Biochemistry. 3rd edition. Dorling Kinderley Pvt. Ltd., India.
10. Stryer L., (1975). Biochemistry. W. H Freeman & Co., San Francisco.

PRACTICAL - IV BIOCHEMISTRY AND EVOLUTION - LAB

Semester: IV **Hours: 2**

Code : 17ZO4CP04 **Credit: 1**

COURSE OUTCOMES:

- Analyse carbohydrate, protein, lipid and urine qualitatively.
- Understand the working principles and applications of biochemical instruments.
- Demonstrate pH measurement of various samples using pH meter.
- Recall the evidences of evolution.

1. Qualitative analysis of Carbohydrate.
2. Qualitative analysis of Protein.
3. Qualitative analysis of lipid.
4. Qualitative analysis of urine - Sugar, albumin, bile salts, bile pigments and ketone bodies.
5. Verification of Beer-Lambert's law - Demonstration.
6. P^H measurement of various samples using p^H paper and p^H meter.
7. Separation of amino acids by Paper Chromatography.
8. Electrophoresis - Demonstration.
9. Centrifuge - Demonstration.
10. Variation in Finger prints.
11. Homologous and Analogous organs, vestigial organs, fossils.
12. Examples of Evolutionary significance:
    a) Peripatus
    b) Limulus
    c) Leaf insect
    d) Stick insect
    e) Chamaeleon.

ALLIED BOTANY - II

Semester: IV **Hours: 3**

Code : 17BO4AC02 **Credits: 3**

COURSE OUTCOMES:

- Attain field experience and preparation of herbaria.
- Perceive and explain the importance of herbarium.
- Explain various divisions of horticulture and importance.
- Design vegetable and ornamental garden.
- Apply the knowledge on medicinal plants.

UNIT I

Angiosperm Taxonomy - Morphology of plant parts. Outlines of Bentham and Hooker's system of classification - Merits and demerits. General characters, Vegetative parts, Floral parts of the following families with Economic importance. Annonaceae - *Annona squamosa,* Rutaceae - *Murraya koenigii,* Asclepidaceae - *Calotropis gigantea,* Euphorbiaceae - *Euphorbia heterophylla* and Poaceae - *Oryza sativa.* **(9 Hours)**

UNIT II

Plant Physiology - Transpiration - Types of transpiration, Structure and Functions of Stomata, Mechanism of stomatal transpiration, Mechanism of opening and closing stomata, Significance of Transpiration, factors affecting transpiration - Internal and external factors, Guttation. Photosynthesis - Light and dark reaction. Photoperiodism - Short day plants, Long day plants, Day neutral plants, Flowering Hormone, Role of phytochrome in flowering, Significance of Photoperiodism. **(9 Hours)**

UNIT III

Horticulture - Propagation of Horticultural Plants, Methods of vegetative propagation - Cuttage - Root cuttings, Stem cuttings, Leaf and Leaf bud cuttings, Layerage - Ground layering and Air layering, Graftage - Methods of Grafting, Types - Approach, Whip, Cleft, Top and Bud. Planning and layout of Orchards and Kitchen garden. Indoor Gardening - Hanging pots. Storage of fruits - Method of storage. **(9 Hours)**

UNIT IV

Economic Botany - Detailed study on the Botanical name, Family, Morphology of useful parts and uses of Cereals - Sorghum, Pulses - Black gram, Fruit - Pine apple, Beverage - Coffee, Fibre - Cotton, Latex - Rubber and Essential oil - Castor oil. **(9 Hours)**

UNIT V

Applied Botany - Mushroom cultivation - nutritive value, importance and storage, Cultivation of Oyster mushroom. Biopesticides - Neem. Biodiesel - Jatropha, biodiesel production process. Taxonomy, Morphology of useful parts, Chemical composition and medicinal value of *Adhatodo vasica* (Acanthaceae), *Aloe vera* (Liliaceae), *Ocimum sanctum* (Lamiaceae) and *Catharanthus roseus* (Apocynaceae). **(9 Hours)**

COURSE BOOK:

Annie Ragland, (2000). A text book of Botany. 1st Edition, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Suresh Kumar., (2006). Economic Botany. Campus Book, International, New Delhi.
2. Dr. Satish Kumar Mehla. (2007). Bio fuel plants cultivation practices and seed bank. Pointer Publishers, Jaipur.
3. Pandy H. P. (2009). Plant Taxonomy. Silver line Publications.
4. Trivedi P. C. (2005). Applied Botany. Aavishkar Publishers, Jaipur.

ALLIED BOTANY - II - LAB

Semester: IV **Hours: 2**

Code : 17BO4AP02 **Credit: 1**

COURSE OUTCOMES:

- Explain the floristic features of families in technical terms.
- Demonstrate physiological activities in plants.
- Assess the marketing opportunities of medicinal plants.
- Apply the methods of propagation of horticultural techniques.

1. TAXONOMY:

Sectioning and mounting the floral parts of

a. Annonaceae - *Annona squamosa*

b. Rutaceae - *Murraya koenigii*

c. Asclepidaceae - *Calotropis gigantea*

d. Euphorbiaceae - *Euphorbia heterophylla*

2. PLANT PHYSIOLOGY:

Demonstration of physiological setup

a. Evolution of O_2 during photosynthesis

b. Evolution of CO_2 during Respiration

c. Ganong's Potometer

d. Light Screen Experiment

3. HORTICULTURE:

Methods of propagation of Horticultural plants

a. Layering

b. Grafting

4. ECONOMIC BOTANY:

Identification of economically important products and their uses

a) Sorghum
b) Black gram
c) Pine apple
d) Coffee
e) Cotton
f) Rubber
g) Castor oil.

5. APPLIED BOTANY:

Mushroom cultivation - Spawn production.

Herbarium submission (15 Medicinal Plants).

6. EDUCATION TOUR/FIELD TRIP TO THE FOREST.

EVOLUTION

Semester: IV **Hours: 4**

Code : 17ZO4CE1A **Credits: 3**

COURSE OUTCOMES:

- Appraise the origin of life.
- Interpret historical background of Evolution of organisms.
- Report the concept of origin of new species.
- Review the impact of elemental forces involved in the origin of organisms.
- Assess the adaptations to merge with the environment.

UNIT I

Lamarckism - Internal urge, Environment, use and disuse theory, inheritance of acquired characters, criticism. Neo Lamarckism - Experimental evidences, germplasm theory. Darwinism - principles of Darwinism, criticism. Neo - Darwinism - experimental support. **(12 Hours)**

UNIT II

Abiogenesis, Biogenesis, Theories of Evolution, Spontaneous Evolution, Stages of Evolution, Evidences of Evolution - Evidences from morphology and comparative anatomy. Homologous structures, Analogous structures, vestigial organs, Parallel, convergent, Connecting links. **(12 Hours)**

UNIT III

Natural selection - Stabilizing, Directional and Disruptive selection. Hardy - Weinberg Law, Factors affecting Hardy - Weinberg equilibrium . Inbreeding and out breeding. **(12 Hours)**

UNIT IV

Speciation - sympatric and allopatric speciation. Mechanism of speciation. Factors influencing speciation, Modern synthetic theory of evolution, Patterns of evolution - Micro evolution, Macro evolution and Mega evolution, Mimicry and colouration. **(12 Hours)**

UNIT V

Fossils - fossil formation, Types of fossils, Geological time scale. Evolution of man - place and time of evolution, Evolution of man as in Fossil record, Cultural evolution, Adaptive radiation - causes, types of adaptive radiation and its significance. Darwin's finches. **(12 Hours)**

COURSE BOOK:

Arumugam N., (2015). Evolution. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Richard Dawkins (1994). The Cambridge Encyclopedia of human evolution. Cambridge university press.
2. Roger Lewin (2004). Human evolution. An illustrated introduction. Wiley - Blackwell Publication, Oxford.
3. Kamshilor M.M., (1974). Evolution of the Biosphere. MIR Publishers, Moscow.
4. Edwin H Colbert, (1990). Evolution of the Vertebrates. V.R. Damodaran for Wiley Eastern Limited, Delhi.
5. Wood B.A., (1978). Human evolution. A Halsed Press book, New York.
6. Mani M.S., (1983). Ecology & Evolution. Sathish Book Enterprise, Agra.
7. John.R. Baker, (1974). Evolution. George & Union Ltd., Oxford.

DIETETICS

Semester: IV **Hours: 4**

Code : 17ZO4CE1B **Credits: 3**

COURSE OUTCOMES:

- Interpret and apply nutritional concepts.
- Evaluate and improve the nutritional health of children.
- Analyse the dietary deficiency and advocate balanced nutritional requirements.
- Acquire knowledge on diet for common health ailments.
- List out the nutritive value of food.

UNIT I

Major nutrients in food stuff - their significance, malnutrition, over nutrition, balanced diet and determination of Basal Metabolic Rate. **(12 Hours)**

UNIT II

Nutritional requirements for infants, school children, adolescent and old age. **(12 Hours)**

UNIT III

General dietary problems of an expectant mother, nutritional requirements for lactating women. **(12 Hours)**

UNIT IV

Diet in obesity and underweight. Diet for diabetics, cholesterol and hypertension. Peptic ulcer - causative factors, symptoms, dietary management. **(12 Hours)**

UNIT V

Nutritional value of protein - protein energy malnutrition. Symptoms, prevention and treatment, Fibre - Sources, Function and requirements and its role in nutrition. **(12 Hours)**

COURSE BOOK:

Srilakshmi (2005). Dietetics - New Age International P. Ltd. Publishers.

BOOKS FOR REFERENCE:

1. Park and Park M.S., (2003). Preventive and Social Medicines. Banarsidas, Banat Publishers.
2. Nutrition and Diet Therapy, (1989). Times mirror/Mosby College Publishers.
3. Shakuntala Mary M. and N. Shadaksharaswathy (2009). Food (Foods and Principles) New Age International Pvt. Ltd., Publishers.

FOOD AND NUTRITION

Semester: IV **Hours: 2**

Code : 17ZO4SK04 **Credits: 2**

COURSE OUTCOMES:

- Schedule their food habits.
- Create interest in the minds of science and non science students regarding the food requirements.
- Gain the knowledge about the importance of balanced diet and its deficiency.
- Formulate balanced diet for their family.
- Evaluate the relationship between diet, nutrition and disease.

UNIT I

Components of food - carbohydrate, protein, lipid, minerals, vitamins and water (sources and biological significances in brief). PEM- Marasmus, Kwashiorkor. Vitamins - Sources, functions and deficiency diseases in brief. **(6 Hours)**

UNIT II

Water - Requirement of water, dehydration. Digestion - human digestion, absorption and assimilation. Minerals - sources, requirements and deficiency of calcium, phosphorous, Iron, sodium, magnesium and zinc. **(6 Hours)**

UNIT III

Balanced diet, Planning for good nutrition - Good nutrition for infants, Adolescence and old age. BMI and BMR - definition and calculation. **(6 Hours)**

UNIT IV

Food and nutrient requirements - pregnancy and lactation, the factors that contribute to successful breast feeding. Recommended dietary allowances for moderate worker. **(6 Hours)**

UNIT V

Nutrition related disorders - Deficiency diseases, Adult chronic disease - diet, prevention and control measures of obesity, hypertension, diabetic and peptic ulcer. Food adulteration - any 10 adulterants. **(6 Hours)**

STUDY MATERIAL:

Santhi V and Jemima Florence Borgia V., (2007). Food and Nutrition.

BOOKS FOR REFERENCE:

1. Arumugam N., (2005). Animal Physiology. Saras Publications, ARP Camp Road, Kottar, Nagercoil, Kanyakumari Dt.
2. Gitanjali Chaterjee. (2000). Hand Book of Food and Nutrition. Rajat Publication.
3. Jyoti S. Sharma. (2009). Applied Nutrition and Food Science. Akansha Publication
4. Shakuntala Mary N. and Shadaksharaswamy M., (2000). Foods facts and Principles. New Age International (P) Limited Publishers.
5. Srilakshmi, (2005). Dietetics. New Age International (P) Limited publishers.

IMMUNOLOGY

Semester: V **Hours: 5**

Code : 17ZO5MC08 **Credits: 5**

COURSE OUTCOMES:

- Discuss innate and acquired immunity and describe the types of lymphoid organs.
- Evaluate the array of immune cells and compare humoral and cell mediated immune response.
- Apply the knowledge about the antigens, antigenicity, diversity of immunoglobulins and method of detection of Antigen- antibody reaction.
- Appraise ideas on complement, MHC, cytokines and hypersensitivity reactions.
- Outline the types of transplantation, tumor immunology, autoimmune disorders and types and schedule of vaccines.

UNIT I

History of Immunology - contributions of Edward Jenner, Louis Pasteur and Elie Metchnikoff. Scope of Immunology. Immunity: Types of immunity - Innate, acquired. Innate - physical and mechanical factors, biochemical factors, cellular factors and genetic factors. Acquired immunity - passive and active immunity - natural active and artificial active. Lymphoid organs - primary lymphoid organ - thymus, bursa of Fabricius, bone marrow, secondary lymphoid organ - lymph node, spleen, MALT, Payer's patches and tonsils. **(15 Hours)**

UNIT II

Cells of the immune system : lymphoid lineage - T cell and its types, B cell and its types, Null cell and its types; Myeloid lineage - eosinophils, basophils, neutrophils, mast cells, platelets, monocytes and macrophages. Humoral Immunity- primary and secondary immune response. Cell mediated immunity. **(15 Hours)**

UNIT III

Antigens - properties, Epitopes, Haptens, Adjuvants, Antigenicity. Antibodies - types, structure, properties, functions. Antigen antibody interaction- properties, Detection of Ag - Ab reaction - precipitation, agglutination, cytolysis, complement fixation, flocculation, opsonisation, Immunofluorescence, ELISA, Western blotting. **(15 Hours)**

UNIT IV

Complement - Properties. Major Histocompatability Complex (MHC) - MHC Antigens, HLA and H2. Hypersensitivity - Type I, II, III and IV. Cytokines - properties and functions. Primary and Secondary Immuno deficiency disease - A brief review. **(15 Hours)**

UNIT V

Transplantation Immunology - classification of grafts, Immunology of graft rejection, Clinical transplantation - Cornea, Kidney, Heart, Liver and bone marrow transplant. Tumour Immunology - tumour antigen, immune response to tumour, immuno diagnosis and immuno therapy. Autoimmune disorders - characteristics, types with two examples each. Vaccines - types of vaccines.

(15 Hours)

COURSE BOOK:

Mani A., Narayanan L.M., Dulsy Fatima A.M., Selvaraj and Arumugam N., (2013). Immunology and Microbiology. Saras Publications, Nagercoil.

BOOKS FOR REFERENCE:

1. Kuby, Kindt T. J., Goldsby R. A and Osborne B.A (2007). Immunology. 6th edition. W. H. Freeman and Company. New York.
2. Rabindra Narain. (2012). Clinical Immunology, Wisdom Press, New Delhi. India.
3. Raj Khanna. (2011). Immunology. Oxford University Press, India.
4. Rao C.V., (2006). Immunology. Narosa Publishing House, New Delhi, India.
5. Roitt J.M., (1984). Essential Immunology. Blackwell Scientific Oxford.
6. Slites D.P., Stoho J.D., Funde A., Berq H.M and Wells J.V., (1994). Basic and Clinical Immunology. Medical Publication, USA.
7. Sudha Gangal and Shubhangi Sontakke (2013). TEXT BOOK of basic and clinical Immunology. University Press Private Ltd. Hyderabad. India.
8. John I. (2010). Immunology. MJP Publishers, Chennai.
9. John Playfair and Gregory Bancroft, (2008). Infection and Immunity. 3rd edition. Oxford University Press, Oxford.
10. Seemi Farhat Basir, (2012), TEXT BOOK of Immunology. PHI Learning Private Limited, New Delhi.
11. Fathimunisha Begum, (2014). Immunology. PHI Learning Private Limited, Delhi.
12. Kannan.I, (2007). Immunology. MIP Publishers, Chennai.
13. Hildemann,W.H., (1984). Essentials of Immunology. Elsevier science Publishing co. Inc, New York.
14. Rajasekara Pandian M. Senthil Kumar.B., (2007). Immunology and Immuno technology. Panima Publishing Corporation, Bangalore, New Delhi.
15. Hannigan.B.M., (2008). Immunology. Viva Books Private Limited, New Delhi.
16. Arun Ingale, (2010). Basic Immunology. New Central Book Agency (P) Ltd., London.
17. Helen Chapel, Mansel Haeney, (1984). Essentials of Clinical Immunology. English Language Book Society / Blackwell scientific Publications, London.

MICROBIOLOGY

Semester: V **Hours: 5**

Code : 17ZO5MC09 **Credits: 5**

COURSE OUTCOMES:

- Identify and classify the major groups of microorganisms.
- Demonstrate the basic microbial techniques.
- Examine the structure, growth and nutritional types of microorganisms.
- Develop knowledge on the applications of microbes in various fields.
- Acquire knowledge and develop skill in the industrial production of microbial products and utilization of microbes as soil fertilizers.

UNIT I

History and Scope of Microbiology - Contributions of Louis Pasteur, Robert Koch and Beijerinck. Classification of microbes - Whittaker's five kingdom concept, Bacteria - size, shape, arrangement, Ultra structure of bacterial cell - cell wall, cell membrane, flagella, pili, capsule, Bacterial reproduction and growth - phases of growth and growth curve, factors affecting growth, measurement of bacterial growth - cell mass and number. **(12 Hours)**

UNIT II

Nutritional types in bacteria - phototrophs, autotrophs and heterotrophs, Bacterial respiration - anerobic, aerobic and facultative, spore formation in bacteria.

Basic techniques in Microbiology: Sterilization and disinfection - dry heat, moist heat, filtration, incineration, radiation and chemical. Culture of microbes - culture medium and techniques (serial dilutions, spread plate, pour plate and streak plate). **(12 Hours)**

UNIT III

Mycology - Outline classification and general characters, structure and reproduction in yeast and penicillium. Phycology - Outline classification, general characteristics and reproduction in algae, structure of chlorella and anabaena. Lichens - Structure, characteristics and significance of lichens. Virology - Outline classification and general characters, structure and multiplication of T4 bacteriophage. **(12 Hours)**

UNIT IV

Food Microbiology - Fermented food products - Yoghurt (milk), sauerkraut (vegetables), leavening of bread; Microbial spoilage of meat, milk, fruits, vegetables and canned food; food infection (amoebiasis), food poisoning (botulism); factors influencing microbial growth in food; Food Preservation - physical and chemical methods.

Medical microbiology - Causative organism and mode of infection- bacterial disease (cholera), viral disease (Influenza), fungal disease (cutaneous - dermatophytosis, systemic - candidiasis). **(12 Hours)**

UNIT V

Industrial microbiology - Basic design of a fermentor, Screening of industrially important microorganisms, production of organic acid (vinegar), amino acid (glutamic acid), antibiotics (streptomycin), enzyme (amylase).

Soil and Agricultural microbiology - Nitrogen fixation - nif genes, mechanism of nitrogen fixation; microbial pesticides: bacterial (*Bacillus thuringiensis*) fungal (*Bauveria bassiana*), viral (NPV, CPV). **(12 Hours)**

COURSE BOOK:

Mani A., Narayanan L.M., Dulsy Fatima A.M., Selvaraj and Arumugam N., (2015). Immunology and Microbiology. Saras Publications, Nagercoil.

BOOKS FOR REFERENCE:

1. Cappuccino J.G and Sherman N., (2005). Microbiology. A Laboratory Manual. 7th edition. Pearson Education and Dorling Kinderley Pvt. Ltd., New Delhi.
2. Dubey and Maheswari D.K., (2013). A TEXT BOOK of Microbiology. Revised edition. S. Chand and Company Ltd., New Delhi.
3. George J Banwan, (2002). Basic Food Microbiology. 2nd edition. CBS Publishers and distributors, New Delhi.
4. Green Wood D., Slack R.C.B and Peutherery J.F., (2002). Medical Microbiology. 16th edition. Churchill Livingstone an Imprint if Elsevier's Science Ltd.
5. Jeffery C. Pommerville, (2014). Alcamo's Fundamentals of Microbiology. 10th edition. Jones and Bartlett India Pvt. Ltd., New Delhi.
6. Patel A.H., (2012). Industrial Microbiology. 2nd edition. Macmillan Publishers India Ltd., New Delhi.
7. Pelcezar M. J., (1993). Microbiology and Reid. Rc Graw Hill Book Company, New York.
8. Schelgel H. G., (1993). General microbiology. Cambridge University Press U.K.
9. Somnath Ditta, (2009). Medical Microbiology, Adhyayan Publishers and Distributors, New Delhi.
10. Sugandhar Babu R. P., (2008). Food Microbiology. Adhyayan Publishers and Distributors, New Delhi.

MOLECULAR BIOLOGY

Semester: V **Hours: 5**

Code : 17ZO5MC10 **Credits: 4**

COURSE OUTCOMES:

- Recall the structure of genetic material.
- Imbibe knowledge on DNA replication and mechanism of DNA repair.
- Acquire understanding of the structure of different RNA and the salient features of genetic code.
- Describe regulation of gene expression at transcriptional and post transcriptional level.
- Illustrate the control of gene expression at translational level.

UNIT I

Introduction to Molecular Biology, DNA - DNA as a genetic material - experimental proof, Chemical composition, Chargaff rule, Nucleoside, Nucleotide, Base pair, Watson and Crick model, Different forms of DNA (A, B and Z), Properties of DNA -melting curves, Tm and cot ½ value, hypochromicity.

(15 Hours)

UNIT II

DNA Replication - Semi conservative mode of replication, Meselsen and Stahl experiment, Mechanism and enzymology of DNA replication, Models of DNA replication. DNA repair - Direct repair, Excision repair, Mismatch repair and Recombinational repair. **(15 Hours)**

UNIT III

RNA: RNA as a genetic material - experimental proof, Chemical composition, Structure of mRNA, tRNA, rRNA, Fine structure of gene - cistron, muton and recon. Gene as a functional unit - Promotor in prokaryotes, Promotor in Eukaryotes, Coding and Non coding sequences, terminator codon. Genetic code - Salient features and deciphering the code. **(15 Hours)**

UNIT IV

Transcription in prokaryotes - Initiation, elongation, termination. Translation in prokaryotes - Initiation, elongation, termination. Gene regulation in prokaryotes - lac operon and trp operon models. **(15 Hours)**

UNIT V

Transcription in eukaryotes - Initiation, elongation, termination and post transcriptional modifications. Translation in eukaryotes - Initiation, elongation, termination and post transcriptional modifications. Gene regulation in eukaryotes - acetylation and methylation. **(15 Hours)**

COURSE BOOK:

Arumugam N., Narayanan L M., Mani A., Selvaraj A M., Padmalatha Singh (2014). Molecular Biology and Genetic Engineering. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Verma P.S. and Agarwal V. K., (2016). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Company Ltd., New Delhi.
2. Gardner, E.J., Michael J. Simmons, Peter Sunstad, D., (1991). Principles of Genetics. 8th edition John Wiley and Sons, INC.
3. Benjamin Lewin., (2004). Genes VIII. Pearson Prentice Hall, Pearson Education, Inc.
4. Strickberger M.W., (1985). Genetics. 3rd Edition, Macmillan Publishing Co., New Delhi.
5. Daniel L. Haartl., Elizabeth W. Jones, (2001). Genetics. 5th edition, Jones and Bartlett Publishers, Sudbury.
6. Meyyan R.P., (2004). Genetics. Saras Publication, Nagercoil.
7. Arumugam N. and Meyyan R.P., (2014). Cell Biology, Molecular Biology, Genetics, Evolution and Ecology - Vol. I. Saras Publication, Nagercoil.

BIOSTATISTICS AND BIOINFORMATICS

Semester: V **Hours: 5**

Code : 17ZO5MC11 **Credits: 4**

COURSE OUTCOMES:

- Define the basic concepts of statistics.
- Apply statistics in Biology.
- Relate the applications of computer in life science.
- Demonstrate the knowledge of computer in documenting genes and proteins.
- Underline the tools of bioinformatics and employ statistical software to solve biological problems.

UNIT I

Basic terminology of Biostatistics - Population, Data, Samples and Variables. Collection of data, sampling methods, classification and tabulation, graphical and diagrammatic presentation of data. **(15 Hours)**

UNIT II

Measures of Central tendency- Calculation of mean, median and mode. Measures of dispersion - range, mean deviation, standard deviation, standard error, variance and coefficient of variation. **(15 Hours)**

UNIT III

Probability - Types, Theorems of Probability (Addition and Multiplication), Binomial distribution. Testing of hypothesis - Null hypothesis and alternative hypothesis, Degrees of freedom, Chi-square test. **(15 Hours)**

UNIT IV

Bioinformatics - Introduction and scope Biological database, Primary database - Gene bank, EMBL, Swiss protein. Secondary database - Motif, domain, Virological, World biodiversity, Model organism databases (E.coli, Drosophila, human databases). **(15 Hours)**

UNIT V

Applications of bioinformatics, Genomics - definition, Genome sequencing - Short gun sequencing, Clone contig. Proteomics - definition, Tools used in Proteomics and Genomics, Proteins - Structure (Primary, secondary, tertiary and quaternary). Human Genome Project - significance. Proteomics methods - X- ray crystallography and NMR. **(15 Hours)**

COURSE BOOKS:

1. Arumugam N., Gopi A., Meena A., Sundaralingam, Kumaresan V., (2016). Biostatistics, Computer Application and Bioinformatics. Saras Publication, Nagercoil.
2. Ramakrishnan P., (2004). Bio Statistics. Saras Publication, Nagercoil.
3. Irfan A. Khan., Atiya Khanum, (2000). Recent Advances in Bioinformatics. Ukaaz Publications, Hyderabad.
4. Arthur M. Lesk, (2005). Introduction to Bioinformatics. (Indian Edition), Oxford University, USA.

BOOKS FOR REFERENCE:

1. Daniel W.W., (2009). Biostatistics. 9th edition, John Wiley and Sons, New York.
2. Gupta S.P., (2014). Statistical Methods. 40th edition, S.S. Chand Publishers, New Delhi.
3. Kothari C.R., (2004). Research Methodology. 2nd edition, New Age International Publishers, New Delhi.
4. Palanichamy, (2002). Statistical Methods for Biologist. Palani Paramount Publications.
5. Zar J.H., (2011). Statistical Analysis.4th Edition, Pearson Education, South Asia.
6. Ruchi singh and Richa Sharma, (2010). Bioinformatics - Basics, Algorithms and applications. University Press (India) Private Limited.
7. Gupta P.K., (1997). Elements of Biotechnology. Rastogi Publication, Meerut.
8. Singh S.K. and Pandey K.K., (2007). Bioinformatics and gene technology. Ansari Road, Darya Ganj, New Delhi.
9. Verma B.L., and Shukla H.D., (1993). Biostaistics. Satish Kumar Jain for CBS Publishers & Distributors.
10. Shelke D.K., (2011). Biostatistical Techniques and designs. Updesh Purohit for Agrobios (India).

PRACTICAL - V IMMUNOLOGY, MICROBIOLOGY AND BIOSTATISTICS - LAB

Semester: V **Hours: 4**

Code : 17ZO5CP05 **Credits: 2**

COURSE OUTCOMES:

- Handle microbes safely and effectively and isolate microbes by series of laboratory experiments.
- Demonstrate the basic apparatus and equipments used in microbiology and immunology.
- Dissect and display lymphoid organs.
- Isolate and identify the lymphocytes.
- Analyse statistical data and interpret their results.

IMMUNOLOGY

1. Lymphoid organs in chick.
2. Histology of lymphoid organ.
   i) Primary lymphoid organs - Thymus, Bone Marrow.
   ii) Secondary lymphoid organs - Lymphnodes, Spleen.
3. Preparation of antigen - BSA, bacterial, SRBC.
4. Production of Anti serum.
5. Separation of lymphocytes.
6. Direct agglutination to determine ABO blood grouping.
7. Rh typing.
8. Immunoelectrophoresis - Demonstration.
9. Haemagglutination - Demonstration.

MICROBIOLOGY

10. Cleaning of glass wares and modes of sterilization.
11. Preparation of culture media for microorganisms - Agar and Broth medium.
12. Pure culture technique - a) Serial dilution b) Streak plate c) Pour plate.
13. Staining technique a) Simple staining b) Gram staining.
14. Detection of microbial content of milk - Methylene blue reduction test.
15. Tools in Microbial techniques : a) Autoclave, b) Hot air oven, c) Laminar Air Flow, d) Inoculation needle.

BIOSTATISTICS

16. Study of Probability with "Two coin tossing" experiments.
17. Calculation of mean, median, mode, variance, standard deviation and standard error using Neem leaves.
18. Calculation of mean, median, mode, variance, standard deviation and standard error of height and weight of class students.

GENETIC ENGINEERING

Semester: V **Hours: 4**

Code : 17ZO5CE2A **Credits: 3**

COURSE OUTCOMES:

- Explicate the role of cloning vectors.
- Explain the tools in genetic engineering.
- Apply the knowledge of genetic engineering.
- Illustrate the rDNA technology.
- Exploit the transgenic organisms for human welfare.

UNIT I

Introduction and scope of genetic engineering. Tools in genetic Engineering - Restriction enzymes, DNA ligases, Coupling tools - linkers, adaptors, Gene cloning vectors - Requirements of cloning vectors. Plasmid vector - Properties, types, artificial plasmid vectors - PBR-322, Natural plasmid vector - Ti plasmid. **(12 Hours)**

UNIT II

Bacteriophage vector - Lambda phage and M13, Animal vector - SV- 40, Bovine papilloma virus, Adeno viruses, Retro viruses. Plant vector - CaMV, TMV. Shuttle vectors, Expression vector, Cosmids. **(12 Hours)**

UNIT III

Steps involved in construction of rDNA - Preparation of desired gene, isolation of the vector DNA, linking of desired gene with vector DNA, applications of rDNA. **(12 Hours)**

UNIT IV

Introduction of rDNA into host cells: Bacteria - transformation; plant cell - electroporation, shot gun method, microinjection, direct gene transfer through Ti plasmid; animal cell - chemical treatment, microinjection, liposome - mediated fusion. Identification of recombinants - insertional inactivation, immunochemical method, colony hybridization. **(12 Hours)**

UNIT V

Applications of genetic engineering - transgenic plants, animals, gene therapy and pollution control. Genomic Library, Biohazards of rDNA technology. **(12 Hours)**

COURSE BOOK:

Narayanan L. M., Mani A., Selva Raj., Arumugam A., Padmalatha Singh., (2014). Molecular Biology and Genetic Engineering, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Gardner E. J., Simmons M. J., Peter Snustad D., (1991). Principles of Genetics. John wiley and sons, INC, New York.
2. Gupta P. K., (1997). Elements of Biotechnology. Rastogi Publication, Meerut.
3. Joshi P., (2004). Genetic Engineering and its applications. 2nd edition, Agrobios (India), Jodhpur.
4. Lewin B., (2000). Genes VII. Oxford University Press, Oxford.
5. Singh B. D., (2006). Biotechnology. Kalyani Publication, Chennai.

BIOTECHNOLOGY

Semester: V **Hours: 4**

Code : 17ZO5CE2B **Credits: 3**

COURSE OUTCOMES:

- Explicate the integral application of knowledge and techniques.
- Demonstrate industrial production of pharmaceutical products.
- Appraise medical biotechnology for human welfare.
- Equip the knowledge of environmental sustainability.
- Apply biotechnology for social welfare

UNIT I

Introduction to Biotechnology - Rural biotechnology - white, blue, green and red. Animal cell culture techniques, Plant tissue culture techniques, Transgenesis - Transgenic plants and animals. **(12 Hours)**

UNIT II

Industrial Biotechnology - Microbial production of Antibiotics. Pencillins: Penicillin, Amino glucosides - Streptomycin, Macrolides: Erythromycin, Aromatic antibiotic**:** Chloram - phenicol. **(12 Hours)**

UNIT III

Medical Biotechnology - Gene Therapy, DNA in Disease diagnosis and medical forensics, DNA finger printing for DNA profiling and production of Single Cell Protein (SCP). **(12 Hours)**

UNIT IV

Environmental Biotechnology - Biodegradation and Bioremediation, Biosensors, Biofuels and Biofertilizers. Role of Biotechnology in pollution control. **(12Hours)**

UNIT V

Biotechnology and Society - Human embryonic stem cell research - Human cloning. Biotechnology and Intellectual property: Intellectual property rights and patenting biological material. **(12 Hours)**

COURSE BOOKS:

V. Kumaresan., (2013). Biotechnology, Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Sathiyanarayana U., (2005). Biotechnology. Book and Allied (P) Ltd, Kolkata.
2. Kingsman S. M and Kingsman A.J., (1988). Genetic Engineering and Introduction to gene and exploitation in eukaryotes. Blackwell Scientific Publications.

HOME AQUARIUM

Semester: V **Hours: 4**

Code : 17ZO5CE2C **Credits: 3**

COURSE OUTCOMES:

- Enjoy aesthetic sense.
- Develop skill on aquarium construction and maintenance and become entrepreneur.
- Formulate feed supplement for aquarium.
- Identify the diseases of aquarium fishes and find remedy.
- Appraise the beauty and necessity of aquatic plants in aquarium.

UNIT I

Construction of Home Aquarium, Materials needed - Wooden and metal frames - Frameless tanks - Sealants and Gums, Design and Construction of Public Freshwater and Marine Aquaria, Water quality requirements - Temperature control, aeration and Lighting. **(12 Hours)**

UNIT II

Setting up aquarium - gravel/pebbles - Plants - Ornamental objects and fishes - Selection of species - Introducing fishes to the aquarium, Nutritional requirements of aquarium fishes, Different kinds of feeds, Culture of live feed organisms, Preparation of dry feeds, Feeding methods. **(12 Hours)**

UNIT III

Aquarium Equipments: Aquarium heater, thermometer, air pump, air stone, planting sticks and algal scraper, hose pipes, aquarium vaccum cleaner, filters, nets, Aquarium fish feeder. **(12 Hours)**

UNIT IV

Species of ornamental fishes - Taxonomy and biology of Gold fish, Guppies, Sword tails, Zebra and Angel fish. Fresh water species - Live bearing fishes and egg layers (two examples each). Common Ornamental fish diseases and their treatment - Bacterial, Viral, Fungal, Protozoan and Parasitic diseases (any three diseases in each category). **(12 Hours)**

UNIT V

Aquarium Plants: Importance of aquarium plants, Live plants, Artificial plants, Floating aquarium plants (*Azolla caroliniana*, *Pistia stratiotes*), submerged aquarium plants (*Hydrilla verticillata*, Vallisneria), arranging aquarium plants, potted aquarium plants, Suitable conditions for aquarium plants. **(12 Hours)**

COURSE BOOK:

Jeyashree K. V., C. S. Thara Devi and N. Arumugam. 2015. Home Aquarium and Ornamental Fish Culture, Saras Publication, Nagercoil, Tamil Nadu.

BOOKS FOR REFERENCE:

1. Yadav, B.N. 2002. Fish and Fisheries, Daya Publishing House, New Delhi.
2. Bal,D.V. and Rao,K.V. 1984. Marine Fisheries of India, Tata Mc Graw - Hill Publishing Company Limited - New Delhi.
3. Biswas K.P. 2009. Fishes around Indian Ocean. Daya Publishing House, New Delhi.
4. Jamson, D., R. Santhanam. 1996. Manual of ornamental fishes and farming technologies. Department of Fisheries Environment - Fisheries college and Research department - Tuticorin.
5. Karen A Randall, 2016. Sunken Gardens - A step - by - step guide to Planting Fresh water Aquariums. Timber Press.

ECONOMIC ENTOMOLOGY

Semester: V **Hours: 4**

Code : 17ZO5CE2D **Credits: 3**

COURSE OUTCOMES:

- Outline the classification of insects and highlight the economic importance.
- Appreciate the benefits of honey, lac, silk for human beings.
- Summarize the advantages of insects in pest control and improve agro industry.
- Apply the knowledge of entomology in medical and vertinary field.
- Review the pest management and recent advances in pest control.

UNIT I

Structure and salient features brief account of external morphology of head, thorax and abdomen; Classification and development (metamorphosis) of insects; Salient features (up to order) and economic importance of Thysanura, Orthoptera, Odonata, Thysanoptera, Isoptera, Coleoptera, Lepidoptera, Hemiptera, Diptera, Hymenoptera, Dermaptera. Methods of collection, mounting and preservation of insects. **(12 Hours)**

UNIT II

Productive insects Sericulture- Types of Silkworm, Life cycle and rearing of mulberry silkworm, *Bombyx mori*; pests and diseases of silkworm, Economic importance of silkworms Apiculture - Types of honey bees, Life cycle and culture methods, enemies and diseases of honey bees, bee product and its economic importance Lac culture - Lac insect, *Laccifer lacca* - Life cycle, Lac processing, Lac products and Economic Importance. **(12 Hours)**

UNIT III

Beneficial insects - Biological control agents - Characters and difference between parasitoids and predators (common Indian insects); General characters and beneficial role of scavengers, pollinators, weed killers; Medicinal and Aesthetic value of insects; Insect as human food (general account only).

Agricultural Entomology: common insect pests of rice and their control: rice thrips, brown plant hopper and rice ear head bug. Insect pests of stored grains and their preventive methods. **(12 Hours)**

UNIT IV

Medical and Veterinary Entomology: Insects in relation to public health and their control: mosquito, housefly, Cockroach, flea and head louse. Most common insect pests of domestic animals and their control: stable fly, shaft louse and head maggot. **(12 Hours)**

UNIT V

Pest management Components of pest control - physical, mechanical, cultural, chemical and biological control; Pesticide applicators; Pesticide poisoning and first aids; General Principles, advantages and disadvantages of Integrated Pest Management; Recent advances in pest control - sterilization techniques, liquid vaporizers, pheromones, kairomones. **(12 Hours)**

COURSE BOOK:

Vasanthraj David, B. and Ramamurthy, VV. 2012. Elements of Economic Entomology, Seventh edition, Namrutha publications, Chennai

BOOKS FOR REFERENCE:

1. David, B and Ananthakrishnan, T. N. 2006. General and Applied Entomology, Second edition, Tata McGraw hill publishing company Ltd., New Delhi, India.
2. Pruthi, H.S. 1969. Text book on Agricultural Entomology, I.C.A.R. Publication, New Delhi.
3. Awasthi, V.B. 2012. Introduction to General and Applied Entomology, third edition, Scientific publishers, India.
4. Abhishek Shkula, 2009. A Handbook on Economic Entomology, Daya Publishing House, India
5. Ganga, G. & Sulochana Chetty, J. 1997. An introduction to Sericulture. Oxford & IBH Publ. Co. pvt. Ltd., India.
6. David, B.V & Ramamurthy, V.V. 2016. Elements of Economic Entomology, 8th Edition, Brillion Publishing, India.

APTITUDE BUILDING - I

Semester: V **Hours: 2**

Code : 17AE5NE01 **Credits: 2**

COURSE OUTCOMES:

- Understand the basic concepts of numerical ability.
- Gain mastery over logical reasoning through concise thinking.
- Have command over English Language.
- Acquaint with general knowledge and current affairs.
- Develop sufficient confidence to face competitive exams and clear it.

UNIT I

Numerical Ability: Numbers - Highest common factor & Least common multiple of numbers - average - Problems on numbers - percentages - Problems on ages - Percentage - Profit and loss - ratio and proportion - Time & work.

UNIT II

Reasoning: Series completion - analogy - coding & decoding - puzzle test - direction sense test - alphabet test - alpha - numeric sequence puzzle - arithmetic reasoning - inserting missing character - logical sequence of words.

UNIT III

English Language: Spotting errors: Articles, Tenses, Nouns, Pronouns, Adjectives, adverbs, Prepositions - Selecting the most suitable word - Synonyms, Antonyms - Spell check - Double blanks in a sentence.

UNIT IV

General knowledge: Computer awareness: Classification, Elements of computing process, Programming languages, Computer memory, Software & Hardware, Operating systems - Banking awareness: Banking Regulation act, Reserve Bank of India, Commercial banks, e-banking, Currency system, Money Market, Banking and Finance, Indian Monetary Policy.

UNIT V

Current affairs: National & International Current Affairs: Economy, Sports, Science & Technology, Polity.

COURSE BOOK:

Course Material prepared by the Staff.

BOOKS FOR REFERENCE:

1. IBPS - VI, Institute of Banking Personnel Selection, Bank Po, Probationary officers/Management trainees Arihant Publications (India) Limited, 2015.
2. A.P. Bhardwaj, General English for Competitive Examinations, Dorling Kindersley (India) Pvt Ltd, New Delhi, 2013.
3. Dr. R.S. Aggarwal, Quantitative Aptitude, S.Chand & Company PVT.LTD, New Delhi, 2013.
4. Dr. R.S. Aggarwal, A Modern Approach to Verbal & Non - Verbal Reasoning, S. Chand & Company PVT.LTD, New Delhi, 2009.

ENVIRONMENTAL BIOLOGY

Semester: VI **Hours: 6**

Code : 17ZO6MC12 **Credits: 6**

COURSE OUTCOMES:

- Enlist the abiotic and biotic factors.
- Restate the importance of ecosystem and natural resources.
- Evaluate the effects of pollution.
- Analyse the impact of environmental factors on animals.
- Assess the biodiversity of animals.

UNIT I

Abiotic factors - water, air, substratum, temperature and light. Biogeochemical cycle - water cycle, gaseous cycle - oxygen cycle, carbon cycle and nitrogen cycle. Sedimentary cycle - Sulphur and Phosphorus. **(18 Hours)**

UNIT II

Community ecology, Population ecology, Ecosystem - structure, types, pond ecosystem and dynamics of ecosystem. Animal Association - Inter and Intra specific relationship, Mutualism, Commensalism and Antagonism. **(18 Hours)**

UNIT III

Habitat - characteristics and adaptations of fresh water, marine and terrestrial habitat, desert and cave. **(18 Hours)**

UNIT IV

Environmental pollution - Causes, effects and remedial measures of air, water, soil and noise. Biological and ecological effects of radiation. **(18 Hours)**

UNIT V

Sampling techniques of population, methods of estimating primary and secondary production. Wildlife conservation and forestry. Biodiversity conservation. Remote sensing - applications in agriculture, fisheries, forest management and flood management. Urbanization - reasons for urbanization, urban problems and methods to control urban growth. **(18 Hours)**

COURSE BOOK:

Arumugam N., (2015). Concepts of Ecology. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Agarwal. V.S., (2001). Strategies in Environmental conservation. Kalyani Publishers, New Delhi.
2. Krishnan N.T., Santhana kumar G., (1992). Environmental Biology. J.J. Publications, Nagercoil.
3. Kumar H.D., (1999). Biodiversity and Sustainable Conservation. Oxford and IBH Publication Co. Pvt. Ltd., NewDelhi.
4. Odum E.P., (2017). Fundamentals of Ecology. 5th edition, Natraj Publication, Gayathri Offest, New Delhi.
5. Pathade G.R. and Goel. P.K., (2001). Environmental Pollution and management of waste waters by microbial techniques. ABD Publishers, Jaipur, India.
6. Saha T.K., (2013). Ecology and Environment Biology. Books and Allied (P) Ltd., Kolkata.
7. Sharma B.K., (2001). An Introduction to Environmental Pollution. Krishnan Prakashan Media Pvt. Ltd., Meerut.
8. Sharma P.D., (1999). Ecology and Environment. Prakasan media, Shivaraj Road, Meerut, U.P.
9. Trivedi, (2012). Ecology APH Publishing Corporation, New Delhi.
10. Verma P.S. and Agarwal V. K., (1992). Principles of Ecology. S. Chand and company Pvt. Ltd., New Delhi.

DEVELOPMENTAL BIOLOGY

Semester: VI **Hours: 7**

Code : 17ZO6MC13 **Credits: 6**

COURSE OUTCOMES:

- Identify the different stages of development of frog and chick.
- Summarize the events of gametogenesis and fertilization.
- Distinguish the organogenesis in frog and chick.
- Understand the reproductive cycle and defects in reproduction.
- Gain knowledge on Assisted Reproductive Technology (ART) and birth control measures.

UNIT I

Introduction - History and Concepts, Theory of Preformation - Epigenesis, Baer's Law, Biogenetic Law and Theory of Pangenesis. Gametogenesis - Oogenesis and spermatogenesis, Structure and function of spermatozoan and egg. Types of eggs and egg membranes. Fertilization - types of fertilization. Parthenogenesis - Natural and artificial parthenogenesis. **(21 Hours)**

UNIT II

Cleavage - planes and patterns of cleavage, Blastulation and Gastrulation in frog and chick, Fate Map, Development of chick based on hours of incubation - 24, 48, 72, and 96 hours of chick blastoderm. Organogenesis in chick - Development of eye, ear, heart and brain. **(21 Hours)**

UNIT III

Gradient Theory, Organizer in amphibian embryo, Embryonic induction - Competence. Nuclear transplantation - Types, Serial transplantation experiments. Nucleo-cytoplasmic interaction - cytodifferenciation experiments. Regeneration - Events in Regeneration, Wolffian Regeneration. Amphibian metamorphosis - Ecological, morphological, physiological and Biochemical changes. **(21 Hours)**

UNIT IV

Placentation in mammals and Foetal membranes in mammals. Twin study, Test tube Baby. Cryopreservation, Stem cells - types, properties, culture and application, Somatic animal cell fusion. **(21 Hours)**

UNIT V

Sexual Cycle - Puberty, Oestrous cycle, menstrual cycle, menopause, pregnancy, parturition, hormonal control of reproductive cycle. Birth Control, Necessity for Birth control, contraceptive devices. Amniocentesis, Infertility - Types and causes of infertility. Assisted Reproductive Technology (ART) in human. **(21 Hours)**

COURSE BOOK:

Arumugam N., (2015). Developmental Biology, Saras Publications, Nagercoil.

BOOKS FOR REFERENCE:

1. Balinsky B. I., (1981). An Introduction to Embryology. 2nd edition, East West Press (P) Ltd., Ansari Road, Dryagana, New Delhi.
2. Verma P.S. and Agarwal V. K., (2003). Chordate Embryology. S. Chand and Company Ltd., New Delhi.
3. Kanna, (2004). TEXT BOOK of Embryology. Discovery Publishing House, Prahlad Street, New Delhi.
4. Mohan P. Arora., (2002). Embryology. 4th Edition, Himalaya Publishing House, Mumbai.
5. Rajendra Kaushik, (2009). Embryology. Oxford Book company, Rajdhani printers, Delhi.
6. Kafmanf B., (2013). Advanced Embryology. Random Exports, Thomson Press (India) Ltd.
7. Veer Bala Rastogi, (2016). Chordate Embryology. Kedernath Ramnath Publication.
8. Morgan T.H., (2012). Embryology and Genetics. Agrobios Publication, Jodhpur.
9. Bruce M Carlson, (2007). Foundations Embryology, (6th edition), Tata Mc Graw-Hill Publishing company Limited, New Delhi.

PHYSIOLOGY

Semester: VI **Hours: 7**

Code : 17ZO6MC14 **Credits: 6**

COURSE OUTCOMES:

- Gain knowledge on the role of enzyme in carbohydrate, protein and fat digestion.
- Compare the structure, functions and co ordination of organs and organ systems.
- Explain the nerve impulse conduction and mechanism of muscle contraction.
- Attain knowledge on mechanism of osmoregulation in animals and the adaptive significance of bioluminescence.
- Describe the structure and functions of endocrine glands and reproductive system of human.

UNIT I

Food and Digestion - Human digestive tract - structure and process of digestion, role of enzymes in carbohydrate, protein and fat digestion in man, absorption of digested food in man, balanced diet, malnutrition. Blood and Circulation - Types of heart, functional anatomy of human heart, origin and conduction of heart beat, cardiac cycle, cardiac output, electrocardiogram, blood pressure and heart diseases. **(21 Hours)**

UNIT II

Respiration - Types of respiration, respiratory organs, respiratory pigments, transport and exchange of oxygen and carbondioxide, respiratory quotient and anaerobiosis. Excretion - Structure of kidney, nephron, mechanism of urine formation in man, kinds of excretory products, dialysis, nephritis and blood urea.

(21 Hours)

UNIT III

Nervous system - Neuron - Structure, types, conduction of nerve impulse, synapse, synaptic transmission of impulses and neuromuscular junction, Reflex action. Sensory system - Structure and mechanism of phonoreceptors and photoreceptors. Muscular system - Ultra structure of skeletal muscle, properties, mechanism of muscle contraction, physico chemical changes during muscular contraction. **(21 Hours)**

UNIT IV

Osmoregulation - Mechanism of osmoregulation in fresh water and marine fishes. Thermoregulation - Poikilotherms, Homeotherms and Heterotherms. Chronobiology - Biological rhythms - circadian rhythm, lunar rhythm, circannual rhythm and biological clock and clock genes. **(21 Hours)**

UNIT V

Endocrine system - Structure and functions of pituitary, thyroid, adrenal, islets of langerhans, testis and ovary. Reproductive system - Structure and function of male and female reproductive system of human. **(21 Hours)**

COURSE BOOK:

Mariakuttiken A. and Arumugam N., (2017). Animal Physiology. Saras Publication, Nagercoil.

BOOKS FOR REFERENCE:

1. Eckert and Randall, (2000). Animal Physiology Mechanism and Adaptations. 2nd edition, CBS Publishers and Distributors, New Delhi.
2. Knut Schmidt-Nielson, (1990). Animal Physiology Adaptation and Environment. 4th edition, Cambridge University Press, New Delhi.
3. Nagabhushanam R., Kodarkar M. S and Sarojini R., (2002). TEXT BOOK of Animal physiology. 2nd edition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Goyal Sastry, (2014). Animal physiology. 6th edition, Rakesh Kumar Rastogi for Rastogi Publlicatons, Meerut, India.
5. Ladd Prosser C., (1992). Comparative Animal Physiology. 3rd edition, Satish Book Enterprise Book Sellers and Publishers, Agra.
6. Knut Schmidt-Niessen, (1997). Animal Physiology (Adaptation and environment), 5th edition, Cambridge university Press, New Delhi.
7. Sobit R.C., (2008). Animal physiology. Narosa Publishing house, New Delhi.
8. Dee Unglaub Silverthorn, (2010). Human physiology an Integrated approach (Fifth edition) Published by Peanson Education.
9. Biswas P.K., (2013). Hand book of Animal Physiology, Agrotech Press, New Delhi.
10. Verma P, Tyagi S., Agarwal V.K., (2002). Animal Physiology. S. Chand & Company Ltd., New Delhi.

PRACTICAL - VI ENVIRONMENTAL BIOLOGY, DEVELOPMENTAL BIOLOGY AND PHYSIOLOGY - LAB

Semester: VI **Hours: 4**

Code : 17ZO6CP06 **Credits: 2**

COURSE OUTCOMES:

- Estimate O_2 content in samples and effect of temperature in biological activities.
- Construct an ecosystem models.
- Identify and describe the developmental stages of frog and chick.
- Examine the excretory products of chordates.

ENVIRONMENTAL BIOLOGY:

1. Sampling of plant population by quadrate method and line transect method in terrestrial habitat.
2. Mounting of any two freshwater plankton.
3. Mounting of any two marine plankton.
4. Study of a pond ecosystem.
5. Estimation of dissolved oxygen in any two water samples.
6. Measurement of water transparency using Secchi disc.
7. Study of food chain and food web from fresh water and terrestrial environment.

DEVELOPMENTAL BIOLOGY:

1. Observation of live sperms in frog.
2. Cleavage, blastula, gastrula of frog - slide observation.
3. Demonstration of chick blastoderm.
4. Study of 24, 48 and 72 hours chick embryo.
5. Placental types - Diffuse, Cotyledonary, Zonary and Discoidal.

PHYSIOLOGY:

1. Examination of excretory products of fish, bird and mammals for detection of ammonia, urea and uric acid.
2. Estimation of oxygen consumption in fish.
3. Estimation of haemoglobin by haemoglobinometer.
4. Enumeration of blood cells by haemocytometer.

CLINICAL LAB TECHNOLOGY

Semester: VI **Hours: 4**

Code : 17ZO6CE3A **Credits: 3**

COURSE OUTCOMES:

- Serve as lab technicians.
- Analyse and report blood, urine, stool and sputum.
- Disseminate knowledge on common ailments.
- Explicate the safety measures in laboratories.
- Improve the quality of human life from dreadful diseases.

UNIT I

Haematology - Composition of blood, Haemogram, Cell study - Counting of Cells (Differential count, Total count), Packed cell volume (PCV), Erythrocyte Sedimentation Rate (ESR), Haemoglobin Concentration (Hb), Bleeding Time (BT), Clotting Time (CT), Blood Pressure (Sphygmomanometer), Blood grouping and Rh - typing, Reading of arterial pulsation. **(12 Hours)**

UNIT II

Analysis of Urine - Physical properties of Urine - Colour, volume, specific gravity, odour and pH. Chemical composition of Urine - Urine Sugar, albumin, bile salts and bile pigments, Microscopic examination of organised and unorganised sediments. **(12 Hours)**

UNIT III

Analysis of stools - Macroscopic examination of stool - Microscopic examination of ova and cyst. Analysis of sputum - Macroscopic and microscopic examination of sputum. Gram stain and Acid Fast Bacilli (AFB). **(12 Hours)**

UNIT IV

Clinical Chemistry - Blood Glucose, Blood Urea, and Blood Cholesterol. Blood Creatinine. Serology - Widal test for Enteric fever, Venereal Disease Research Laboratory test (VDRL). Safety measures in Laboratory. **(12 Hours)**

UNIT V

Laboratory diagnosis - Causative organisms, mode of transmission, Clinical symptoms and laboratory diagnosis of Bacterial diseases - Tuberculosis, Typhoid and Tetanus. Viral Diseases - Jaundice and Polio. Venereal disease - Syphillis and Gonorrhea. **(12 Hours)**

BOOKS FOR REFERENCE:

1. Kanai L., Mukherjee, volume 1 (2005), Volume2 (2005), Volume 3 (2008). Medical Laboratory Technology. A Procedure Manual for Medical Laboratory Technology. Routine diagnostic test.
2. Philip Evans., (1993). The family Medical Reference Book the essential Guide to Health and Medicine. Published by Little Brown under the Black cat imprint, London.
3. Isidro Aquilar and Herminia Galbes., (1999). Encyclopedia of Health and Education for the family. Education and Health Library, Published under the title of Encyclopedia familiarrida, Amor Y sexo.

SERICULTURE

Semester: VI **Hours: 4**

Code : 17ZO6CE3B **Credits: 3**

COURSE OUTCOMES:

- Restate the importance of mulberry in sericulture.
- Describe the anatomy and life cycle of silk worm.
- Categorize the types of eggs in silk worm.
- Develop skill in rearing silk worm and aspire to be an entreprenuer.
- Design methods to enhance the production of cocoon and improve the yield.

UNIT I

Introduction to Sericulture - historical note, origin and evolution, present status. Moriculture - classification of mulberry, methods of cultivation, harvesting and storage, pests and diseases. **(12 Hours)**

UNIT II

Silkworm Biology - Taxonomy, life cycle, anatomy, physiology - digestive system, respiratory system, circulatory system, excretory system and reproductive system. **(12 Hours)**

UNIT III

Seeds / silkworm eggs - types, structure - commercial and reproductive, Non - hibernating - voltinism, seed preparation and handling moth emergence, moth examination, acid treatment, incubation, hibernation schedule - loose egg and card egg preparation. **(12 Hours)**

UNIT IV

Rearing facilities - Rearing house, Rearing appliances, Appliances used for keeping the worms being reared, Appliances used for feeding, Appliances used for bed cleaning, Appliances used to support the spinning larvae, Appliances needed for disinfection, Appliances needed for optimum conditions, Rearing methods, mounting, spinning and harvesting of cocoons, Disease of *Bombyx mori* - protozoan, bacterial, viral, fungal diseases. Pests of silkworm. **(12 Hours)**

UNIT V

Cocoon marketing - transport of cocoons, physical characters of cocoons considered for commercial purposes, defective cocoons, cocoon markets. Silk reeling - stifling, sun-drying, steam stifling, hot stifling, storage of cocoons, sorting of cocoons, deflossing, cocoon cooking, boiling, brushing, reeling operations, reeling appliances, by products of sericulture. **(12 Hours)**

BOOKS FOR REFERENCE:

1. Ganga G. And Sulochana Chetty J., (2012). An Introduction to Sericulture. 2nd edition. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Ganga G., (2003). Comprehensive Sericulture. Volume - 2, Silkworm rearing and silk reeling. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Dandin, S B., Jayant Jayaswal and Giridhar K., (2001). Hand Book of Sericultural Technologies, Central Silk Board, Madivala, Bangalore.
4. Kamile Afifa, S. and Amin Masoodi M., (2000). Principles of temperate Sericulture, Kalyani Publishers, Rajinder Nagar, Ludhianas.
5. Khan M.A., Anil Dhar M., Zeya S. B. and Trag A.R., (2004). Pests and diseases of Mulberry and their Management. Bishen Singh Mahendra Pal Singh, New Connaught Palace, Dehra Dun.
6. Madan Mohan Rao, M., (1999). Comprehensive Sericulture Manual, B. S. Publications, Sultan Bazar, Hyderabad.
7. Narasaiah, M.L., (2003). Problems and prospects of Sericulture, Discovery Publishing House, New Delhi.
8. Sathi, T.V. and Judhav A.D., (2012). Sericulture and pest management. Days Publishing House, Delhi.

POULTRY SCIENCE

Semester : VI **Hours: 4**

Code : 17ZO6CE3C **Credits: 3**

COURSE OUTCOMES:

- Address the malnutrition problem by producing egg and meat.
- Construct poultry farm and manage on their own.
- Raise and incorporate the new ideas to formulate diet for all stages of poultry.
- Formulate poultry feed using commercial mineral mixture and make their own job.
- Diagnose the poultry diseases and have prophylactic approaches to poultry diseases.

UNIT I

Poultry industry in India. Poultry manure: Volume, composition and values. Nutritional content of eggs. Commercial layers and broilers, Sexing in one day old chick, Poultry housing - General principles of building poultry house, Deep litter system, Droppings pit, Feeders, Waters, Nest boxes. Laying cages - Californian cages - Management of cage birds. **(12 Hours)**

UNIT II

Management of poultry - Chicks, Growers, Layers and Broilers. Lighting for Chicks, Growers, Layers and Broilers. Summer and winter management. Debeaking - Forced moulting. **(12 Hours)**

UNIT III

Poultry nutrition: Energy Protein and Amino acid Carbohydrates and Fat requirements for chicks , growers, layers and broilers - Symptoms of excessive dietary levels and deficiency. requirements for Chicks, Growers, Layers and Broilers, Symptoms of excessive dietary levels and deficiency, Requirements of vitamins and inorganic minerals, deficiency symptoms. **(12 Hours)**

UNIT IV

Requirement of poultry feed: Importance of feed additives in poultry feed. Preparation of supplementary feed for poultry - South Indian feed ingredients in relation to Metabolizable Energy (M.E) level, Protein level, Amino acid, Minerals (ca & p) and Fibre content. Mash for chick, grower, layer and broiler. **(12 Hours)**

UNIT V

Poultry diseases - Causes, Symptoms, Transmission, Treatment, Prevention and Control of Viral diseases (Ranikhit disease, Fowl pox) bacterial disease (Fowl typhoid, Paratyphoid) fungal diseases (Aspergillosis and Aflatoxicosis) Parasitic disease- Coccidiosis. Nematode infections) external parasites of chicks - Ticks, mites and lice. Prophylactic approach to diseases, Homeopathy in poultry diseases. **(12 Hours)**

COURSE BOOK:

Gnanamani M.R. (2010). Modern sapects of commercial Poultry keeping. Madurai: Deepam Publications.

BOOKS FOR REFERENCE:

1. Singh, K. S. and Panda, B. (1988). Poultry Nutrition. New Delhi; Kalyani Publishers.
2. Livestock and Poultry Production: Singh, Herbans and Earl Moore; Prentice Hallin India
3. Powell, Owen, W. 2000. Poultry Farming and Keeping. Daya publishers, New Delhi.
4. Narahari, D. 1996. Commercial Broiler Production. Emaly, New Delhi.

DAIRY FARMING

Semester : VI **Hours : 4**

Code : 17ZO6CE3D **Credit : 3**

COURSE OUTCOMES:

- Appreciate the nutritive value of milk.
- Design shed for rearing cattle and to manage.
- Choose the best commercial or mixed feed for the better yield.
- Identify the common cattle disease and their treatment.
- Appraise the processing of dairy and dairy products and setup their own enterprise.

UNIT I

Study of general management practise of dairy animals: Grooming, Drying off, control of bad habits, castration, dehorning, deworming and identifications marks. **(12 Hours)**

UNIT II

Calf raising, heifer management, management of pregnant, parturient, lactating and dry Cows, buffaloes, and breeding bull - Summer management of buffalo. Diseases of calf: Pneumonia, calf scours, diarrhea, Worm infestation. Parasitic and protozoan diseases: theilariais, Babesiosis, Trypansomiasis, Trichomoniasis.

(12 Hours)

UNIT III

Management of lambs and kids - Management of pregnant, parturient and lactating doe and Ewe. Diseases of Goat: PPR, blue tongue. **(12 Hours)**

UNIT IV

Live stock diseases - Common parasites in India - Treatment. **(12 Hours)**

UNIT V

Nutrition - Nutritive values of common feeds, Commercial and mixed feeds, Balance ration. Marketing the diary products - Milk and other dairy products - Nutritive values of fresh and preserved products - Combating spoilage of milk - Souring - Gassy Curdling - Robiness - Sweet curdling - Pasteurization. **(12 Hours)**

BOOKS FOR REFERENCE:

1. Principles of Dairy Chemistry. Janness, Robert and Sturte Patton; WielyEastern.
2. Artificial Insemination in Farm animals: Perry Enos (Eds.) Oxford &IBH.
3. Breeding and Improvement of Farm animals: Rice, Victor, Arthur; Tata MCGraw Hill.
4. Livestock and Poultry Production: Singh, Herbans and Earl Moore; Prentice Hallin India.

APTITUDE BUILDING - II

Semester: VI **Hours: 2**

Code : 17AE6NE02 **Credits: 2**

COURSE OUTCOMES:

- Understand the concepts of numerical ability other than basic.
- Gain mastery over logical reasoning through concise thinking to advanced level.
- Have good command over English Language.
- Acquaint with general knowledge and current affairs with complete framework.
- Develop sufficient confidence to face advanced level competitive exams and clear it.

UNIT I

Numerical Ability: Time and distance - problems on trains - simple interest - compound interest - area - probability - true discount - bankers' discount - data interpretation - tabulation - bar charts - pie charts.

UNIT II

Reasoning: Logic - statements & arguments, statement & assumptions, statement & course of action - statement & conclusions - deriving conclusions from passage.

UNIT III

English Language: Choosing the appropriate filler - Phrase substitution - Ordering of jumbled sentences - Cloze test / Passages - Comprehension passages.

UNIT IV

General knowledge: Educational institutions - National days & awards - Indian freedom struggle - Books & Authors - Who's Who.

UNIT V

Current affairs: National & International affairs: Economy, Sports, Science & Technology, Polity.

COURSE BOOK:

- Course Material prepared by the Staff.

BOOKS FOR REFERENCE:

1. IBPS - VI, Institute of Banking Personnel Selection, Bank Po, Probationary officers / Management trainees Arihant Publications (India) Limited, 2015.
2. A.P. Bhardwaj, General English for Competitive Examinations, Dorling Kindersley (India) Pvt. Ltd, New Delhi, 2013.
3. Dr. R.S. Aggarwal, Quantitative Aptitude, S. Chand & Company PVT. LTD, New Delhi, 2013.
4. Dr. R.S. Aggarwal, A Modern Approach to Verbal & Non - Verbal Reasoning, S. Chand & Company PVT. LTD, New Delhi, 2009.

BASIC HEALTH EDUCATION

Semester: VI **Credits: 2**

Code : 17ZO6SS01

COURSE OUTCOMES:

- Gain knowledge on basic concepts in food and nutrition.
- Discuss the sources of minerals and vitamins and manifestate the deficiency diseases.
- Describe the functions of organs and organ systems.
- Restate ideas on child health care.
- Gain knowledge on under and over nutrition, food additives and food poisoning.

UNIT I

Basic concepts in food and nutrition, Basic terms used in study of food and nutrition - Amino Acids, Blood Glucose, Calories, Dehydration, Diet, Dietary Supplements, Electrolytes, Fibre, Glycemic Index, HDL, LDL, Nutrition, Triglycerides, Water Intake, Understanding relationship between food, Nutrition and health.

UNIT II

Functions, dietary sources and clinical manifestations of deficiency/ excess of the following nutrients - carbohydrates, lipids and proteins. Fat soluble vitamins - A, D, E and K. Water soluble vitamins - Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Vitamin B_{12} and Vitamin C, Minerals - Calcium, Iron and Iodine.

UNIT III

Menstrual cycle, menopause, Effects of post menopause, Gestation period and physiological changes during pregnancy, Premenstrual syndrome, Acquired Immuno Deficiency Syndrome, Immunization schedule, Baby's diet, breast feeding and birth control measures. Measures of the physical fitness, Benefits of physical exercise.

UNIT IV

Dietary requirements of the following Adolescents, Pregnant and Lactating woman and old age, Indicators of Maternal Child Health Care - Antenatal Care, Prenatal Care, Intranatal Care, Postnatal Care and Neonatal Care.

UNIT V

Accidental contamination - Botulism, Staphylococcal and Aflatoxin intoxication. Food additives and Adulterants in commonly consumed food items, Etiology, prevalence, clinical features and preventive strategies of Under nutrition - Protein energy malnutrition, over nutrition - obesity, coronary heart disease, diabetes.

STUDY MATERIAL:

Shanthi V and Sagayarani C., (2010). Family Health Care.

COURSE BOOK:

Srilakshmi B. 2002. Dietetics. 4thEdition. New Age International (P) Limited Publishers, Chennai.

BOOKS FOR REFERENCE:

1. Routine diagnostic test (Volume 1 (2005) 2 (2005), 3 (2008) Tata McGraw - Hill Publishing Company Ltd., New Delhi.
2. Park K., (2003). Text Book of preventive and Social Medicine. 16th edition. Ms Banarsidas Bhanot Publishers, Jahalpur, India.
3. Philip Evans, (1993). The family Medical Reference Book the essential Guide to Health and Medicine. Published by Little Brown under the Black cat imprint, London.
4. Isidro Aquilar and Herminia Galbes, (1999). Encyclopedia of Health and Education for the family. Education and Health Library, Published under the Title of Encyclopedia familiarrida, Amor Y sexo.

CERTIFICATE COURSE

SERICULTURE

Semester: II **Hours: 3**

Code : CCZOSC01 **Credits: 1**

COURSE OUTCOMES:

- Restate the importance of mulberry in sericulture.
- Describe the anatomy and life cycle of silk worm.
- Categorize the types of eggs in silk worm.
- Develop skill in rearing silk worm and aspire to be an entrepreneur.
- Design methods to enhance the production of cocoon and improve the yield.

UNIT I

Importance of sericulture, sericulture industry in India, sericulture as cottage industry. Morphology of mulberry plants, methods of propagation. (6 Hours)

UNIT II

Classification of mulberry silkworm, habit and habitats of silkworms, voltinism, races of silkworm, life cycleof mulberry silkworm, structure of egg, larva, puba and adult, sexual dimorphism. Glands of silkworm, Non mulberry - Tassar, muga, Eri. (6 Hours)

UNIT III

Rearing of silkworm: Rearing house - Rearing appliances - Rearing operation - Disinfection - Brushing - Maintenance of optimum condition, Feeding - bed cleaning - spacing. Rearing of young ones - Chawki rearing - rearing of late age larva: Shelf rearing, Floor rearing, Shoot rearing. (6 Hours)

UNIT IV

Cocoon marketing: Characteristics of cocoons - defective cocoons - chemical composition - method of harvesting, Preparation of compost using sericulture wastes. (6 Hours)

UNIT V

Silk reeling: Cocoon stifling- types, storage of stifled cocoons, sorting, cocoon boiling and deflossing- brushing. Process od reeling: Different methods, Silk waste and byproducts of silk reeling. Raw silk and marketing. (6 Hours)

BOOKS FOR REFERENCE:

1. Y. Tazima., The silkworm: An important laboratory tool.
2. Lawrence I. Gilbert Enri Frieden. Metamorphosis: A problem in Developmental Biology.
3. Thangavelu., Chakraborty.K. and Bhagowati. A.K. Hand Book Of Muga Culture.
4. Robert. C. and Akai . H. Insect Ultra structure.
5. King L.A. and Posse. R.D. The Baculo virus expression System. Krishnasamy S. Sericulture manual I and II.

CERTIFICATE COURSE – SERICULTURE LAB

Semester: II **Hours: 2**

Code : CCZOSCP1 **Credit: 1**

1. Selection of mulberry leaves to appropriate size according to different stages of growth of larva.
2. Life history - Egg, larva, pupa and adult.
3. Observation of mulberry variety - MR2, S30, S36 and V2.
4. Chandrike.
5. Rearing tray and rearing stand.
6. Reeling of silk.
7. Report on field visit to sericulture farms.

PART I - HINDI - COURSE PATTERN (2017- 2020)

Part	Sem.	Code	Title of the Paper	Hours	Credits
I	I	17GH1GS01	Paper - I - Prose, Short Story and Grammar- I	5	3
	II	17GH2GS02	Paper - II - Novel, One act Play, and Grammar - II	5	3
	III	17GH3GS03	Paper - III Poetry and History of Hindi Literature, Alankar	5	3
	IV	17GH4GS04	Paper IV - General Essay, Technical Hindi, Translation, and Letter Writing	5	3
		Total		**20**	**12**

TESTING AND EVALUATION

Course	Continuous Internal Assessment	Semester Examination
Hindi	40%	60%

Continuous Internal Assessment

Continuous Assessment will be carried out by the Course Teachers. The components of CIA are as follows:

Components	Marks
Test -I	30
Test -II	30
Seminar/Quiz	10
Assignment	05
Attendance	05
Total	***80**

* The total internal marks obtained for 80 will be converted into marks obtained for 40.

HINDI - EXTERNAL QUESTION PATTERN

Time: 3 Hours **Marls: 60**

Section A: (One Word / Sentence) 10 x 1 = 10 Marks

Section B: (Paragraph / Annotation) 4 x 5 = 20 Marks

Section C: (Essay) 3x 10 = 30 Marks

PAPER I - PROSE, SHORT STORY AND GRAMMAR - I

Semester: I **Hours: 5**

Code : 17GH1GS01 **Credits: 3**

COURSE OUTCOMES:

- ❖ Develop the reading and writing skill in Hindi.
- ❖ Learn the concept of "Bhakthi" through Hindi Poems.
- ❖ Inculcate the Value and Morals through short stories in Hindi
- ❖ Improve the grammatical knowledge and enable the students to communicate effectively.
- ❖ Appreciate the literary contribution of various writers through short stories and poems.

1. Prose : Naveen Hindi Patamala Part-3

Published by Dakshina Bharathi Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following Lessons have been prescribed

a) Shiraj Ki Gurubhakthi

b) Shri Krishn

c) Gupth Rupya

d) Karmaveer Kamaraj

2. Short Story : Kahani Manjari

Edited by : Dakshin Bharath Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following short stories have been priscribed

a) Badegar kee beti	-	Premchand
b) Thayee	-	Vishwamranava Shrama Kaushik
c) Paanch minute	-	Mohanlalji Mahato yogi
d) Usne Kaha tha	-	Chandra dharshama Guleri

3. Grammar 1 : Vyakaran Pradeep Published by Ramdev, Hindi Bhaan,

63, Tagore Nagarm Allahabad -2

The following topics have been prescribed

a) Noun b) Gender and Number

c) Pronoun d) Adjectives

PAPER II - NOVEL, ONE ACT PLAY AND GRAMMAR - II

Semester: II **Hours: 5**

Code : 17GH2GS02 **Credits: 3**

COURSE OUTCOMES:

- Analyse the impact of social references among women through the novel of 'Nirmala'.
- Demonstrate the creative skill through one Act play.
- Inculcate the values of patriotism among students through the one Act play of Doorshra Din.
- Formulate the approach of Hindi linguistic and grammar
- Analyse on literary critism in Hindi literature.

1. **Novel** : Nirmala (Abridged version)
   by Premchand, Hamsa Prakashan Allahabad
2. **One Act Play** : Aadarsh Ekanki
   Published by Dakshina Bharath Hindi Prachar Sabha,
   Thyagaraya Nagar, Chennai - 600 017.
   The following Ekankies have been prescribed
   a) Doosra din - Kanchanlatha sabbarval
   b) Rajpoothri Ka badla - Divjendralal Rai
3. **Grammar** : Ramdev, Published by Hindi Bhavan,
   63 Tagore Nagar, Allahabad - 2
   The following topics have been prescribed
   a) Verb
   b) Tense and Voice
   c) Adverb
   d) Prepositions
   e) Conjunctions
   f) Interjunctions

PAPER III - POETRY AND HISTORY OF HINDI LITERATURE, ALANKAR

Semester: III **Hours: 5**

Code : 17GH3GS03 **Credits: 3**

COURSE OUTCOMES:

- Understand the spiritual and social values through Dona of Kabir, Tulasi, Rahim and Bihari.
- Analyse the literary approach of various Hindi Poems.
- Analyse the history of Hindi Literature.
- Develop the knowledge regarding Alankkar in Hindi Literature.
- Apply Alankkar to enhance the beauty of literature.

1. POETRY:

Kavya Saurab Published by Dakshina Bharatha Hindi Prachar Sabha, T. Nagar, Chennai - 600 017.

The following poems have been prescribed

1. Sachche Devtha - Ayodhya Singh Upadhyay Harioudh
2. Murjhaphool
3. Vivshtha
4. Badal - Sumitranandan Panth
5. Vasanth Aayaa
6. Deep Koi jal raha hai
7. Kabir Ke Dohe - 5 numbers
8. Tulasi Ke Dohe - 5 numbers
9. Raheem Ke Dohe - 5 numbers
10. Bihari Ke Dohe - 5 numbers

2. HISTORY OF HINDI LITERATURE:

Hindi Sahitya Ka Ithas by Rajanath Sharma Vinod Pushhak Mandir, Agra - 2

The following topics have been prescribed Salient features of Aadikl Bakthikal (Gyan marg, Premmag, Rambakthi, Krishnabakthi and Reethika.

Short Notes from Adunikkal**:** Chayavad, Pragathivad, Mythili Sharan, Gupta, Dinkar Premchand Pant Prasad, Ramachandra Shukla

3. ALANKAR:

Ras chand Alankar Chandrika Karnataka Mahila Hindi Seva Samithi, Chamarajpet, Bangalore - 560 008. The following Alankars have been prescribed Anupras, Yamak, Vakrokthi, Upama, Virodabhas.

PAPER - IV - GENERAL ESSAY, TECHNICAL HINDI, TRANSLATION AND LETTER WRITING

Semester: IV **Hours: 5**

Code : 17GH4GS04 **Credits: 3**

COURSE OUTCOMES:

- Write argumentative essay using appropriate style, structure and voice.
- Harness the critical thinking abilities by reading essay.
- Improve the proficiency in Hindi and English translation.
- Imbibe the knowledge of technical terms in Hindi and its application in daily life.
- Learn the forms and convention of different types of letter.

1. General Essay:

Nibandh Praveshika, Dakshin Bharath Hindi Prachar Sabha T.Nagar, Chennai - 600 017

The following Sahityotar (General) essay have been prescribed

a. Anushashan
b. Parishram Ka Mahatva
c. Paropkar
d. Bharat Ki Kalatmak Ekta
e. Nari Ka Karthavye Aur Adhikaar

2. Translation: Anuvad Abyas - III (1-5 Lessons) English to Hindi, Hindi to English Published by Dakshina Bharath Hindi Prachar Sabha T.Nagar, Chennai - 600 017.

3. Technical Hindi: Karyalaya Sahayika, Kendriya Sachivalaya Hindi Parishad NewDelhi, Hindi Vathayan

Dr. K. Chandra Mohan, Viswa Vidyalaya Prakashan Varanashi

Banking Terms	:	50 only
Nemikaryalaya Tippani	:	50 only
Name of the Ministries	:	33 only

4. Letter Writing: Pramanik Alekan Aur Tippan Prof Viraj M.A. Kashmirgate, Delhi - 110 006

PaariVarik Patra, Avedan Patra, Sampathak ke naam Patra, Padhadhikariyon ke naam Patra.

NATIONAL CADET CORPS

NON MAJOR ELECTIVE

Sem.	Part	Code	Title of Paper	Hours	Credits
V	IV	17NC5NE01	Organization and health programme in NCC	2	2
VI	IV	17NC6NE02	National integration and personality development	2	2

INTERNAL COMPONENTS

Internal - I	:	30 marks
Internal - II	:	30 marks
Component - I	:	10 marks
Component - II	:	10 marks
Component - III	:	10 marks
Component - IV	:	10 marks
Total	**:**	**100 marks**

ORGANIZATION AND HEALTH PROGRAMME IN NCC

Semester: V **Hours: 2**

Code : 17NC5NE01 **Credits: 2**

UNIT I: INDIAN MILITARY AND NCC ORGANIZATION

History of Indian Military - Paramilitary forces - BSF- CRPF and CISF - NCC Organization and History - Aims and Objectives of NCC - Motto of NCC - DG's Four Cardinal Principles of NCC - NCC Song- Ranks in Army, Air force and Navy - Certificate Examination in NCC- Honours and Awards. **(6 Hours)**

UNIT II: MAP READING

Map and its features - kinds of north - Service protractor and Compass-bearing - Conversion of bearings - Conventional signs - Setting of map - Finding own position - Map to ground - Ground to map - Night March chart. **(6 Hours)**

UNIT III: HYGIENE AND SANITATION

Personal Hygiene - Sanitation - Methods of purification of drinking water -Latrine types - Urinal Types. **(6 Hours)**

UNIT IV: TYPES OF DISEASE AND POLLUTION

Define Health - Types of Health - Communicable and Non communicable Disease - Pollution and its type. **(6 Hours)**

UNIT V: FIRST AID

Aims of First Aid - Principle of First Aid - Motto of First Aid - List of items in First aid Box - Types of Bandages - Types of Fracture - Dislocation - Types of Wounds - Burns and Scalds - Sprain - Strain - Asphyxia - Drowning - Poison - Shock - Snake bite - Sun and Heat Stroke - Insect bite - Dog bite - Hanging - Artificial Respiration - Haemorrhage. **(6 Hours)**

BOOK FOR REFERENCE:

Mishra R.C., **A Handbook of NCC,** Kanti Prakashan, Etawah, 2000.

NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

Semester: VI **Hours: 2**

Code : 17NC6NE02 **Credits: 2**

UNIT I: NATIONAL INTEGRATION

Motto of National Integration - Importance of National Integration Culture and heritage of Tamil Nadu. **(6 Hours)**

UNIT II: CIVIL AFFAIRS

Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster - Essential services during natural calamities **(6 Hours)**

UNIT III: CIVIL DEFENCE AND SELF DEFENCE

Civil Defence - Organization - Aims and services - Aid to Civil authorities in emergency - Self Defence -Aims of Self Defence - Women and Self Defence **(6 Hours)**

UNI IV: LEADERSHIP AND PERSONALITY DEVELOPMENT

Leadership - Types and traits - Man Management in NCC - Duties of a Good Citizen - Role of Youth in Nation Building - Morale - Factors which affect morale - Factors which develop high morale Personality Development - Factor influencing Personality-Time Management . **(6 Hours)**

UNIT V: SOFT SKILLS

Soft skills - interview skill - influencing skill - social skill - communication skill - self motivation - self esteem - body language. **(6 Hours)**

BOOK FOR REFERENCE:

Mishra R.C., **A Handbook of NCC,** Kanti Prakashan, Etawah, 2000.

INTERNAL QUESTION PATTERN

Time: 2 hours **Marks: 30**

PART - A

Answer Any 4 out of five 4 x 2 = 8

PART- B

Two either or questions (one from each) 2 x 4 = 8

PART - C

Two either or questions (one from each 2 x 7 = 14

PHYSICAL EDUCATION

COURSE PATTERN (2017 - 2020)

(PART V)

Sem.	Code	Title of the Paper	Hours	Credits
I & II	17NP4GS01	Yoga and Rhythmic Activities	120	-
III & IV		Fundamentals of Physical Education	120	1
		Total	**240**	**1**

YOGA AND RHYTHMIC ACTIVITIES

Semester: I & II **Hours: 120**

Code : 17NP4GS01

COURSE OUTCOMES:

- Recall the principle of Asnas
- Classify Pranayama for different needs
- Appraise the application and effects of Suryanamaskar for human wellness
- Execute the techniques in Free Hand Exercise
- Construct Pyramids based on the underlying principles

UNIT I: ASNAS

Sitting Postures - Standing Posture - Prone Posture - Supine Postures.

(24 hours)

UNIT II: PRANAYAMA

Pranayama - Suga Pranayama - Chandra bethana - Nadi Sudhi - Ujjayee - Seethali - Seethakari - Brahmari. **(24 hours)**

UNIT III: SURYANAMASKAR

Suryanamaskar: 12 Postures - 12 Postures & Breathe consioius - 12 Postures With manthra - Relaxation Techiniques. **(24 hours)**

UNIT IV: CALLISTHENICS (FREE HAND EXERCISE)

Standing series - Bending series - Sitting series - Twisting series - Dumb - bells - Indian Clubs - Lezium - Hoops. **(24 hours)**

UNIT V: AEROBICS & PYRAMIDS

Aerobics: Aerobic Basics - Aerobic Movements - Aerobic With Rhythm - Aerobic Programme

Pyramids: Basics of Pyramids - Types of Pyramids. **(24 hours)**

BOOKS FOR REFERENCE:

1. Wuest Jeborah,A and Charles A. Bucher (1987), 'Foundation of Physical Education, B.I Publication Pvt.Ltd., New Delhi.
2. Elangovan.R, (2002), 'Utarkalvi Oru Arimugam', Ashwin Publication, Triunelveli.
3. Chandrasekaran.K, (1999), 'Sound Health through Yoga, Prem Kalyan Publication, Sedapatti.
4. Iyengar, B.K.S,'Lights on Yoga', Unwin Hyman Company, London

FUNDAMENTALS OF PHYSICAL EDUCATION

Semester: III & IV **Hours: 120**

Code : 17NP4GS01 **Credits: 1**

COURSE OUTCOMES:

- Familiarize the fundamentals of Physical Education
- Illustrate different rules for different games and athletic events
- Examines the need for good nutrition
- Synthesis the relation between hygiene and health
- Apply the first aid techniques

UNIT I: PHYSICAL EDUCATION

Definition, need, scope, aims and objectives of physical education. **(24 hours)**

UNIT II: GAMES AND ATHLETEIC EVENTS

History of Games: Basketball, Volley Ball, Kho-Kho, Kabaddi, Badminton and Ball Badminton - Rules and regulation of the Games and Athletic Events. **(24 hours)**

UNIT III: NUTRITION

Balanced Diet, Daily Energy Requirement, Nutrient Balance, Nutrition Intake, Diet and Competition, Nutritional Tips, Your Ideal Weight. **(24 hours)**

UNIT IV: HEALTH EDUCATION

Meaning of health education, Definition of health education, Personal Hygiene, Communicable Diseases **(24 hours)**

UNIT V: FIRST AID

First Aid: Injuries to bones and Muscles, Sprain, Strain, Muscle Cramp and joints Dislocation and Fractures Snake-bite, Dog bite Poisoning, Artificial Respiration, (Drowning) **(24 hours)**

BOOKS FOR REFERENCE:

1. Sathyanesan, R.C., 'Hand Broken Physical Education, 'Gheena Publishers, Madurai.
2. Thirunarayanan,C and Hariharan,s, 'Analytical History of physical Education 'South India Press, Karaikudi.
3. St. John Ambulance Association, 'First Aid to the Injured' New Delhi.
4. Prabhakar Eric, (1995), 'The way to Atheletic Gold', Affliated East West Pvt. Ltd., New Delhi.

SCHEME OF EVALUATION

1.	Summative Examination (2 hours)	:	40 marks
2.	Continuous Internal Assessment	:	60 marks
	Total	**:**	**100 marks**

SCHEME OF EVALUATION FOR CONTINUOUS INTERNAL ASSESSMENT

1.	Attendance (240 hrs)			:	20 marks
	❖ Theory Class	:	120 hrs		
	❖ Games	:	60 hrs		
	❖ Field Work	:	60 hrs		
2.	Performance in any one Game			:	10 marks
3.	Performance in any one of Athletic event			:	10 marks
4.	Performance in Yoga / Rhythmic activities			:	10 marks
5.	Assignment			:	10 marks
	Total			**:**	**60 marks**

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total marks: 40 **Time: 2 hours**

SECTION - A

Answer All Questions (5x1=5)

(Choose the best Answer)

SECTION - B

Answer any four questions (4x2=8)

(Four question out of six)

SECTION - C

Answer any Four out of Six questions (4x5=20)

(Four question out of six)

SECTION - D

Answer any one question (1x7=7)

(One question out of two)