

PG & RESEARCH
DEPARTMENT OF ZOOLOGY
B.Sc., (ZOOLOGY)-SYLLABUS

Effect from the Academic Year 2019-2020



NEHRU MEMORIAL COLLEGE (AUTONOMOUS)

Puthanampatti

Trichy- 621 007

NEHRU MEMORIAL COLLEGE
(AUTONOMOUS)
PUTHANAMPATTI, TRICHY DIST.

SYLLABUS REVISION
(w.e.f. 2019-2020)

Department	: Zoology
Academic Programme offered	: B.Sc., Zoology
Year of Implementation	: 2019-2020

Programme Educational Objectives (PEO)

1. To succeed in obtaining employment opportunities appropriate to their interest in Zoology related fields and to harness skills to critically assess, analyze and solve problems related to life science.
2. To continue to develop their professional career through life-long learning and to pursue higher education in their areas of interest.
3. To motivate the students to excel in their academic activities.
4. To promote leadership qualities and moral values through ethical ways with the concern for the society and the environment
5. To cater the students to the needs of the industry/ society so as to contribute for the development of the country.

Program Outcome (PO)

On successful completion of this course the students will:

1. Apply the principles that they learnt to the needs of the Employer/ Institution/Enterprise/Society.
2. Gain analytical skills in the fields/areas of Zoology.
3. Understand and appreciate professional ethics, community living and Nation Building initiatives.
4. Apply the knowledge of various branches of Zoology and General biology meant both for a graduate terminal course and for higher studies.
5. Understand the unity of life with the rich diversity of organisms and their ecological and evolutionary significance.

6. Acquire basic skills in the observation and study of nature, biological techniques, experimental skills and scientific investigation.
7. Acquire basic knowledge and skills in certain applied branches to enable them for self-employment.
8. Impart awareness of the conservation of the biosphere.
9. Develop positive attitude towards sustainable development

PROGRAMME SPECIFIC OUTCOME (PSO)

The Students should be able to

1. Apply the knowledge of Zoology in the domain of Biological Science.
2. Solve the complex problems in the field of Zoology such as global warming, pollution and decreasing of animal population with an understanding of the societal, legal and cultural impacts.
3. Get concrete ideas of classification of invertebrate phyla and vertebrate classes and to become familiar with the dissection of some specific invertebrates and vertebrate animals.
4. Understand the life at cellular level and know the mechanism of cell cycle in normal and cancerous cells.
5. Know detailed information on physiology of various organ-systems and their importance to the integrative functions of the human body.
6. Apply their understanding on embryonic development, reproductive function and assisted reproductive technologies to circumvent infertility and contraceptive methods.
7. Demonstrate an understanding of ecological relationships between organisms and their environment.
8. Perform procedure as per laboratory standards in the areas of Biochemistry, Bioinformatics, Economic zoology and Ecology.
9. Appreciate the process of evolution and see how it progressed from simple, unicellular cells to complex, multicellular organisms.
10. Understand the roles of antigens, antibodies and immunocompetent cells in pathogenesis and immunity to infectious diseases and to apply the immunotechniques for mitigating diseases occurrence/curing them.
11. Recognize the scope of microbiology and to identify disease causing pathogenic microbes and their prevention and treatments.

12. Familiarize with genetic engineering techniques, biotechnology products, public policy, biosafety, and intellectual property rights issues related to biotechnology.
13. Apply knowledge of various applications of bioinformatics tools.
14. Apply the knowledge of pest management.
15. Understand importance of wild life protection and conservation.
16. Apply knowledge obtained from poultry science, dairy farming, apiculture, sericulture and aquaculture and to become an entrepreneur
17. Aware of personal and public health care.

NEHRU MEMORIAL COLLEGE
(AUTONOMOUS)
PUTHANAMPATTI – 621 007, TRICHY DISTRICT.
B.Sc., ZOOLOGY PROGRAMME
COURSE STRUCTURE & SYLLABUS UNDER CBCS PATTERN
(w.e.f 2019-2020 ONWARDS)

Semester	Part	Course Title	Hrs/ week	Credits	Exam Hrs.	Marks		Total	
						Int.	Ext.		
I	I	Tamil – I	6	3	3	25	75	100	
	II	English – I	6	3	3	25	75	100	
	III	Core Course-I (CC): Invertebrata		5	5	3	25	75	100
		Core Course-II (CC): Practical – I: Invertebrata		3	2	3	40	60	100
		Allied Course –I (AC): Botany		5	4	3	25	75	100
	IV	Allied Course –II (AC): Botany Practical		3	-	*	-	-	-
		Value Education		2	2	3	25	75	100
Total			30	19	-	-	-	600	
II	I	Tamil – II	6	3	3	25	75	100	
	II	English – II	6	3	3	25	75	100	
	III	Core Course-III (CC): Chordata		4	4	3	25	75	100
		Core Course-IV (CC): Practical-II: Chordata		3	2	3	40	60	100
		Allied Course –II (AC): Botany Practical		3	4	3	40	60	100
		Allied Course –III (AC): Botany		4	4	3	25	75	100
		*Skill Based Course-I		2	2	3	25	75	100
	Environmental Studies		2	2	3	25	75	100	
Total			30	24	-	-	-	800	
III	I	Tamil -III	6	3	3	25	75	100	
	II	English -III	6	3	3	25	75	100	
	III	Core Course – V (CC): Cell Biology		5	5	3	25	75	100
		Core Course – VI (CC): Practical-III: Cell Biology		3	2	3	40	60	100
		Allied Course – IV (AC): Chemistry		5	4	3	25	75	100
	IV	Allied Course – V (AC): Chemistry Practical		3	-	*	-	-	-
		*Skill Based Course-II		2	2	3	25	75	100
Gender Studies (self-study course)		0	1	3	-	100	100		
Total			30	20	-	-	-	700	
IV	I	Tamil – IV	6	3	3	25	75	100	
	II	English – IV	6	3	3	25	75	100	
	III	Core Course –VII (CC): Animal Physiology		5	5	3	25	75	100
		Core Course –VIII (CC): Practical –IV: Animal Physiology		3	2	3	40	60	100
		Allied Course – V (AC): Chemistry Practical		3	4	3	40	60	100
		Allied Course –VI (AC): Chemistry		5	4	3	25	75	100
	IV	*NMEC-I		2	2	3	25	75	100
	Soft Skill (self study course)		0	2	3	-	100	100	
Total			30	25	-	-	-	800	

Semester	Part	Course Title	Hrs/ week	Credits	Exam Hrs.	Internal marks	External marks	Total
V	III	Core Course – IX (CC): Developmental Biology	6	5	3	25	75	100
		Core Course – X (CC): Environmental Biology	6	5	3	25	75	100
		Core Course – XI (CC): Immunology	5	4	3	25	75	100
		Core Course – XII (CC): Practical –V: Developmental Biology, Environmental Biology and Immunology.	6	5	3	40	60	100
		#Major Based Elective Course –I (MBEC)	5	5	3	25	75	100
	IV	*NMEC–II	2	2	3	25	75	100
		Total	30	26	-	-	-	600
VI	III	Core Course – XIII (CC): Genetics and Evolution	6	5	3	25	75	100
		Core Course – XIV (CC): Biotechnology and Bioinformatics	6	5	3	25	75	100
		Core Course – XV (CC): Practical –VI: Genetics, Evolution, Biotechnology and Bioinformatics	6	5	3	40	60	100
		#Major Based Elective Course – II (MBEC)	6	5	3	25	75	100
		#Major Based Elective Course – III (MBEC)	6	5	3	25	75	100
	IV	Extension Activities	-	1	-	-	-	-
	IV	Comprehensive Course (Self-study course)	0	4	3	-	100	100
	IV	§SKBC-III (Self-study course)	0	2	3	-	100	100
			Total	30	32	-	-	700
			Over all Total (Including self study)	180	146			

#Major Based Elective Course-I

- a. Biostatistics and Bioinstrumentation
- b. Microbiology

#Major Based Elective Course-II

- a. Aquaculture and Fish Farming
- b. Endocrinology

#Major Based Elective Course -III

- a. Economic Entomology
- b. Wildlife Biology

*Non-Major Elective Course-I: Entrepreneurial Zoology

*Non-Major Elective Course-II: Public Health and Hygiene

§Skill Based Course I: Apiculture

§Skill Based Course II: Poultry Farming and Dairy Farming

§Skill Based Course III: Sericulture (Self study)

Part 1 Tamil - Proposed Course Structure under CBCS
(For the candidate admitted from the academic year 2019-2020 onwards)

Semester	Course	Course Title	Ins. Hrs/Week	Credits	Exam hrs	Int. Marks	Ext. Marks	Total
I	Language course 1 (LC 1)	செய்யுள் (இக்காலம்), சிறுகதை, பயன்முறைத் தமிழ், தமிழ் இலக்கிய வரலாறு	6	3	3	25	75	100
II	Language course 2 (LC 2)	செய்யுள் (இடைக்காலம்), உரைநடை, தமிழ்ச் செம்மொழி வரலாறு, மொழிபெயர்ப்பியல், தமிழ் இலக்கிய வரலாறு	6	3	3	25	75	100
III	Language course 3 (LC 3)	செய்யுள் (காப்பியங்கள்), கட்டுரை இலக்கியம், புதினம் , தமிழ் இலக்கிய வரலாறு	6	3	3	25	75	100
IV	Language course 4 (LC4)	செய்யுள் (பழந்தமிழ் இலக்கியம்) நாடகம், தமிழ் இலக்கிய வரலாறு, கட்டுரை வரைவியல்	6	3	3	25	75	100
Total			24	12				400

இளநிலைப் பட்டப் படிப்பு (கலையியல், அறிவியல், வணிகவியல் மற்றும் வணிக மேலாண்மையியல்)

முதலாமாண்டு : முதற்பருவம்

பகுதி 1 தமிழ் - தாள் 1

செய்யுள் (இக்காலம்), சிறுகதை, பயன்முறைத் தமிழ்,
வரலாறு

தமிழ் இலக்கிய

பாட நோக்கம் (Course Objectives)

தன்னம்பிக்கை, பொறுப்புணர்வு, சமுதாய அக்கறை, மனித உறவுகளைப் போற்றுதல், சுற்றுச்சூழல் விழிப்புணர்வு, உலக அமைதி, அற உணர்ச்சி, தாய்மொழிப் பற்று முதலான இன்றைய இளம் தலைமுறையினருக்குத் தேவையான அடிப்படைப் பண்புகளைக் கற்பித்தல். இக்காலப் படைப்பிலக்கிய வகைமைகளை, படைப்பிலக்கியச் சூழல்களை, படைப்பாளர்களை அறிமுகம் செய்தல்.

பிழையின்றித் தமிழ் எழுதத் தேவையான அடிப்படைகளைக் கற்கச் செய்தல்.

பணித்தேர்வுகளுக்கு உதவக்கூடிய தமிழ்ப் பாடப்பகுதிகளைக் கற்பித்தல்.

அலகு - 1

1. பாரதியார் பாடல்கள் - புதுமைப்பெண் பா.எண்கள் 3,4,5,7,8
2. பாரதிதாசன் பாடல்கள் - எந்நாளோ
3. பெருஞ்சித்திரனார் - தமிழ் நெஞ்சம்
4. தமிழ் ஒளி - மழைக் காலம்
5. முருகுசுந்தரம் - சமுதாய தர்மம்
6. பொன்னடியான் - உள்ளம் உயர்....
7. முடியரசன் - மொழியுணர்ச்சி
8. முத்துலிங்கம் - எது தேசியம்
9. தமிழேந்தி - தொண்டின் பழம்
10. தாரா பாரதி - வெறுங்கை என்பது
11. இன்குலாப் - கவலையும் கண்ணீரும் நம்முடன் இருக்கட்டும்
12. நா.காமராசன் - காகிதப்பூக்கள்
13. ஈரோடு தமிழன்பன் - இப்போது நினைந்து
14. தேவதேவன் - நுனிக்கொம்பர் நாரைகள்

15. காசி ஆனந்தன் – தமிழ் மண் வளம்

அலகு – 2

1. அப்துல் ரகுமான் - ஆறாத அறிவு
2. தணிகைச்செல்வன் - சுகம் எங்கே
3. மீரா - உழவன்
4. மு.மேத்தா – கண்ணீரின் கதை
5. சிற்பி - தம்பி உனக்காக
6. வைரமுத்து – கூடு
7. அறிவுமதி - வலி
8. பழநிபாரதி – கண்ணில் தெரியுது வானம், இரத்தத்தின் நிறம் பச்சை
9. பிச்சினிக்காடு இளங்கோ – பகல் நீ, தஸ்லிமா நஸ்ரின்
10. இளம்பிறை – மகளிர் நாள் வாழ்த்துகள், ஆசைகள்
11. சக்தி ஜோதி - நிலவென்று சொல்லாதே, பெண்
12. பாவலர் வையவன் – முறிந்த சிறகு, பாதை மறந்த போதை
13. தாமரை – என்னையும் அழைத்துப் போ, ஒரு கதவும் கொஞ்சம்
கள்ளிப்பாலும்
14. ந.வீ.விசயபாரதி - தன்னம்பிக்கைத் தாமரைகள், புன்னகை மந்திரம்,
அன்புள்ள அம்மா
15. அ.வெண்ணிலா - ஆதியில் சொற்கள் இருந்தன

அலகு : 3

சிறுகதை – சிறுகதை மலர்

அலகு : 4

பயன்முறைத் தமிழ்

பிழைகளும், திருத்தங்களும் - வலிமிகுதல், வலி மிகாமை,
மயங்கொலி எழுத்துகளின் வேறுபாடுகள் - தமிழில் பிறமொழிச் சொற்கள்

அலகு : 5

தமிழ் இலக்கிய வரலாறு – இக்காலம்

கற்றல் விளைவுகள் (Course Outcome)

மாணவர்கள் வாழ்வியல் கூறுகளை அறிந்துகொள்வதோடு, நற்பண்புகளை வளர்த்துக்கொள்வர்.

இன்றைய இலக்கியப் படைப்புச் சூழலை அறிந்து கொள்வதால்

படைப்பிலக்கியவாதிகளாகும் ஆற்றல் பெறுவர்.

சமுதாய, அரசியல், சூழலியல் விழிப்புணர்வு பெறுவர்.

தாய்மொழியில் திறன் பெறுவர்.

பணித்தேர்வுகளுக்கு உரிய தமிழ்த்திறன் பெறுவர்.

பாட நூல்கள்

1. செய்யுள் திரட்டு, தமிழ்த்துறை வெளியீடு.
2. சிறுகதை மலர் - பிரமி பதிப்பகம், திருச்சி-21.
3. பயன்பாட்டுத் தமிழ் (இலக்கணக் கையேடு), தமிழ் நாதன் பதிப்பகம், சென்னை - 110.

4. தமிழ் இலக்கிய வரலாறு,

முனைவர் கோ.பாக்கியவதி, முனைவர் க.சுந்தரபாண்டியன்,

பிரமி பதிப்பகம், திருச்சி-21.

B.A/B.SC/B.COM/ BCA/BBA PART II ENGLISH COURSE PATTERN (FROM 2019-2020)

Sem.	Course	Course Title	Hrs / Week	Credits	MAX.MARKS		
					Int.	Ext.	Total
I	Core Course I	English For Communication I	6	3	25	75	100
	Core Course II	English For Communication II	6	3	25	75	100
	Core Course III	English For Communication III	6	3	25	75	100
	Core Course IV	English For Communication IV	6	3	25	75	100
			TOTAL	24	12	200	300

Programme Educational Objectives (PEO)

Programme Educational Objectives are broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve. PEO's are measured 4-5 years after graduation. The PEO is measured through employer satisfaction survey (yearly), alumni survey and placement records.

PEO 1: Learners will participate in critical conversations and prepare, organize, and deliver their work to the public

PEO 2: They will appreciate the literary works.

PEO 3: The Graduates will attain phonological and morphological aspects of English.

PEO 4: Learners can express a thorough command of English and its linguistic structures.

Program Outcome (PO)

The POs are narrower statements that describe what the students are expected to know and be able to do by the time of graduation. POs are based on relevance.

PO 1 Become knowledgeable in the subject of English for Communication and apply the principles of the same to the needs of the Employer/Institution/Enterprise/ Society.

PO 2: Gain Analytical skills in the field/area of English for Communication.

PO 3: Understand and appreciate professional ethics, community living and Nation Building initiatives.

PO 4: Develop language learning skills like Listening, Speaking, Reading and Writing.

PO 5: Making the Learners to realize their own Identity.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSOs are Statement that describe what the graduates of a specific educational Programme should be able to

PSO1: Design solution to overcome Communication Problems.

PSO 2: Apply Ethical Principles and Commit to Professional Ethics and Responsibilities.

PSO 3: Recognize the need of Extensive Reading Skills.

PSO 4: function as a team and an individual member amicably with other co-workers.

PSO 5: Use English effectively in formal and informal situations.

PSO 6: Develop vocabulary and communicative skills.

Course Code & Title	ENGLISH FOR COMMUNICATION - I		
Class	<u>I YEAR</u>	Semester	I
Cognitive Level	K – 1 Acquire K – 2 Understand K – 3 Apply K – 4 Evaluate K – 5 Analyze		
Course Objectives	The Course aims <ul style="list-style-type: none"> • To expose students to effective communication in the form of prose • To make the learners aware of social issues • To help them to know great personalities • To make them aware of dangers from human carelessness • To help them realize the need for honesty 		
UNIT	Content	No. of Hours	
I	1.Spoken English and Broken English: G.B.Shaw 2. Give us a Role Model : Dr. A.P. J. Abdul Kalam		

II	Water-The Elixir of Life : Sir C. V. Raman No Guarantee Please No Longer : A Newspaper Article	
III	I have a Dream : Martin Luther King Jr. The Gettysburg Address : Abraham Lincoln	
IV	Mosquitoes : Article Polluting the World :Article	
V	A Little Incident : Lu Hsun Jimmy Valentine : O. Henry	
	GRAMMAR: 1. Articles 2. Preposition 3. Adjective 4. Adverb	
Reference	Lessons will be edited and compiled.	
Course Outcomes	On completion of the course, students should be able to CO 1: communicate effectively CO 2: aware of social issues CO 3: know great personalities. CO 4: aware of dangers from human carelessness. CO 5: know the need for honesty	

Mapping of COs with PSOs & POs:

CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
CO1	S	M	S	M	M	M	S	S	M	M	S
CO2	S	M	M	M	M	S	M	S	M	M	M
CO3	S	M	S	M	M	M	S	S	M	M	S
CO4	S	M	M	M	M	S	M	S	M	M	M
CO5	S	M	S	M	M	M	S	S	M	M	S

Strongly Correlating(S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 mark

No Correlation (N) - 0 mark

B.Sc., ZOOLOGY - SYLLABUS
(w.e.f. 2019- 2020 Academic Year)

Part III		
SEMESTER – I	CORE COURSE – I	COURSE CODE:
Instruction Hours: 5 hrs/week		Internal: 25
Credits: 5		External: 75

CC-I: INVERTEBRATA

Course Objectives:

- To enlighten the students about the diverse forms of invertebrate animals which belong to major phyla and minor phyla present around us.
- To help our students to distinguish various invertebrate animals.
- To understand the systematic and functional morphology of various groups of invertebrates.
- To help our students to understand both beneficial and harmful forms of invertebrates; and to know the evolutionary sequence of invertebrate animals.

UNIT	CONTENT	TEACHING HOURS
UNIT-I	Animal kingdom: A brief introduction and nomenclature - Level of Organization and Classification. Phylum Protozoa: General Characters and Classification up to class with suitable examples of ecological/biological importance. Detailed Study: <i>Plasmodium</i> . General Topics: Locomotion in Protozoa and Economic importance of Protozoa.	12 hrs
UNIT-II	Phylum Porifera: General characters and classification up to class with suitable examples of ecological/biological importance. Detailed Study: <i>Sycon</i> . General Topics: Canal system in sponges and Skeleton in sponges. Phylum Coelenterata: General Characters and Classification up to class with suitable examples of ecological/biological importance. Detailed Study: <i>Obelia</i> . General Topics: Corals and Coral reefs and its conservation.	15 hrs
UNIT-III	Phylum Platyhelminthes: General characters and Classification up to class with suitable examples of ecological/biological importance. Detailed Study: Tape worm. General Topic: Parasitic adaptations in Platyhelminthes. Phylum Aschelminthes: General characters and Classification up to class with suitable examples of ecological/biological importance. Detailed Study: <i>Ascaris</i> . General Topic: Economic importance	12 hrs

	of Aschelminthes.	
UNIT-IV	Phylum Annelida: General characters and classification up to classes with examples of ecological/biological importance. Detailed study: Leech. General topic: Trochophore larva and its evolutionary significance. Phylum: Arthropoda: General characters and classification up to classes with examples of ecological/biological significance. Detailed study: Prawn. General topic: Peripatus and its affinities.	18 hrs
UNIT-V	Phylum: Mollusca: General characters and classification up to classes with examples. Detailed study - Freshwater Mussel. General topic: Foot in Mollusca. Phylum Echinodermata: General characters and classification up to classes with examples. Detailed study: Starfish. General topic: Echinoderm larvae and their significance. Minor phyla: General characters and affinities of Minor Phyla (Rotifera).	18 hrs

Course outcomes:

The students will able to

- Understand the fascinating world of invertebrates and get a concrete idea of classification of invertebrate phyla.
- Understand the basics of systematics of various groups of invertebrate phyla.
- Describe the structure and physiology of invertebrates with typical examples in each phylum.
- Know the economic importance of invertebrates
- Explain the taxonomic and characteristic features of minor phyla (Rotifera).

List of Text Books:

1. Ayyar, E.K. and T.N. Ananthakrishnan. 1995. A manual of Zoology. Vol. I (Invertebrata) Part I & II. Viswanathan Pvt. Ltd.,
2. Kotpal, R.L. 2009. Modern Text Book of Zoology Invertebrates. Rastogi Publications, New Delhi.
3. Arumugam, N. Kannan, S and Ragunathan, M.G. 2018. Invertebrata. Volume I. Saras Publications. Nagercoil.
4. Rastogi, V.B. 1984. Invertebrate Zoology. Kedar Nath Ram Nath Publications, Meerut.

List of Reference Books:

1. Agarwal, V.K. 2003. Invertebrate Zoology. S.Chand & Company Ltd., New Delhi.
2. Barnes, R.D. 1982. Invertebrate Zoology. Saunders College, Philadelphia.
3. Barrington, E.J.W. 1979. Invertebrates. Structure and Function. ELBS & Nelson.
4. Jordan, E.L. and Verma, P.S.2009 (Multicolour Revised Edition). Invertebrate Zoology. S. Chand & Company Ltd., New Delhi.

Part III		
SEMESTERS – I	CORE COURSE – II	COURSE CODE:
Instruction Hours: 3 hrs/week		Internal: 40
Credits: 2		External: 60

CC-II: PRACTICAL-I: INVERTEBRATA

Course Objectives:

- To impart training on the technique of dissecting the invertebrate animals to understand the various systems of invertebrates.
- To demonstrate the technique of *in silico* dissection of invertebrate animals.
- To observe the preserved animals (wet and dry) and to study their characteristic features.

Major Dissections:

1. Digestive systems of Earthworm.
2. Nervous system of Cockroach and Prawn.
3. Dissection of any one Invertebrate animal's digestive and Nervous system by using Computers (Demonstration only).

Minor Dissections:

1. Mounting of body setae and pineal setae of Earthworm.
2. Mounting of mouth parts of Honey bee, House fly, Cockroach.
3. Appendages of Prawn.

Spotters: Study of invertebrate forms which belong to different phyla with special reference to the following aspects:

A. Classify giving reasons: *Euglena, Obelia* (Entire), *Ascaris, Nereis, Leech, Arenicola*, Prawn, Centipede, Millipede, House fly, *Lepas, Loligo, Sepia, Chiton, Murex*, Star fish and Sea Cucumber.

B. Biological Significance: *Paramecium* – Conjugation and Binary fission; Sponge - Gemmule; *Fasciola*, Tape worm, *Limulus*, Nauplius Larva, Cocoon of silk moth, *Peripatus*, and *Bipinnaria* Larva.

C. Ecological adaptations: *Physalia, Porpita, Velella, Aphrodite*, Head Louse and *Teredo*,

D. Relationship between structure and function: Sponge- Spicules, *Taenia solium* – Scolex *Nereis* – Parapodium, *Sepia* - Cuttle bone and *Pila* – Radula.

E. Draw and Label the parts: *Fasciola* – T.S., *Leech* – T.S. and *Nereis* – T.S.

Record Submission:

Course outcome:

The students will be able to

- Familiar with dissection of invertebrates.
- Describe the morphological and anatomical structure of invertebrates.
- Understand various systems of invertebrates.

இளநிலைப் பட்டப் படிப்பு (கலையியல், அறிவியல், வணிகவியல் மற்றும் வணிக மேலாண்மையியல்)

Semester	Course	Course Title	Ins. Hrs/Week	Credits	Exam hrs	Int. Marks	Ext. Marks	Total
I	Value Education (VE)	வாழ்வியல் கல்வியும் மனித உரிமைகளும் (Value Education and Human Rights)	2	1	3	-	100	100

முதலாமாண்டு : முதற்பருவம்

வாழ்வியல் கல்வியும் மனித உரிமைகளும்

Education and Human Rights)

(Value

பாட நோக்கம் (Course Objectives)

தனித்திறன் மேம்பாடு, தன்னம்பிக்கை, நாட்டுப்பற்று, சமுதாயப் பொறுப்புணர்வு, மனித உறவுகளைப் போற்றும் பண்பு, அறச்சிந்தனை முதலான இன்றைய இளம் தலைமுறையினருக்குத் தேவையான அடிப்படை வாழ்வியல் பண்புகளைக் கற்பித்தல்.

கவலை, சினம், பொறாமை, சோம்பல் முதலான தீமை தரும் பண்புகளை விலக்கச் செய்தல். உடல்நலத்தில் அக்கறை கொள்ளச் செய்தல்.

மனித உரிமைகளை அறியச் செய்தல்.

அலகு :1

வாழ்வியல் கல்வி : திறன் மேம்பாடும் உயர் பண்புகளும்

கல்வி, வாழ்வியல் கல்வியின் நோக்கம் - வாழ்வியல் கல்வியின் பரிணாம வளர்ச்சி - வாழ்வியல் கல்வியின் கூறுகள் - சுய முன்னேற்றம் - திறன் மேம்பாடு - உயர்பண்புகள் - தன்மதிப்பீடும் சுயபரிசோதனையும் - பாலினச் சமத்துவத்தை உளமாரப் பின்பற்றுதல் - மாற்றுத் திறனாளிகள், மனவளம் குன்றியோர், வயதில் பெரியவர்கள், அனுபவசாலிகள், சான்றோர்கள்,

குடும்ப உறுப்பினர்கள், அருகில் வசிப்பவர்கள், சுற்றத்தார், உடன் பணியாற்றுவோர் இவர்களுக்கு மதிப்பளித்தல் - நற்பண்புகளும் நடத்தை உருவாக்கமும் - உண்மை - ஆக்கத்திறன் - தியாகம் - நேர்மை - கட்டுப்பாடு - உதவி செய்யும் மனப்பான்மை - சகிப்புத்தன்மை - அறிவியல் கண்ணோட்டம்

அலகு : 2

தேசிய, உலக முன்னேற்றத்திற்கான வாழ்வியல் கல்வி

தேசம், சர்வ தேசங்கள் குறித்த எண்ணங்கள் - நமது நாடு - அரசமைப்பு - மக்களாட்சித் தத்துவம் - சமதர்மம் - மதச்சார்பின்மை - சமத்துவம் - சமூக நீதி, தனியுரிமை - சுதந்திரமும் சகோதரத்துவமும் சமூகப் பண்புகள் - இரக்கம் மற்றும் நேர்மை, சுயகட்டுப்பாடு, உலகளாவிய சகோதரத்துவம் - தொழில் சார் பண்புகள் - அறிவு வேட்கை - தொழிலில் நேர்மை - முறைமை - காலந்தவறாமையும் நம்பிக்கையும் - மதம் சார்ந்த பண்புகள் - சகிப்புத்தன்மை, மெய்யறிவு, நன்னடத்தை - அழகியல் பண்புகள் - இலக்கியம், நுண்கலைகள் ஆகியவற்றைப் பயில்தல், சுவைத்தல், மனதாரப் பாராட்டுதல் மதித்தல், பாதுகாத்தல், தேசிய ஒருமைப்பாடும் சர்வதேசப் புரிதலும்.

அலகு : 3

அறப்பண்புகள் மற்றும் வாழ்வியலில் உலகளாவிய பெருவளர்ச்சிகள் ஏற்படுத்தும் தாக்கங்கள்

அறிவியல் வளர்ச்சியின் தாக்கங்கள் - பண்பண்பாட்டு முரண்பாடுகளின் தாக்கங்கள் - பொருளியல் சிந்தனைகள் - மக்கள் தொடர்புச் சாதனங்கள் - இளமை உணர்ச்சி வேக நடத்தையின் நவீன அறைகூவல்கள் - இல்லறமும் நல்லுணர்வும் - ஒப்பீடும் போட்டி இடுதலும் -

நேர்மறை, எதிர்மறை எண்ணங்கள் - அகந்தை - சினம் - சுயநலம் - அறைகூவல்கள்

அலகு : 4

உடல், உள்ள நலமும்

நோய் தீர்க்கும் செயல்பாடுகளும் உணவுப் பழக்கமும் உணவு முறைகளும் - பொருந்தும் உணவுகள் - பொருந்தா உணவுகள் - மனக் கட்டுப்பாடு - மனத்திண்மை - எளிய உடற்பயிற்சி - தியானம் - மனம், ஆன்மா சார்ந்த விளைவுகள் - யோகா - நோக்கங்கள் - வகைகள் - முறைகள் - ஆசனங்கள் - ஆசைகளை ஒழுங்குபடுத்துதல் - கவலை நீக்குதல் - சினம் தணிதல் - நெடுநீர், மறதி, சோம்பல் தவிர்த்தல் - தூக்கம் முறைப்படுத்துதல் - துக்கம், இழப்புகளை எதிர்கொள்ளல் - புகை, மது முதலானவைகளின் தீங்கு உணர்தல்- வாழ்த்துகளின் பயன்கள்

குறிப்பு : இந்த அலகு உடற்பயிற்சி : தியானம் - யோகா செய்முறைப் பயற்சிகளுடன் கூடியது.

அலகு : 5

மனித உரிமை, மனித உரிமைக் கருத்துகள்

தேசிய மற்றும் பன்னாட்டுக் கண்ணோட்டங்கள் - மனித உரிமையின் பரிணாமம் - மனித உரிமையின் பரந்த வகைப்பாடுகள் வாழ்தற்கான உரிமை, சுதந்திரம், கண்ணியத்துடன் வாழ்வதற்கான உரிமைகள் - கலாச்சாரம் மற்றும் கல்விக்கான உரிமைகள் - பொருளாதார உரிமைகள் - அரசியல் உரிமைகள் - சமூக உரிமைகள் - பெண்கள் மற்றும் குழந்தைகளின் மனித உரிமை - சமூகப் பழக்கங்களும் அரசியலமைப்புப் பாதுகாப்புகளும்.

கற்றல் விளைவுகள் (Course Outcome)

மாணவர்கள் வாழ்வியல் கூறுகளை அறிந்துகொள்வதோடு நற்பண்புகளை வளர்த்துக்கொள்வர். தீமை தரும் பண்புகளை அறிந்து அவற்றிலிருந்து தம்மைக் காத்துக்கொள்வர்.

உடல்நலத்தில் அக்கறை கொள்வர்.

மனித உரிமைகளை அறிந்து கொள்வர்.

பாடநூல்

வாழ்வியல் கல்வியும் மனித உரிமைகளும்,

தமிழ்த்துறை வெளியீடு,

நேரு நினைவுக் கல்லூரி, புத்தனாம்பட்டி.

முதலாமாண்டு : இரண்டாம் பருவம்

பகுதி 1 தமிழ் - தாள் 2

செய்யுள் (இடைக்காலம்), உரைநடை, தமிழ்ச் செம்மொழி வரலாறு, மொழிபெயர்ப்பியல், தமிழ் இலக்கிய வரலாறு

பாட நோக்கம் (Course Objectives)

பக்தி இலக்கியம், சிற்றிலக்கியங்களை அறிமுகம் செய்தல்.

இக்காலத் தமிழ் உரைநடையை அறிமுகம் செய்தல்.

தமிழ்ச் செம்மொழி வரலாற்றைக் கற்கச் செய்தல்.

ஆங்கிலச் சொற்களுக்கு இணையான தமிழ்ச்சொற்களைப் பயன்பாட்டு முறையில் அறியச்செய்தல்.

பணித்தேர்வுகளுக்கு உதவக்கூடிய தமிழ்ப் பாடப்பகுதிகளைக் கற்பித்தல்.

அலகு – 1 இடைக்கால இலக்கியங்கள்

1.தேவாரம் - திருநாவுக்கரசர் தேவாரம்

திருவையாற்றுப் பதிகம் - 3 பாடல்கள்

1. ஏருமதிக் கண்ணி யானை (பா.எண் -5)

2. விரும்பு மதிக் கண்ணி யானை (பா.எண் -8)

3. திங்கள் மதிக் கண்ணி யானை (பா.எண் -10)

தனித்திருத் தாண்டகம் - 4 பாடல்கள்

1. முடிகொண்டார் முளையிளவெண் (பா.எண் -3)

2. பொக்கணமும் புலித்தோலும் (பா.எண் -4)

3. அணிதில்லை அம்பலமா (பா.எண் -7)

4. கடையொன்றிற் கங்கையையுந் (பா.எண் -10)

2.திருவாசகம் - திருப்பூ வல்லி - 3 பாடல்கள்

1. எந்தையெந்தாய் சுற்றம் (பா.எண் -276)
2. தேனாடு கொன்றை (பா.எண் -279)
3. வானவன் மாலயன் (பா.எண் 286)

திருச்சதகம் - 4 பாடல்கள்

1. மெய்தான் அரும்பி (பா.எண் -5)
2. நாடகத்தா லுன்னடியார் (பா.எண் -15)
3. ஆமாறுன் திருவடிக்கே (பா.எண் -18)
4. வானாது மண்ணாது (பா.எண் -19)

3.திருமந்திரம் - 10 பாடல்கள்

1. நான் பெற்ற இன்பம் பெறுக (பா.எண் -85)
2. அன்பும் சிவமும் இரண்டென்ப (பா.எண் -270)
3. என்பே விறகா இறைச்சி (பா.எண் -272)
4. நிற்கின்ற போதே (பா.எண் -292)
5. கல்லாத மூடரைக் காணவும் (பா.எண் -317)
6. உள்ளத்தின் உள்ளே (பா.எண் -509)
7. உள்ளம் பெருங்கோயில் (பா.எண் -823)
8. உடம்பினை யானிருந்து (பா.எண் -725)
9. ஒன்றே குலம் ஒருவனே தேவனும் (பா.எண் -2103)
10. அறிவுக்கு அழிவில்லை (பா.எண் 2358)

4.நாலாயிரத் திவ்ய பிரபந்தம் - 10 பாடல்கள்

குலசேகர ஆழ்வார் - பெருமாள் திருமொழி - நான்காம் திருமொழி

திருவேங்கடத்தில் இருத்தலும் போதியது எனல்

1. ஊனேறு செல்வத்து பா.எண் 677
2. ஆனாத செல்வத்து பா.எண் 678
3. ஒண்பவள வேலை பா.எண் 680
4. மின்னனைய நுண்ணியர் பா. எண் 682
5. வான்ஆளும் மாமதிபோல் பா.எண் 683

வித்துவக்கோட்டு அம்மாளை வேண்டி நிற்பல்

1. தருதுயரம் தடாயேல் பா.எண் 688
2. கண்டார் பா.எண் 689
3. மீன் நோக்கும் பா.எண் 690
4. வாளால் அறுத்து பா.எண் 691
5. வெங்களத்தின் பா.எண் 692

5.இயேசு காவியம் - மலைப்பொழிவு

6.தீன் குறள் - இரு அதிகாரங்கள் - நல்லிணக்கம், வரன் தட்சணை

7. கலிங்கத்துப் பரணி - களம் பாடியது - 10 பாடல்கள்

1. தேவாசுரம், இராமாயணம் (பா.எண் -473)
2. உடலின் மேல் பல காயம் (பா.எண் -476)
3. நெடுங்குதிரை மிசைக் கலணை (பா.எண் -477)
4. விருந்தினமும் வறியவரும் (பா.எண் -478)
5. மா மழைபோல் பொழிகின்ற (பா.எண் -480)
6. தன் கணவருடன் தாமும் (பா.எண் -482)

7. வாய் மடித்துக் கிடந்ததலை (பா.எண் -483)
8. பொரு தடக்கை வாள் எங்கே (பா.எண் -485)
9. ஆடல் துரங்கம் பிடித்து (பா.எண் -486)
10. சாதுரங்கத் தலைவனைப் போர்க் களத்தில் . . . (பா.எண்-502)

8. குற்றாலக் குறவஞ்சி - குறத்தி கூறும் நாட்டு வளம் - 5 பாடல்கள்

1. சூழ மேதி இலங்குந் துறையில் (பா.எண் -3)
2. தக்க பூமிக்கு முன்புள்ள நாடு (பா.எண் -5)
3. அஞ்சநூறு மகம்கொண்ட நாடு (பா.எண் -6)
4. மாதம் மூன்றும் மழையுள்ள நாடு (பா.எண் -7)
5. நீங்கக் காண்பது சேர்ந்தவர் பாவம் (பா.எண் -8)

9. தமிழ் விடுதூது - 110 -120 கண்ணிகள்

அலகு : 2

உரைநடை - காற்றின் கையெழுத்து - பழநிபாரதி

அலகு - 3

தமிழ்ச் செம்மொழி வரலாறு

செம்மொழி விளக்கம் - செம்மொழி வரலாறு - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழிக்கான தகுதிகள் அல்லது செம்மொழிப் பண்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

அலகு - 4

மொழிபெயர்ப்பியல் - ஒரு மடல்(கடிதம்) , ஒரு பத்தி
ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல்.

அலகு - 5

தமிழ் இலக்கிய வரலாறு - இடைக்காலம்

கற்றல் விளைவுகள் (Course Outcome)

மாணவர்கள் ஆன்மீகச் சிந்தனையுடன் கூடிய நற்பண்புகளை
வளர்த்துக்கொள்வர்.

இடைக்கால இலக்கியப் படைப்புச் சூழலை அறிந்து கொள்வதால் இலக்கிய
வரலாற்று அறிவு பெறுவர்.

சமுதாய, அரசியல், சூழலியல் விழிப்புணர்வு பெறுவர்.

தாய்மொழியில் திறன் பெறுவர்.

பணித்தேர்வுகளுக்கு உரிய தமிழ்த்திறன் பெறுவர்.

பாட நூல்கள்

1. செய்யுள் திரட்டு, தமிழ்த்துறை வெளியீடு.
2. தமிழ்ச் சொம்மொழி வரலாறு, முனைவர் மு.சாதிக்பாட்சா, இராஜா
பப்ளிகேசன், திருச்சி-23.
3. மொழிபெயர்ப்புகள் (கடிதங்களும் பத்திகளும்)
மகிழினி பதிப்பகம், சென்னை- 106.
4. தமிழ் இலக்கிய வரலாறு -பிரமி பதிப்பகம், திருச்சி-21.
5. காற்றின் கையெழுத்து, பழநிபாரதி, தமிழ்நாதன் பதிப்பகம், சென்னை.

Course Code &	ENGLISH FOR COMMUNICATION – II
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Title			
Class	<u>I YEAR</u>		<u>II</u>
Cognitive Level	K – 1 Acquire K – 2 Understand K – 3 Apply K – 4 Evaluate K – 5 Analyze		
Course Objectives	The Course aims To expose students to the wisdom of great men To familiarize students with the danger of modern food and entertainment To make them realize to treat all equally To make them know to use science carefully To make them understand the need to help others		
UNIT	Content		No. of Hours
I	It is Personality that matters : Swami Vivekananda Pele		
II	Fun Food Keep Television at Arm’s length		
III	Women not the weaker sex : M.K. Gandhi A Tree Speaks : C. Rajagopalachary		
IV	The Despair of the Ganges : A. Damodharan The Fukushima- Nuclear Disaster :		
V	The Verger : William Somerset Maugham The Selfish Giant : Oscar Wilde		
Reference	Lessons will be edited and compiled.		
Course Outcomes	On completion of the course, students should be able to CO 1: Know the wisdom of great men. CO 2: know the dangers in modern life. CO 3: accept to treat all equally CO 4:realize the need to use science carefully. CO 5: understand the need to help others.		

Mapping of COs with PSOs & POs:

CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
CO1	S	M	M	M	M	S	M	S	M	M	M
CO2	S	M	S	M	M	M	S	S	M	M	S
CO3	S	M	M	M	M	S	M	S	M	M	M
CO4	S	M	S	M	M	M	S	S	M	M	S
CO5	S	M	M	M	M	S	M	S	M	M	M

Strongly Correlating(S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 mark

No Correlation (N) - 0 mark

Part III		
SEMESTER – II	CORE COURSE – III	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 6		External: 75

CC-III: CHORDATA

Course Objectives:

- To enlighten the students about the diverse forms of chordate animals around us.
- To help our students to discriminate both harmful and beneficial chordate animals.
- To understand the systemic and functional morphology and anatomy of vertebrates.

UNIT	CONTENT	TEACHING HOURS
UNIT-I	Prochordata: General characters and an outline classification of Prochordata up to orders with suitable examples of biological interest. Origin of Chordates. Detailed Study: Amphioxus. Pisces: General characters and an outline classification of Pisces with suitable examples of biological interest. Detailed study: <i>Scoliodon</i> (Shark) - external characters, digestive, respiratory, circulatory and urino-genital systems. General topics - Accessory respiratory organs in fishes.	19 hrs

UNIT-II	Amphibia: General characters and an outline classification of Amphibia with suitable examples of biological interest. Detailed Study: <i>Rana hexadactyla</i> (Frog) - external characters, digestive, respiratory, circulatory and urinogenital systems. General topics: Parental Care in Amphibia and Neoteny.	17 hrs
UNIT-III	Reptiles: General characters and an outline classification of Reptilia with suitable examples of biological interest. Detailed Study: <i>Calotes versicolor</i> (Garden Lizard) - external characters, digestive, respiratory, circulatory and urinogenital systems. General topics: Identification and distribution of poisonous and non-poisonous snakes of India.	18 hrs
UNIT-IV	Aves: General characters and an outline classification of Aves with suitable examples of biological interest; Aves: Detailed Study: <i>Columba livia</i> (Pigeon) - external characters, digestive, respiratory, circulatory and urinogenital systems. General Topics: Flightless birds; Flight adaptations in birds.	18 hrs
UNIT-V	Mammalia: General characters and an outline classification of Mammalia with suitable examples of biological interest. Detailed study: <i>Oryctolagus</i> (Rabbit) - external characters, digestive, respiratory, circulatory and urinogenital systems. General topics: Adaptive radiation in aquatic mammals.	18 hrs

Course outcome:

The students will be able to

- Inculcate the fascinating vertebrate life.
- Learn the evolution, hierarchy and classification of different classes of chordates
- Get an overview of the morphology and physiology of typical examples of chordates.
- Familiarize the adaptations and economic importance of specific vertebrates.

List of Text Books:

1. Ayyar. E.M., Anantha Krishnan T.N. 1995. Manual of Zoology Vol.II, Part I & II. (Chordata), S. Viswanathan Pvt. Ltd., Chennai.
2. Kotpal, R.L.1998. Modern Text Book of Zoology - Vertebrata, Rastogi and Company, Meerut, India.
3. Thangamani, T. and Arumugam, N. 2009. A text book of Chordates. Saras Publications.

List of Recommended Books:

1. Dhama, P.S and Dhama, J.K. 1982. Chordate Zoology. R.Chand & co Publishers, New Delhi.
2. Goodrich, 1958. Structure and development of vertebrates, Vol.I & II. Reprinted by Dower Pub. Inc. New York.
3. Jordan, E. 1983. Chordate Zoology. S. Chand & Company Ltd., New Delhi
4. Jordon E and Verma P.S. 1995. Chordate Zoology elements of animal physiology. S.Chand & Co. New Delhi.

5. Waterman, A.J. 1971. Chordate structure and function. Macmillan Company- New York.

Part III		
SEMESTERS – II	CORE COURSE – IV	COURSE CODE:
Instruction Hours: 3 hrs/week		Internal: 40
Credits: 2		External: 60

CC-IV: PRACTICAL-II (CHORDATA)

Course objectives:

- To impart training on the technique of dissecting the vertebrate animals to understand the various systems of vertebrates.
- To demonstrate the technique of *in silico* dissection of vertebrate animals.
- To identify chordate animals with their characteristic features.

Major Dissections:

1. Digestive system of a fish.
2. Urogenital system of a fish.
3. Dissection of any one vertebrate animal's digestive, nervous, excretory and reproductive systems by using Computers.

Minor Dissections:

1. Mounting of Placoid scales of fishes.
2. Mounting of Cycloid scales of fishes.
3. Mounting of Ctenoid scales of fishes.

Spotters:

A. Classify giving reasons:

1. **Prochordates:** *Balanoglossus*, *Amphioxus* and *Ascidian*
2. **Pisces:** *Arius*, *Hippocampus*, *Exocoetus* and *Anabus*
3. **Amphibia:** *Bufo*, *Hyla* and *Salamandra*,
4. **Reptiles:** *Hemidactylus*, *Varanus* and *Chelone*.
5. **Aves:** Pigeon and Kingfisher,
6. **Mammalia:** Rat, Kangaroo and Bat.

B. Skeletal System:

1. **Mammalian Vertebrae** – Atlas, Axis, Cervical, Thoracic, Lumbar, Sacral and Caudal.

C. Biological significance:

1. Tornaria larva.
2. *Narcine*
3. *Alytes*,
4. *Draco*,
5. *Naja naja*,
6. Kangaroo.

D. Ecological adaptations:

1. *Echeneis*,

2. Tadpole,
3. *Hydrophis*,
4. Owl
5. Bat.

D. Relationship between structure and function

1. Frog- Skull.
2. Frog - Pectoral and pelvic girdles.
3. Frog - Fore limbs and hind limbs.

E. Draw and Label the parts:

1. Quill feather,
2. Synsacrum
3. Beak modification.

Record Submission:

Course outcome:

The students will able to

- Familiarize with dissection of vertebrate animals.
- Understand various systems of vertebrates.

Part IV		
SEMESTER – II	SKILL BASED COURSE –I	COURSE CODE:
Instruction Hours: 2 hrs/week		Internal: 25
Credits: 2		External: 75

SKBC-I: APICULTURE

Course Objectives:

- To impart training to our students both on site and off site on the techniques of Honey, Royal Jelly and wax production from Apiculture.
- To kindle the young minds to become self employers/entrepreneurs of apiculture practices of their choice in their native places after graduation.

UNIT	CONTENT	TEACHING HOURS
	APICULTURE	
UNIT-I	Honey bees: Species, morphology, colony organization and life Cycle. Pests and diseases of bees.	6 hrs
UNIT-II	Social behaviour of bees: Division of labour, food gathering, feeding, Communication and working habit of field bees.	6 hrs
UNIT-III	Bee Keeping Equipments: Newton’s bee hive and Other bee	6 hrs

	keeping equipments, and equipments for handling Bees.	
UNIT-IV	Selection of apiary site and bee species. Examination of bee colony. Seasonal bee management – Principle of bee management, swarming and control. Extraction of honey. Economics of bee keeping. Queen rearing.	6 hrs
UNIT-V	Beehive products: Honey - Chemical composition of honey, Nutritional and Medicinal values of Honey. Wax, Bee Venom, Propolis and Royal Jelly. Adulteration of honey and available methods for detection. Bee Pollination: Pollination and Fertilization–External agents of pollen transfer – Advantages of Bee Pollination in Crops. <i>Visit to a nearby apiculture unit for imparting training on various aspects of Apiculture. Preparation and submission of a report on the visit.</i>	6 hrs

Course outcome:

The student will be able to

- Explain the morphology, colony organization and life cycle of honey bees.
- Identify different species of wild honey bees and suitable species for apiculture.
- Familiar with the beekeeping equipments and method of honey harvesting.
- Realize the nutritional and medicinal values of honey.
- Explain the values and production of bee products.
- Apply the knowledge of apiculture to become an entrepreneur.

Part IV		
SEMESTER – II	Question Paper Pattern	Part A : 5x8=40
Instruction Hours: 2		Part B : 5x12=60
Credits: 2		External: 100

ENVIRONMENTAL STUDIES

Objectives:

To create awareness among the students about our environment, its values, and the need for protecting it for the wellbeing of mankind in the months and years to come.

UNIT	CONTENT	TEACHING HOURS
UNIT-I	Multidisciplinary nature of Environmental Studies – Definition – Scope and importance. <u>Natural resources:</u> Land resources: Lands as resources and their uses – <u>Forest resources:</u> Importance of forest resources - Major and minor forest produces – need for afforestation – <u>Water resources:</u> Availability of surface and ground	6 Hrs

	water – Importance of water conservation – <u>Food resources</u> : World food problems and possible solutions.	
UNIT – II	<u>Mineral resources</u> : Their availability and uses – <u>Energy resources</u> : Growing energy needs – Renewable and Non-Renewable energy sources – Use of alternate energy sources – Case studies – Equitable use of resources for sustainable life styles.	4 hrs
UNIT – III	<u>Ecosystem</u> : Concept – Structure and function of a pond ecosystem – Food chains, food webs and Ecological pyramids. <u>Biodiversity</u> : Definition – Genetic, Species and Ecosystem diversity – Biogeographical classification of India – Values of Biodiversity – Biodiversity at global, national and local levels – India as a mega-diversity nation – Hotspots of Diversity – Threats to Biodiversity – Endangered and Endemic species of India – <i>In situ</i> and <i>Ex situ</i> conservation of biodiversity.	8 hrs
UNIT – IV	Environmental pollution: Definition, Causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear pollution – Solid Waste Management: Causes, effects and management of urban and industrial wastes.	6 Hrs
UNIT – V	<u>Social issues and environment</u> : Effects of deforestation, Construction of Dams, Mineral mining on environment – <u>Natural disasters and their management</u> : Floods, Earthquake, Cyclone and Landslides – Conflicts over water – Advantages of rainwater harvesting and watershed management – Environmental ethics – Case studies – Population explosion – Effects of population explosion on environment – Role of individual in preservation of environment.	6 hrs

List of Reference Books:

1. Anon. 2000. Environmental Studies (U.G.C Syllabus), Periyar E.V.R College, Tiruchirapalli.
2. Kumaraswamy, K., Alagappa Moses, A. and Vasanthi, M. 2004. Environmental Studies (A Text Book for all under graduate students). Bharathidasan University, Tiruchirapalli.
3. Benny Joseph. 2005. Environmental Studies. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
4. Asthana, D.K., Meera, A. 2006. A Text Book of Environmental Studies for under graduate students. S.Chand & Company Ltd., New Delhi.

இரண்டாமாண்டு : மூன்றாம் பருவம்

பகுதி 1 தமிழ் - தாள் 3

செய்யுள் (காப்பியங்கள்), கட்டுரை இலக்கியம், புதினம்,
இலக்கிய வரலாறு

தமிழ்

பாட நோக்கம் (Course Objectives)

பண்டைத் தமிழரின் அரசியல் நேர்மை, குடிமக்களின் உரிமை, குடிமக்களின் பொறுப்புணர்வு, அறச்சிந்தனைகளை அறியச்செய்தல்.

நேர்மை, பிறருக்கு உதவும் பண்பு, நன்னெறிகளைப் பின்பற்றுதல் முதலான வாழ்வியல் பண்புகளை வளர்த்தல்.

வாழ்வின் எல்லா நிலைகளிலும் திறம்படச் செயலாற்றக் கற்றுத்தருதல்.

பெண்களை மதிக்கச் செய்தல், சொல்லாடல் திறன் வளர்த்துக்கொள்ள உதவுதல்.

மிகச் சிறந்த தமிழ் உரைநடைகளை அறிமுகம் செய்தல்.

பணித்தேர்வுகளுக்கு உதவக்கூடிய தமிழ்ப் பாடப்பகுதிகளைக் கற்பித்தல்.

அலகு - 1

1. சிலப்பதிகாரம் : வழக்குரை காதை
2. மணிமேகலை : சிறைக்கோட்டத்தை அறக்கோட்டம் ஆக்கிய காதை
3. கம்பராமாயணம் - வாலி வதைப் படலம் - 106 பாடல்கள்

அலகு - 2

1. வில்லிபாரதம் : கன்னபருவம் - பதினேழாம் போர்ச்சருக்கம்-104பா-ள்
2. சீறாப் புராணம் : மானுக்குப் பிணைநின்ற படலம் - 30 பாடல்கள்
3. தேம்பாவணி - வளன் சனித்த படலம் - 30 பாடல்கள்

4. இராவண காவியம் : இலங்கைக் காண்டம்-அரசியற்படலம் –40 பா-ள்

அலகு : 3 கட்டுரை இலக்கியம் - 'கட்டுரை இலக்கியம்', பிரமி பதிப்பகம் .

அலகு : 4 புதினம் - வேரில் பழுத்த பலா, சு.சமுத்திரம்

அலகு : 5

தமிழ் இலக்கிய வரலாறு - காப்பிய காலம்

கற்றல் விளைவுகள் (Course Out Come)

மாணவர்கள் நேர்மைப் பண்பு, துணிவுடைமை, சமுதாய அக்கறை உள்ளவர்களாக வளம்பெறுவர்.

இல்லற வாழ்வில் பெண்களை மதித்தல் வேண்டும் என்ற உணர்வு பெறுவர்.

சமுதாய, அரசியல், சூழலியல் விழிப்புணர்வு பெறுவர்.

நல்ல தமிழ் உரைநடையில் பயிற்சி பெறுவர்.

பணித்தேர்வுகளுக்கு உரிய தமிழ்த்திறன் பெறுவர்.

பாடநூல்கள்

1. செய்யுள் திரட்டு, தமிழ்த்துறை வெளியீடு.

2. கட்டுரை இலக்கியம் - பிரமி பதிப்பகம், திருச்சி-21.

3. வேரில் பழுத்த பலா, சு.சமுத்திரம் என்.சி.பி.எச்.வெளியீடு, சென்னை.

தமிழ் இலக்கிய வரலாறு – பிரமி பதிப்பகம், திருச்சி-21.

Course Code & Title	ENGLISH FOR COMMUNICATION III		
Class	<u>II YEAR</u>	Semester	<u>III</u>
Cognitive Level	K – 1 Acquire K – 2 Understand K – 3 Apply K – 4 Evaluate		

K – 5 Analyze		
Course Objectives	The Course aims <ul style="list-style-type: none"> • To expose students to vocabulary • To familiarize students with different levels of meaning. • To help them to think logically • To read and analyze a passage • To make them competent to face an interview 	
UNIT	Content	No. of Hours
I	1. Synonyms : 100 2. Antonyms : 100 3. Words that Confuse : 50 4. Single Word Substitution : 100	
II	5. Phrasal verbs : 50 6. Idioms : 50	
III	7. Errors and How to avoid them :100 8. Spotting Errors :100 9. Jumbled Sentences :25	
IV	10. Reading Comprehension : 15 11. Dialogue Writing : 20	
V	12. Letter Writing (Application, Business& Complaints): 15 13. Report Writing : 10 14. Interview Skills 15. Group Discussion	
Reference	Lessons will be edited and compiled.	
Course Outcomes	On completion of the course, students should be able to CO 1: use words correctly. CO 2: understand different levels of meaning. CO 3: think logically. CO 4: analyze a passage. CO 5: face an interview successfully	

Mapping of COs with PSOs & POs:

CO/PO	PO	PSO
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	1	2	3	4	5	1	2	3	4	5	6
CO1	S	M	S	M	M	M	S	S	M	M	S
CO2	S	M	M	M	M	S	M	S	M	M	M
CO3	S	M	S	M	M	M	S	S	M	M	S
CO4	S	M	M	M	M	S	M	S	M	M	M
CO5	S	M	S	M	M	M	S	S	M	M	S

Strongly Correlating(S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 mark

No Correlation (N) - 0 mark

Part III		
SEMESTER – III	CORE COURSE – V	COURSE CODE:
Instruction Hours: 5 hrs/week		Internal: 25
Credits: 5		External: 75

CC-V: CELL BIOLOGY

Course objectives:

- To develop knowledge and skills in cell biology and become aware of the complexity and harmony of the cell.
- To understand the structures and functions of prokaryotic and eukaryotic cells.
- To understand the structure of cellular components and their functions.
- To know the importance and molecular mechanism of cell cycle.
- To understand the cellular events underlying different cell divisions.

UNIT	CONTENT	TEACHING HOURS
UNIT-I	Introduction: Cell and cell theory, and types of cells. (Prokaryotes and Eukaryotes). Ultra structural organization of animal cell. Plasma Membrane - Ultrastructure, Unit membrane and fluid mosaic model, Membrane proteins - peripheral and integral proteins- functions of plasma membrane. Cytoplasm: structure and composition, physical and biological properties.	15 hrs
UNIT-II	Endoplasmic Reticulum (ER): Occurrence, ultrastructure, types and functions of endoplasmic reticulum. Golgi apparatus:	15 hrs

	Occurrence, distribution, morphology and functions. Lysosomes and centrosome: Morphology, chemistry and functions. Ribosome: Occurrence, ultrastructure and function.	
UNIT-III	Mitochondria: Morphology, chemical composition and functions; Nucleus: Ultrastructure, nuclear envelope, nucleoplasm. Chromosomes: Types, structure and functions; Histones and Heterochromatins. Cell cycle and cell division - Amitosis, Mitosis and Meiosis. An overview of Cancer - its causes and effects. Apoptosis- mechanism of programmed cell death. Ageing.	17 hrs
UNIT-IV	Genetic material: DNA and RNA as a genetic material. DNA - Watson and Crick's model of DNA – Polymorphism of DNA; Replication of DNA: DNA replication in eukaryotes; DNA Repair. RNA: Structure, Types and Functions.	15 hrs
UNIT-V	Genetic code: Characteristics of genetic code –Protein Synthesis: Central dogma – Transcription of mRNA, Translation and Protein synthesis, Regulation of gene action.	13 hrs

Course outcome:

The students will be able to

- Develop deeper understanding of what life is and how it functions at cellular level.
- Compare the structure of eukaryotic cells with the structure of simpler prokaryotic cells.
- Describe cellular membrane structure and function, fine structure and function of cell organelles.
- Explain the cell division in somatic and germ cell.
- Discuss the mechanisms of cell cycle in normal and cancer cell.
- Explain the structure and function of the genetic material and its types.
- Describe the structural organization of genes and the control of gene expression.
- Understand the protein synthesis.

List of Text Books:

1. Arumugam, N.2001. Cell Biology. Saras Publications, Nagercoil.
2. David, F. 2003. Molecular Biology. Second Edition. Narosa Publishing House, New Delhi.
3. Jeyanthi, G. P. 2009. Molecular Biology. MJP Publishers, Chennai.
4. Kumar, H.D. 2003. Molecular Biology. Second revised Edition. Vikas Publishing House Pvt. Ltd., New Delhi.
5. Powar, C.B. 1997. Cell Biology. Himalaya Publishing House, Bombay.
6. Turner, P.C., McLennan, A.G., Bates, A.D and White, M.R.H. 2001. Molecular Biology. Second Edition. Viva Books Pvt. Ltd., New Delhi.
7. Verma, P.S. and V.K. Agarwal. 1998. Cell Biology. S.Chand Company Ltd., New Delhi.
8. Verma, P.S. and V.K.Agarwal. 2003. Cytology (Cell Biology and Molecular Biology). S.Chand Company Ltd, New Delhi.

9. Verma, P.S. and V.K. Agarwal. 2007. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Company Ltd. New Delhi.

List of Reference Books:

1. De Robertis, E.D.P. and De Robertis E.M.F. 1995. Cell and Molecular Biology. 8th Edition, B.I. Waverly Pvt., Ltd., New Delhi.
2. Freidfelder, D. 2003. Molecular Biology. Narosa Publishing House, New Delhi.

Part III		
SEMESTERS –III	CORE COURSE – VI	COURSE CODE:
Instruction Hours: 3 hrs/week		Internal: 40
Credits: 2		External: 60

CC-VI: PRACTICAL-III: CELL BIOLOGY

Course objectives:

To impart training on the cytological techniques.

Major Practical

1. Isolation of Mitochondria.
2. Squash preparation of onion root tip to study the different stages of mitosis.
3. Squash preparation of grasshopper testis to study the different stages of meiosis.
4. Cell as an osmometer.
5. Isolation of DNA from human saliva.

Minor Practical

1. Squash preparation of giant chromosomes using chironomus larva.
2. Buccal smear – Identification of Barr Body.

Spotters

1. Prokaryotic Cell (Bacteria)
2. Eukaryotic cell (Pancreatic Beta cell)
3. Blood cell of Human and frog.
4. Study of different types of tissues
 - a. Epithelial tissues – Columnar, ciliated glandular and squamous epithelium.
 - b. Connective tissues – Cartilage, bone and blood.
 - c. Muscular tissues – Striated muscle, smooth muscle and cardiac muscle.
 - d. Neural tissues - Neuron.
5. Model of DNA.
6. DNA replication - model
7. RNA types – model.

Record submission:

Course outcome:

The students will be able to

- Observe chromosomal arrangements during cell division
- Distinguish different cells and tissues.
- Familiarize with conventional and modern cytological techniques.

Part IV		
SEMESTER – III	SKILL BASED COURSE –II	COURSE CODE:
Instruction Hours: 2 hrs/week		Internal: 25
Credits: 2		External: 75

POULTRY FARMING AND DAIRY FARMING

Course Objectives:

- To impart training to our students, both on site and off site on the techniques of poultry and dairy farming.
- To create interest in the young minds to become self employers/entrepreneurs of these two farming practices of their choice in his/her native places after graduation.

UNIT	CONTENTS	TEACHING HOURS
	POULTRY FARMING	
UNIT-I:	Poultry Industry in India. Breeds of fowls – Indigenous breeds and Exotic breeds: American, Asiatic and Mediterranean Classes; Breeding and rearing – Selection of Breed – Breeding – Housing of Birds - Semi-Intensive - Intensive Methods – Deep Litter system – Individual Cage System.	6 hrs
UNIT-II:	Poultry Feeds and feeding: Feeding utensils – Feed additives - Incubation of Eggs: Artificial Incubation – Brooding and Rearing of Chicks – Poultry diseases and their management: Ranikhet (New Castle) disease, Fowl pox, Avian Leucosis, Tick fever, Tuberculosis, Fowl Cholera, Avian leucosis, Infectious coryza - Culling.	6 hrs
UNIT-III:	Nutritive values of eggs and meat: Quality, Preservation and Marketing of poultry products – By-products of Poultry — Economics of Poultry farming - Visit to a nearby Poultry farm for imparting training on various aspects of Poultry farming. Preparation and submission of a report on the visit.	6 hrs
	DAIRY FARMING	
UNIT-IV:	Breeds of dairy: Draught breeds, Dairy breeds, Dual purpose breeds; Indigenous and Exotic breeds; Feeding stuff – Maintenance of rations – Feeding of young stock – Important pests and diseases of dairy cattle.	6 hrs

UNIT-V:	Breeding: Important traits for breeding - Cross breeds – Breeding and Cattle Improvement Programmes in India - Reproduction in cattles: Artificial Insemination - Nutritive values, Quality, Preservation and Marketing of dairy products – By-products of dairy farming. Visit to a nearby Dairy farm for imparting training on various aspects of Dairy farming to the students. Preparation and submission of a report on the visit.	6 hrs
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Course outcome:

Poultry Farming:

The student will be able to

- Identify and selection of breeds of fowl.
- Plan a housing unit for breeding and rearing of fowls.
- Describe feed types and feeding of poultry.
- Analyze the poultry diseases and apply disease management techniques.
- Understand the nutritive value of eggs and meat.
- Apply knowledge obtained from poultry science to become an entrepreneur.

Dairy farming:

The student will be able to

- Identify the breeds of cattle.
- Understand the breeding and cattle improvement programme in India.
- Analyze the pests and diseases of dairy cattle and apply their management methods.
- Understand the byproducts of dairy farming.
- Apply knowledge obtained from dairy farming to become an entrepreneur.

List of Text Books:

1. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R. 2009. Applied Zoology. Saras Publication, Nagercoil.
2. Babu, M. and Lurthu Reetha, T. 2011. A Handbook on Poultry farming. Tamilnadu Veterinary and Animal Sciences University and Nehru Memorial College, Trichy.
3. Tomar, B.S. and Singh, N. 2007. A Text Book of Applied Zoology. Emkay Publications, Delhi.

இரண்டாமாண்டு : நான்காம் பருவம்

பகுதி 1 தமிழ் - தாள் 4

செய்யுள் (பழந்தமிழ் இலக்கியம்) நாடகம், தமிழ் இலக்கிய வரலாறு, கட்டுரை வரைவியல்

பாட நோக்கம் (Course Objectives)

பழந்தமிழரின் வாழ்வியல் அறம், வாழ்வியல் நூட்பங்கள், அக வாழ்வுச் சிந்தனைகளை அறியச்செய்தல்.

தனித் திறன்களை மேம்படுத்திக் கொள்ள உதவுதல்.

கடமை உணர்ச்சி, பெரியோரை மதித்தல் முதலான உயர்பண்புகளை வளர்த்தல்.

தமிழர்தம் இயற்கை வளம், செல்வ வளம், இலக்கிய வளங்களை அறிமுகம் செய்தல்.

நிகழ்கால வாழ்வியல் சிக்கல்களில் தெளிவுபெறச் செய்தல், சமுதாய அக்கறை கொள்ளச்செய்தல்.

பணித்தேர்வுகளுக்கு உதவக்கூடிய தமிழ்ப் பாடப்பகுதியைக் கற்பித்தல்.

அலகு - 1

1. குறுந்தொகை - 10 பாடல்கள்

குறிஞ்சி

1. நிலத்தினும் பெரிதே (பா.எண் -3)
2. வேரல் வேலி (பா.எண் -18)
3. யாயும் ஞாயும் (பா.எண் -40)
4. இடிக்கும் கேளிர் (பா.எண் -58)

நெய்தல்

1. அணிற்பல் அன்ன (பா.எண் -49)
2. ஞாயிறு பட்ட அகல்வாய் (பா.எண் -92)
3. கடும்புனல் தொடுத்த (பா.எண் -103)

மருதம்

1. தச்சன் செய்த சிறுமா (பா.எண் -61)
2. நன்நலம் தொலைய (பா.எண் -100)
3. வேம்பின் பைங்காய் (பா.எண் -205)

2. நற்றிணை – 5 பாடல்கள்

1. நின்ற சொல்லர் ,... (குறிஞ்சி) . (பா.எண் -1)
2. விளம்பழம் கமழும் (பாலை) . (பா.எண் -12)
3. தடமருப்பு எருமை (மருதம்) . (பா.எண் 120)
4. விளையாடு ஆயமொடு (நெய்தல்) . (பா.எண் -172)
5. அம்ம வாழி தோழி (முல்லை) . (பா.எண் -289)

3. கலித்தொகை - 5 பாடல்கள்

1. பாலைக் கலி - வயக்குறு மண்டிலம் (பா.எண் 24)
2. குறிஞ்சிக் கலி - பாடுகம் வா வாழி தோழி (பா.எண் 05)
3. மருதக்கலி - ஈண்டு, நீர்மிசைத் தோன்றி (பா.எண் 24)
4. முல்லைக் கலி - தனி பெறு தண் புலத்துத் (பா.எண் 1)
5. நெய்தற் கலி - மா மலர் முண்டகம் (பா.எண் 16)

4. ஐங்குறுநூறு - 10 பாடல்கள்

வேழப்பத்து

1. மனைநடு வயலை வேழம் (பா.எண் 11)
2. பரியுடை நன்மான் (பா.எண் 13)
3. ஓங்குபூ வேழத்துத் (பா.எண் 16)

4. இருஞ்சாய் அன்ன ... (பா.எண் 18)

5. நெகிழ்பு ஓடும் வளை ... (பா.எண் 20)

அன்னாய் வாழிப் பத்து

1. அன்னாய் வாழி! வேண்டு அன்னை! நம் படப்பை (பா.எண் 203)

2. அன்னாய் வாழி! வேண்டு அன்னை! அஃதெவன்கொல்?.. (பா. 204)

3. அன்னாய் வாழி! வேண்டு அன்னை! எந்தோழி (பா.எண் 206)

4. அன்னாய் வாழி! வேண்டு அன்னை! நன்றும் (பா.எண் 208)

5. அன்னாய் வாழி! வேண்டு அன்னை! கானவர் (பா.எண் 208)

5. புறநானூறு - 5 பாடல்கள்

1. இரும்பனை வெண்தோடு... (பா.எண் 54)

2. உண்டாலம்ம இவ்வுலகம்... (பா.எண் 14)

3. யாண்டு பலவாக ... (பா.எண் 191)

4. யாதும் ஊரே... (பாடல் எண் 192)

5. செய்குவம் கொல்லோ நல்வினை... (பா.எண் 214)

6. பத்துப்பாட்டு - பட்டினப்பாலை முழுவதும்

அலகு - 2

1. திருக்குறள் - 3 அதிகாரங்கள்

1. மடியின்மை

2. இடுக்கண் அழியாமை

3. சொல்வன்மை

2. நாலடியார் - 12 பாடல்கள்

பொறையுடைமை

1. காதலர் சொல்லுங் (பா.எண் 73)
2. அறிவதறிந்தடங்கி (பா.எண் 74)
3. இன்னா செயினும் (பா.எண் 76)
4. தான்கெடினும் தக்கார் . . . (பா.எண் 80)

தீவினையச்சம்

1. அக்கே போல் அங்கை . . . (பா.எண் 123)
2. நெருப்பழல் சேர்ந்தக் கால் . . . (பா.எண் 124)
3. பெரியவர் கேண்மை . . . (பா.எண் 125)
4. யாஅர் ஒருவர் (பா.எண் 127)

பெரியாரைப் பிழையாமை

1. பொறுப்பரென் . . . (பா.எண் 161)
2. அவமதிப்பும் ஆன்ற . . . (பா.எண் 163)
3. நளிகடல் தண்ணேர்ப்ப (பா.எண்166)
4. பெரியார் பெருமை (பா.எண் 170)

3.பழமொழி - 12 பாடல்கள்

அறிவுடைமை

1. அறிவின் மாண்பு (பா.எண் 27)
2. அறிவினர் மாண்பு(பா.எண் 28)
3. அறிவுடையாருடன் அறிவுடையார் சேர்தல் (பா.எண் 30)
4. அறிவிலாரை அறிவுடையார் புகவிடாமை(பா.எண் 31)

இன்னா செய்யாமை

1. முற்பகல் செய்யின் பிற்பகல் விளையும்(பா.எண்- 47)
2. நலியப் பெற்ற எளியர் அழுத கண்ணீர்(பா.எண் 48)
3. மதிப்பு மிக்கவரை அழிக்க முயலுதல்(பா.எண்-49)
4. நலிந்தாரை நலியாமை(பா.எண் 50)

சான்றோர் இயல்பு

1. சான்றோர் பெருமை(பா.எண் 70)
2. வறுமையினும் நின்ற நிலையில் வழுவாமை(பா.எண் 71)
3. பீடிலாவிடத்தும் பெருந்தகைமையில் வழுவாமை(பா.எண் 72)
4. இடருற்ற விடத்தும் மதிப்பிற் குறையாமை(பா.எண் 73)

4.இன்னா நாற்பது – 5 பாடல்கள்

1. அறமனத்தர் கூறும் கடுமொழி (பா.எண் 6)
2. உண்ணாது வைக்கும் பெரும் பொருள் . . . (பா.எண் 16)
3. குலத்துப் பிறந்தவன் கல்லாமை யின்னா . . . (பா.எண் 19)
4. யானையின் மன்னரைக் கண்டால் . . . (பா.எண் 22)
5. பிறன் மனையாள் பின்னோக்கும் பேதைமை யின்னா . . . (பா.எண் 38)

5. இனியவை நாற்பது – 5 பாடல்கள்

1. பிச்சை புக்காயினும் கற்றல் (பா.எண் 1)

2. மானமிழிந்தபின் வாழாமை முன்னினதே . . . (பா.எண் 13)
3. குழவிதளர் நடை காண்டல் இனிதே . . . (பா.எண் 14)
4. வருவா யறிந்து வழங்கல் . . . (பா.எண் 22)
5. பத்து கொடுத்தும் பதியிருந்து (பா.எண் 40)

அலகு : 3

நாடகம் - பிசிராந்தையார் - பாரதிதாசன்

அலகு : 4

கட்டுரை வரைவியல் - பொதுக்கட்டுரைகள்

அலகு : 5

தமிழ் இலக்கிய வரலாறு – சங்க காலம், சங்கம் மருவிய காலம்

கற்றல் விளைவுகள் (Course OutCome)

மாணவர்கள் வாழ்வியல் நுட்பங்களில் வல்லமை பெறுவர்.

சமுதாய அக்கறை உள்ளவர்களாக மனவளம் பெறுவர்.

சமுதாய, பொருளியல், சூழலியல் விழிப்புணர்வு பெறுவர்.

பணித்தேர்வுகளுக்கு உரிய தமிழ்த்திறன் பெறுவர்.

பாடநூல்கள்

1. செய்யுள் திரட்டு, தமிழ்த்துறை வெளியீடு.
2. பிசிராந்தையார் - பாரதிதாசன், தமிழ் நாதன் பதிப்பகம், சென்னை – 110
3. பொதுக்கட்டுரைகள், மகிழினி பதிப்பகம், சென்னை- 106.

4. தமிழ் இலக்கிய வரலாறு,
பிரமி பதிப்பகம், திருச்சி-21.

Course Code & Title	ENGLISH FOR COMMUNICATION IV		
Class	<u>II YEAR</u>	Semester	<u>IV</u>
Cognitive Level	K – 1 Acquire K – 2 Understand K – 3 Apply K – 4 Evaluate K – 5 Analyze		
Course Objectives	The Course aims <ul style="list-style-type: none"> • To make the students to live meaningfully • To Familiarize students with various great personalities • To understand qualities like freedom • To know human values like patriotism and universal brotherhood • To realize the value of comradeship 		
UNIT	Content		No. of Hours
I	A Poison Tree : William Blake King Bruce and the Spider : Eliza Cook The Character of a Happy Life : Henry Wotton		
II	Ulysses : Lord Alfred Tennyson Money Madness : D. H. Lawrence I vow to thee my Country		
III	The Ocean : Lord Byron The Unknown Citizen : W. H. Auden Night of the Scorpion : Nissim Ezekiel		
IV	The Rising of the Moon : Lady Gregory The Little Man : John Galsworthy The Path Finder : Herman Ould		
V	A Tale of two cities : Charles Dickens		
Reference	Lessons will be edited and compiled.		
	On completion of the course, students should be able to		

Course Outcomes	CO 1: live meaningfully. CO 2: know great qualities like leadership. CO 3: understand qualities like freedom and parenthood CO 4: live as a group in unity CO5: realize the value of comradeship
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Mapping of COs with PSOs & POs:

CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	6
CO1	S	M	M	M	M	S	M	S	M	M	M
CO2	S	M	S	M	M	M	S	S	M	M	S
CO3	S	M	M	M	M	S	M	S	M	M	M
CO4	S	M	S	M	M	M	S	S	M	M	S
CO5	S	M	M	M	M	S	M	S	M	M	M

- Strongly Correlating(S) - 3 marks
 Moderately Correlating (M) - 2 marks
 Weakly Correlating (W) - 1 mark
 No Correlation (N) - 0 mark

Part III		
SEMESTER – IV	CORE COURSE – VII	COURSE CODE:
Instruction Hours: 5 hrs/week		Internal: 25
Credits: 5		External: 75

CC-VII: ANIMAL PHYSIOLOGY

Course objectives:

- To provide a basic approach about the structure and function of bio molecules.
- To understand the enzymatic activity and analyze the metabolic processes in cells.
- To know the structure and function of the major organ system, including the molecular, biochemical and cellular mechanisms for maintaining homeostasis.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I:	Biomolecule: Introduction and importance of biomolecules. Major nutrients: Carbohydrates - classification; Amino acids – Classification and function; Proteins - Classification of Protein – Protein Structure and function; Lipids –classification.	14 hrs
UNIT-II:	Minor nutrients: Vitamins - Fat soluble vitamins – Water soluble vitamins; Vitamin deficiency syndrome. Minerals - classification and their importance. Enzymes: Nomenclature and classification – Isoenzymes; Mechanism of Enzyme Action - Factors Influencing enzyme Activity.	16 hrs
UNIT-III	Feeding and Digestion: Feeding Mechanisms - Digestion and Absorption of Carbohydrates, Lipids and Proteins; Metabolism: Carbohydrate - Glycogenesis, Glycogenolysis and Glycolysis and Krebs's Cycle; Protein - Transamination, Deamination and Urea Cycle; Lipid - Biosynthesis and β oxidation of palmitic acid.	15 hrs
UNIT-IV:	Respiration: Structure of mammalian lung - mechanism of respiration- Respiratory pigments- Transport of gases in blood. Circulation: Composition, properties and functions of blood. Structure of mammalian heart, Origin and conduction of the cardiac impulse, Cardiac cycle and ECG. Excretion: Nitrogenous waste products -ammonia, urea and uric acid - biosynthesis of urea in man. Structure and function of mammalian kidney and nephron - mechanism of urine formation.	16 hrs
UNIT-V:	Nervous System: Structure and types of nerve cells – Conduction of nerve impulse – synaptic transmission - The special senses: optic and auditory. Muscular system: Structure and types of muscles – Chemical composition of muscles and mechanism of muscle contraction. Mammalian reproduction: Structure of reproductive organs and reproductive cycle.	14 hrs

Course outcome:

The students will be able to

- Understand the importance of Bio molecules.
- Familiar with various biochemical pathways.
- Analyze structural-functional relationships of proteins.
- Understand the structure and function of various systems.
- Apply the knowledge to lead a healthy life.

List of Text Books:

1. Agarwal, R.A., A.K. Srivastava and K.Kumar. 2005. Animal Physiology and Biochemistry. S.Chandand Company Ltd. New Delhi.

- Berry A.K. 1998. A text book of animal physiology. Embay publications, Delhi.
- Mariakuttikan and N.Arumugam, 2002. Animal Physiology. Saras Publication, Nagarcoil.
- Rastogi, S.L., 1997. Essential of Animal Physiology. New Age International Publisher, New Delhi.
- Sambasivaiah, Kamalakararao and Augustine Chellappa 1990. A Text book of Animal Physiology and Ecology, S. Chand & Co., Ltd., New Delhi.
- Verma, P.S. and V.K. Agarwal.1992. Animal Physiology. S. Chand and Co. New Delhi.

List of Reference Books

- Parameswaran, Anantkrishnan and Ananta Subramaniam, 1975. Outlines of Animal Physiology, S. Viswanathan Pvt. Ltd., Chennai.
- William S. Hoar, 1976. General and Comparative Physiology, Prentice Hall of India Pvt. Ltd., New Delhi.
- Wood, D.W., 1983. Principles of Animal Physiology 3rd Ed., Edward Arnold, London, UK.
- Prosser, C.L. Brown 1985. Comparative Animal Physiology, Satish Book Enterprise, Agra.

Part III		
SEMESTERS –IV	CORE COURSE – VIII	COURSE CODE:
Instruction Hours: 3 hrs/week		Internal: 40
Credits: 2		External: 60

CC-VIII: PRACTICAL-IV: ANIMAL PHYSIOLOGY

Course objective:

- To impart training on the physiological and biochemical techniques.
- To learn clinical procedures for blood analysis.

Major Practical:

- Qualitative tests for Carbohydrate, Protein and Lipids.
- Enumeration of total RBC.
- Enumeration of WBC.
- Human salivary amylase activity under optimum condition.
- Quantitative estimation of Protein – Colorimetric method
- Analysis of Blood samples by using Biochemistry Analyser (Demonstration only)

Minor Practical:

- Estimation of Haemoglobin by Sahli's method
- Identification and enumeration of different types WBCs.
- Identification of Nitrogenous waste products.

Spotters:

- Sphygmomanometer.
- Amino acids – model.
- Haemoglobin – model.
- ATP molecule – model.
- Spectrophotometer.
- Haemoglobinometer.

Record Submission:

Course outcome:

The student will be able to

- Demonstrate basic principles in physiology.
- Develop skill in simple biochemical laboratory procedures.
- Analyze blood samples.

Part IV (Open to students of all Programme)		
SEMESTER – IV	NON – MAJOR ELECTIVE COURSE – I	COURSE CODE:
Instruction Hours: 2 hrs/week		Internal: 25
Credits: 2		External: 75

NMEC-I: Entrepreneurial Zoology

Course Objectives:

- To impart training on various farming techniques and revenue generation potentials.
- To encourage the trained students to become self-employers/ entrepreneurs in the farming technique of his/ her choice after graduation.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I:	Aquaculture: Construction of fish farm - Techniques of culture - cultivable fishes - Nursery ponds – Stocking ponds - Rearing ponds. Induced Spawning methods. Harvesting and post-harvesting: Harvesting – precautions, sorting and grading the catch. Fish spoilage, fish preservation; Nutritive value of fishes - Fish products and by-products.	6 hrs
UNIT-II:	Poultry Farming: Breeds of fowls – Exotic breeds – Indigenous breeds. Rearing techniques: Incubation of eggs - Brooding – Housing of poultry – Semi-intensive, Intensive, Deep litter and Individual Cage system. Poultry feeding and disease management. Nutritive values of egg and meat. Economics of Poultry farming.	6 hrs
UNIT-III:	Dairy Farming: Breeds of cattle – Draught breeds, dairy breeds, dual purpose breeds – Exotic and Indigenous breeds - Cross breeds. Reproduction in Cattles: Artificial Insemination - Nutritive values of milk - Value added milk products. Revenue generation potentials of Dairy farming.	6 hrs
UNIT-IV:	Sericulture: Mulberry Silkworm: Commercial races of India; Rearing Facilities: Rearing house - Rearing appliances - Appliances used for feeding - Bed cleaning - disinfection and maintaining optimum culture conditions; Rearing methods: Chawki rearing of young age worms in India - paraffin paper rearing. Storage of cocoons - Cocoon Marketing.	6 hrs

	Revenue generation potentials of Sericulture.	
UNIT-V:	Apiculture: Wild Bees – Species of Honey Bees. Colony Organization. Bee Keeping Equipments: Newton’s Bee Hive and Other Bee Keeping Equipment. Bee Hive Products: Honey - Chemical composition of honey. Nutritional and Medicinal values of Honey - Wax – Bee Venom – Propolis – Royal Jelly; Pollination: Advantages of Bee Pollination in Crops.	6 hrs

Course outcome:

The student will be able to

- Identify various methodology and perspectives of applied branches of zoology for the possibilities of self-employment.

Aquaculture:

- Plan a set-up of fish farm.
- Describe basic culture methodologies, common problems and solutions of commercially important fishes.

Poultry Farming:

- Explain the breeds of fowls and selection of breed.
- Plan a housing unit for breeding and rearing of fowls.
- Describe feed types and feeding of poultry.
- Analyze the poultry diseases and apply disease management techniques.

Dairy farming:

- Explain the breeds of cattle.
- Understand the breeding and cattle improvement.

Apiculture:

- Understand the colony organization of honey bees.
- Describe the beekeeping equipment and method of honey harvesting.
- Understand the nutritional and medicinal values of honey.

Sericulture:

- Enlighten the rearing methods of silk.
- Explain the storage of cocoon and cocoon marketing.
- Apply the knowledge to become an entrepreneur.

List of Text Books:

1. Shanmugam, K. 1992. Fishery Biology and Aquaculture. Leo Pathipagam, Madras.
2. Srivastava, C.B.L. 1992. A text book of Fishery Science and Indian Fisheries. Kitab Mahal, Allahabad.
3. Santhanam, R., N. Sugumaran and P. Natarajan. 1987. A manual of Fresh water aquaculture. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

4. Tomar, B.S. and Singh, N. 2007. A Text Book of Applied Zoology. Emkay Publications, Delhi.
5. Shukla, G.S. and Upadhyay, V.B. 1997. Economic Zoology. Rastogi Publications, Meerut.
6. Ahsan, J. and Sinha, S.P. 2003. A Hand book on Economic Zoology. S.Chand & Company Ltd., New Delhi.
7. Babu, M. and Lurthu Reetha, T. 2011. A Handbook on Poultry farming. Tamilnadu Veterinary and Animal Sciences University and Nehru Memorial College, Tiruchirappalli.
8. Ganga, G. and Sulochana Chetty, J. 2003. An Introduction to Sericulture (2nd Edition). Oxford and IBH Publishing co. Pvt-Ltd., New Delhi.
9. Taxima, Y. 1972. Hand Book of Silkworm Rearing. Fuji Publication, Tokyo.
10. Ullal, S.R. and Narasimhanna, M.N. 1979. Hand book of Practical Sericulture. Central Silk Board, Bombay.

Part III		
SEMESTER – V	CORE COURSE-IX	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

CC-IX: DEVELOPMENTAL BIOLOGY

Course Objectives:

- To understand the processes of early embryonic development.
- To analyze the mechanisms of development by experimental manipulation of developing embryos.
- To review current developments in the field of embryology.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I:	Introduction of developmental biology. Structure of Male and female gonads. Gametogenesis - spermatogenesis and oogenesis. Comparative study of vertebrate sperms and eggs. Ovulation in Mammals – Hormonal control of Ovulation.	18 hrs
UNIT-II:	Fertilization: Mechanism, physiology and theories. Parthenogenesis: Natural and artificial parthenogenesis – Significance of parthenogenesis. Cleavage: Types, plans and patterns. Blastulation: Blastula – process in frog and chick; fate map. Gastrulation: Gastrula – process in frog and chick.	18 hrs
UNIT-III:	Organogenesis: Development of eye and heart in from and chick. Metamorphosis: Definition and role of hormones in metamorphosis. Teratogenesis: Definition, causes and precaution and treatment. Placenta: Types and their functions. Organizer: Property, structure and induction.	18 hrs

UNIT-IV:	Regeneration in animals: Types, Factors influencing regeneration. Asexual reproduction: Fragmentation, fission, budding, gemmule formation and cells involved in Asexual reproduction. Stem cell: Source, types and importance in human welfare.	18 hrs
UNIT-V:	Birth control: Necessity, contraceptive devices. Impotency: Causes of Impotency and sterility in male and female. Assisted Reproductive Technology (ART): Artificial Insemination in humans - In Vitro Fertilization (IVF) and Gamete-Intra-Fallopian Transfer (GIFT). Advantages and Disadvantages. Ethical issues.	18 hrs

Course Outcome:

The Student will be able to

- Explain the structure and function of gonads, and understand the process of spermatogenesis and oogenesis.
- Explain the mechanism of fertilization and familiar with various stages involved in the developing embryo.
- Understand the initial developmental procedures involved in frog and chick.
- Relates the process of regeneration and asexual reproduction.
- Understand various contraceptive methods and familiar with applications of Assisted Reproductive Technology.

List of Text Books:

1. Arumugam, N. 2005. A text book of Embryology. Saras Publication. Nagercoil
2. Berry, A.K. 2003. An Introduction to Embryology. Emkay Publications, Delhi.

List of Reference Books:

1. Balinsky, B.I. 1981. An Introduction to Embryology. W.B. Saunders Company. Philadelphia.
2. Rastogi, V.B and Jayaraj, M.S. 2002. Developmental Biology (Embryology). Kedar Nath & Ram Nath, Meerut.
3. Twymann, R.M. 2003. Developmental Biology. Viva Books Private Ltd., New Delhi.
4. Verma, P.S., and Agarwal, V.K. 2007. Chordate Embryology. S. Chand & Company Ltd., New Delhi.

Part III		
SEMESTER – V	CORE COURSE – X	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

CC-X: ENVIRONMENTAL BIOLOGY

Course Objectives:

- To provide fundamental ecological principles for in-depth understanding of our natural world.
- To understand the scientific basis for working environmental systems, environmental issues, environmental problems, effects and solutions.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I:	Abiotic factors: Atmosphere (air), Hydrosphere (Water), Lithosphere (Soil), Temperature and light. Effects of light and temperature on animals.	15 hrs
UNIT-II:	Biotic factors: Animal relationship: Symbiosis – Commensalisms – Mutualism – Antagonism – Antibiosis – Parasitism – Predation – Competition. Ecosystem: Concept and Components. Pond ecosystem – Primary production – Secondary production – Food chain – Food web. Trophic levels – Energy flow – Pyramid of biomass – Pyramid of energy. Biogeochemical cycle – Carbon, Nitrogen and phosphorus cycles.	20 hrs
UNIT-III:	Community Ecology: Types of Communities; Characteristics of Community – Stratification - Community interdependence - Ecotone - Edge effect; Ecological Niche – Ecological succession. Habitat ecology - Characteristics features and adaptations of Rocky, Sandy and Muddy shore Fauna.	19 hrs
UNIT-IV:	Population Ecology: Definition, Density estimation, Natality, Mortality, Age distribution, Age pyramids. Population growth, Population equilibrium, Biotic potential and Regulation	18 hrs
UNIT-V:	Pollution Ecology: Pollution: Types and Sources: Air – Water – Land – Noise – Thermal – Pesticide – Radioactive elements. Effect of Green house. Ozone, Global warming, Acid rain. Bio accumulation – Bio magnification, depletion. EIA Principles of environmental impact assessment and environmental monitoring.	18 hrs

Course outcome:

The student will be able to

- Understand on the basic theories and principles of ecology and learn current environmental issues based on ecological principles.
- Explain the effects of light and temperature on animals.
- Explain and identify the role of the organism in energy transfers.
- Create general awareness on pollution and their impacts.
- Gain critical understanding on human influence on environment.

List of Text Books:

1. Arumugam, N.1992. Concepts of ecology. Saras publications, Nagarkoil.
2. Verma P.S. and V.K. Agarwal, 2007. Environmental Biology. S. Chand and Co., New Delhi.

- Verma, P.S and V.K. Agarwal. 2007. Cell biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Company Ltd. New Delhi.

List of Reference Books:

- Claude, F., Christiane, F., Paul, M. and Jean, D. 1998. Ecology Science and Practice. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
- Odum E.P.1971. Fundamentals of ecology. W.B. Saunders Co., Philadelphia.
- Rastogi, V.B. and M.S. Jayaraj. 1997. Animal ecology and distribution of animals. Kedarnath & Ramnath, Meerut.

Part III		
SEMESTER – V	CORE COURSE – XI	COURSE CODE:
Instruction Hours: 5 hrs/week		Internal: 25
Credits: 4		External: 75

CC XI: IMMUNONOLGY

Course objectives:

- To study the function of immune system, structure and function of immunoglobulin.
- To provide students understanding development of antibodies responses to a vaccine antigen and the immunological techniques.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I:	Types of immunity: Innate and Acquired Immunity; Central and Peripheral lymphoid organs; Cells of lymphoid and myeloid lineage.	15 hrs
UNIT-II:	Immunobiology: Antigens and Immunogenicity. Immunoglobulins - structure and function, antigen-antibody reaction. Detection and application of antigen-antibody reactions. Complement System and Monoclonal Antibodies.	16 hrs
UNIT-III:	Hypersensitivity: Immunologic Tolerance and Autoimmunity – Immunopotential and Immunosuppression; Immunodeficiency Diseases.	14 hrs
UNIT-IV:	Microbial infection and Immunity: General Account of Pathogenic Bacteria – (Pneumonia, Diphtheria, Tuberculosis) Fungi (Madura foot, Athlete’s foot, Candidiasis) and Protozoa (Malaria, Amoebic dysentery, Trypanosomiasis). Viral diseases and treatment. Injury and inflammation; immune responses to bacterial (tuberculosis) parasitic (malaria) and viral (Chikungunya) infections.	16 hrs
UNIT-V:	Immunological Techniques: Double Immuno-diffusion, Immunoelectrophoresis, RIA, ELISA and Immuno-blotting.	14 hrs

Course Outcome:

The students will be able to

- Understand the importance of Immune system
- Explain the structure and function of lymphoid organs and types of immunity.
- Distinguish innate immunity and Acquired Immunity.
- Familiarize with antigen – antibody reactions.
- Analyze and apply hypersensitivity reactions and immunological techniques.

List of Text Books:

1. Annadurai, B. 2009. A Textbook of Immunology and Immunotechnology. S.Chand & Company Ltd., New Delhi.
2. Fatima, D. and Arumugam, N. 2001. Immunology. Saras Publications, Nagercoil, India.
3. Kannan, I. 2007. Immunology. MJP Publishers, Chennai.
4. Mani, A., Narayanan, L.M., Fatima, D., Selvaraj, A.M and Arumugam, N. 2005. Immunology and Microbiology. Saras Publications, Nagercoil, India.

List of Reference Books

1. Kannan, I. 2007. Immunology. MJP Publishers, Chennai.
2. Rao, C.V. 2006. Immunology. Narosa Publishing House, New Delhi.
3. Shastri, N.V. 2005. Principles of Immunology. Himalaya Publishing House, Delhi.
4. Shetty, N. 2006. Immunology. New Age International (P) Limited, Publishers. New Delhi.

Part III		
SEMESTER – V	CORE COURSE – XII	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 40
Credits: 5		External: 60

CC-XII: PRACTICAL-V: DEVELOPMENTAL BIOLOGY, ENVIRONMENTAL BIOLOGY AND IMMUNOLOGY

Course objective:

- Developmental Biology provides understanding of the processes of early embryonic development and developing embryos.
- Environmental biology provides fundamental ecological principles that provide in-depth understanding of our natural world, the scientific basis for understanding how environmental systems work.
- To impart training on the immunological techniques.

DEVELOPMENTAL BIOLOGY:

1. Mounting of bull semen.
2. Temporary mounting of chick blastodisc.

Spotters:

1. Sections of testis and ovary showing the maturation stages of gametes.
2. Slides of mammalian Sperm and Ovum.
3. Study of Egg types – Frog’s egg and Hen’s egg.
4. Slides of cleavage stages, blastula, gastrula and neurula of frog.
5. Slides of different stages of chick embryo. 18 Hours (primitive streak stage), 24 Hours, 48 Hours, 72 hours and 96 Hours.

6. Placenta of sheep, Pig and Man.

ECOLOGY:

1. Estimation of pH in water samples.
2. Estimation of dissolved Oxygen content in water samples.
3. Estimation of Salinity in water samples.
4. Estimation of dissolved Carbon dioxide in water samples.
5. Estimation of Carbonate and Bicarbonate in water samples.
6. Plankton mounting and identification from water samples.
7. Study of natural ecosystem and field report of the visit.

Spotters

1. Intertidal fauna: Rocky, Sandy, Muddy shores – any 4 examples in each type
2. Animal association: Commensalisms, mutualism and Parasitism.

IMMUNOLOGY:

1. Lymphoid organs of the rat (Demonstration).
2. Double Immuno-diffusion (Demonstration).

Spotters: Study of prepared slides.

- 1) Thymus
- 2) Spleen
- 3) Bone marrow
- 4) Lymph node.

Record Submission

Course outcome:

The student will be able to

- Familiarize with the embryo development.
- Develop observational, analytical and evaluation skills related to environmental biology.
- Familiarize with immunological techniques.

Part III		
SEMESTER – V	MAJOR BASED ELECTIVE COURSE –1 a	COURSE CODE:
Instruction Hours: 5 hrs/week		Internal: 25
Credits: 5		External: 75

MEC-1A: BIOSTATISTICS AND BIOINSTRUMENTATION

Course objectives

- The objective of Biostatistics is to emphasis basic idea about the Biostatistics and its application.
- The Bioinstrumentation course is to emphasis the principle and biological applications of Microscope, chromatograph, electrophoresis and spectroscope.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I	BIOSTATISTICS <u>(50% of questions for Section B and Section C should be asked)</u>	15 hrs

	<u>with problems)</u>	
	<p>Collection of Data: Methods of primary data collection-Census Methods and Sampling Methods - Random and Non-random Sampling.</p> <p>Classification of Data and Frequency Distribution: Data Types of based on source. Differences between Classification and Tabulation, Necessity of Classification of Data, Objectives of Classification, Class Intervals– Frequency Distribution.</p>	
UNIT-II	<p>Graphical Representation of Data: Bar Diagram, Pie Chart and Pictogram; Graphs Histogram, Frequency polygon and Frequency curve. Measures of Central Tendencies: Mean, Median and Mode.</p>	15 hrs
Unit-III	<p>Measures of Dispersion: Range, Variance, Standard Deviation and Standard Error; Coefficient of variation; Correlation: Karl Pearson's Correlation coefficient – Spearman's Rank Correlation; Student's t Test; Hypothesis Test; Chi-Square Test.</p>	15 hrs
	BIOINSTRUMENTATION	
Unit-IV	<p>Microscopy: Components of a microscope – Types of Microscope: Simple Microscope, Phase contrast microscope and Electron microscopy. Balances: Analytical balances; Centrifuge: Basic Principles of Sedimentation – Types of Rotors – Types of Centrifuges. pH meter: Principle, Components and applications.</p>	15
Unit-V	<p>Colorimetry: Principle - Beer and Lambert's Law – Colorimeter and its applications; Chromatography: Principle and applications of chromatography - Paper chromatography. Electrophoresis: Principle and applications of electrophoresis.</p>	15

Course outcome:

The student will be able to

- Understand the importance of classification and tabulation of data.
- Analyze and apply the sampling methods.
- Test the hypotheses using *chi-square* test and 't' test.
- Explain the principles and applications of bio instruments
- Get an idea on equipments available for studying biochemical and biophysical nature of life.

List of Text Books:

1. Bajpai, P.K. 2006. Biological Instrumentation and Methodology. S. Chand & Company Ltd., New Delhi.
2. Gurumani, N. 2005. An Introduction to Biostatistics 2nd Edition, MJP Publishers, Chennai.
3. Ramakrishnan, P. 1995. Biostatistics. Saras Publications, Nagercoil.

4. Sharma, A.K 2005. Text book of Biostatistics, Discovery publishers House, New Delhi.
5. Veerakumari, L. 2006. Bioinstrumentation, MJP Publishers, Chennai.

List of Reference Books:

1. Arora P.N and Malhan P.K., 2007. Biostatistics – Himalaya publishers House, Mumbai.
2. Bajpai, P.K. 2010 (Revised Edition). Biological Instrumentation and Methodology. S.Chand & Company Ltd., New Delhi.
3. Marcello Pagano Kimberlee Gauvreau. 2000. Principles of Biostatistics, 2nd edition. CRC Press (Tailor & Francis Group), USA.
4. Myra Samuels, Jeffrey A. Witmer and Schaffner, A.A. Myra L., 2012. Statistics for the Life Sciences. Prentice Hall, New York.
5. Palanichamy, S. and Manoharan, M. 1991. Statistical Methods for Biologists, Palani Paramount Publications. Palani.
6. Palanichamy, S. and Shunmugavelu, M. 1993. Principles of Biochemistry and Biotechniques. Palani Paramount Publications, Palani.
7. Skoog, A., Douglas, J. and Leary, J.J. 1992. Principles of Instrumental Analysis. Sanders Golden Sunberst Series, Philadelphia.

Part III		
SEMESTER – V	Major Based Elective Course – I b	COURSE CODE:
Instruction Hours: 5 hrs/week		Internal: 25
Credits: 5		External: 75

MEC-I b: MICROBIOLOGY

Course objectives:

- To teach the students with the latest information about microbiology.
- To provide advanced knowledge, understanding, and critical judgment appropriate for the medical profession in microbiology.
- Learn about morphology, culture characteristics, pathogenesis, laboratory diagnosis, treatment, prevention and control measures of each type of bacteria.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I	Structure of Microbial cells. Microorganisms and Viruses: Prions –	13 hrs

	Viroids – Rickettsias – Mycoplasmas – Bacteria – Cyanobacteria – Protozoa – Algae – Fungi and Slime Moulds.	
UNIT-II	Viruses: Symmetry – Transmission – composition – serology and replication of viruses. Laboratory study of viruses. Plant and Human Viruses.	17 hrs
UNIT-III	Bacteria: Morphological Features - Colony Characters –Physiological and Genetic Characters. Numerical Taxonomy: Major Groups of bacteria. Nutrition and growth of Bacteria: Sources of nutrients – Entry of nutrient into the cell – Factors affecting microbial growth. Metabolism of bacteria; Bacterial respiration – Bacterial fermentation.	16 hrs
UNIT-IV	Microorganisms in the Environment: Soil Microorganisms– Microorganisms in aquatic habitats – Microorganisms in sewage – Methane production. Microorganisms and pollution. Microorganisms in Industry and food. Fermentation processes – Products of Industrial Fermentations.	15 hrs
UNIT-V	Pathogenesis, laboratory diagnosis and treatment of disease causing Bacteria, Virus and Fungus (any five for each).	14 hrs

Course Outcome:

The students will be able to

- Recognize the scope of Microbiology.
- Distinguish the structure and replication of animal, and plant virus.
- Explain the nutrition for bacterial growth and the factors affecting the growth.
- Produce fermented products using bacteria and yeast.
- Identify disease causing pathogenic microbes.

List of text Books:

1. Ananthanarayanan, R. and Jayaraman Paniker, C.K. 1990. Text Book of Microbiology. Orient Longman.
2. Dubey, R.C. and Maheswari, D.K.1999. Text Book of Microbiology. S. Chand and Company New Delhi.
3. Narayanan, L.M., Selvaraj, A.M and N. Arumugam. 1999. Microbiology (General and applied). Saras Publication, Nagercoil
4. Rao, A.S. 2001. Introduction to Microbiology. Prentice Hall of India Private Limited, New Delhi.

Reference Book:

1. Malacinski, M.G. 2006. Essentials of Microbiology (Fourth edition). Narosa Publishing House, New Delhi.
2. Pelczar, M.J., Chan, E.S., Kreig, N.R. 1993. Microbiology (Fifth edition). Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Purohit, S.S. 2005. Microbiology Fundamentals and applications (Sixth Edition). Student edition, Jodhpur.
4. Raman Rao, P.V. 2005. Essentials of Microbiology. CBS Publishers and Distributors, New Delhi.

Part IV (Open to students of all programmes)		
SEMESTER – V	NON-MAJOR ELECTIVE COURSE-II	COURSE CODE:
Instruction Hours: 2 hrs/week		Internal: 25
Credits: 2		External: 75

NMEC –II: PUBLIC HEALTH AND HYGIENE

Course objectives:

- To impart awareness on personal and public health hygiene.
- To create knowledge on health education.

UNIT	CONTENTS	TEACHING HOURS
UNIT-I	The Home as Health Centre: Guarding your Family's Health - Germs from various sources – Health factors in the home - Comfort and protection – Proper Light – Cleanliness and orderliness. Personal hygiene. Mental Health	6 hrs
UNIT-II	Nutrition and Health: Macro and micronutrients – Nutrient contents of principal foods – Balanced diet – Controlling body weight.	6 hrs
UNIT-III	Food toxicants and food additives. Malnutrition and its effects. Community nutrition programmes.	6 hrs
UNIT-IV	Maternal and child Health. Expectant motherhood. Signs of pregnancy and maternal hygiene.	6 hrs
UNIT-V	Congenital malformations. Antenatal and Postnatal care - feeding infants - Factors responsible for infant mortality and keeping baby well. Family Planning methods.	6 hrs

Course outcome:

The students will be able to

- Understand home as a health centre.
- Analyze the importance of micro and macronutrients and their sources.
- Explain the importance of balance diet.
- Identify food toxicants and food additives.
- Comprehend the maternal health care, antenatal care and congenital malformation.

Text Book:

1. Park, K. 2017. Park's Textbook of Preventive and Social Medicine (18th Edition). M/s. Banarsidas Bhanot Publishers, Jabalpur, India.

List of Reference Books:

1. Anderson, R.C. 1976. Your Guide to Health (Fifth Edition). Oriental Longman Publishing House, Poona, India.
2. Anonymous. 1996. Know your Body. A Reader's Digest Guide. RDI Print and Publishing Pvt., Ltd., Mumbai.
3. Bauer, W.W. (Editor) 1965. Today's Health Guide. American Medical Association. USA.
4. Shryock, H. 1979. Modern Medical Guide. Pacifica Press publishing Association, California, USA.

Part III		
SEMESTER – VI	CORE COURSE - XIII	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

CC-XIII: GENETICS AND EVOLUTION

Course objectives:

- To give a basic overview of genes, mutations, sex determination and patterns of inheritance.
- To teach inheritance and expression of human blood groups and inheritance of genetic disorders.
- To understand the evolution of life.

UNIT	CONTENT	TEACHING HOUR
GENETICS		
UNIT-I	Inheritance: Mendel's principles and applications. Linkage and crossing over –chromosome theory of linkage, kinds of linkage, linkage groups, types of crossing over, mechanism of meiotic crossing over, kinds of crossing over, theories about the mechanism of crossing over, cytological detection of crossing over, significance of crossing over. Multiple Alleles – ABO blood group in Man – Human Rh Blood Group system.	19 hrs
UNIT-II	Sex Determination: Sex Determination in animals – Chromosomal theory of sex determination – gynandromorphism – Environmental determination of sex – hormonal theory of sex determination. Population Genetics: Gene Frequency – Gene Pool – Hardy-Weinberg Law – Hardy-Weinberg Equilibrium.	17 hrs
UNIT-III	Chromosomal variation: Euploidy, Non-disjunction and Aneuploidy. Chromosomal deletions and duplications; inversions and translocations. Gene mutations. Mutagens. Genetic diseases (gout, hypercholesterolemia, cystic fibrosis, phenylketonuria, haemophilia, and muscular dystrophy), syndromes (Down, Klinefelter, and Turner). Amniocentesis and Euphenics. Eugenics – Positive Eugenics –	18 hrs

	Negative Eugenics – Genetic Counselling.	
EVOLUTION		
UNIT-IV	Significance of Evolutionary Biology - Direct Evidences of Evolution: Embryological evidences; Theories of origin of life, Abiogenesis, Biogenesis, Cosmozoic, special creation theory, organic evolution theory. Theories of Organic Evolution: Theory of inheritance of acquired characters (Lamarckism): Examples of Lamarckism, Neo-Lamarckism; Theory of natural selection (Darwinism) – Neo-Darwinism.	19 hrs
UNIT-V	Mimicry and animal colouration; Speciation and Species concept; Isolating mechanisms. Evolution of horse and Evolution of man.	17 hrs

Course outcome:

The student will be able to

- Describe the genetic variation through linkage and crossing over, chromosomal aberrations and sex determination.
- Analyze the genetic defects and inborn errors of metabolism.
- Explain the molecular structure of genetic materials and the mechanism of gene expression and regulation character formation.
- Enable the students to understand the evolution of universe and life.
- Understand the process and theories in evolutionary biology.
- Develop an interest in the debates and discussion taking place in the field of evolutionary biology.
- Explain the theories of evolution and highlighted the role of evidences in support of evolution.

Genetics

List of Text Books:

1. Meyyan, R.P. 2009. Genetics. Saras Publications, Nagercoil.
2. Rastogi, V.B. 1990. A Text Book of Genetics. Kedar Nath & Ram Nath, Meerut.

List of Reference Books:

1. Gupta, P.K. 2003. Genetics. Rastogi Publication, Meerut.
2. Sarin, C. 2006. Genetics. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Singh, B.D. 2006. Fundamentals of Genetics. Kalyani Publishers. Lucknow.
4. Strickberger, M.W. 2002 Genetics (3rd edition). Prentice Hall of India, New Delhi.
5. Verma, P.S and Agarwal, V.K. 2002. Genetics. S. Chand & Company Ltd., New Delhi.

Evolution:

List of Text Books:

1. Arumugam, N.1998. Essentials of evolution. Saras publications, Nagarkoil.
2. Arumugam, N. 1989. Organic Evolution –. Saras publication, Nagercoil.

- Verma, P.S and V.K. Agarwal. 2007. Cell biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand and Company Ltd. New Delhi.

List of Reference Books:

- Dobzhansky, T. 1984. Genetics and Origin of species. Columbia Univ. Press. Columbia.
- Dobzhansky, T., Ayala, F.J., Stebbins, G.L. and J.M.Valentine 1998. Evolution, Surjeet Publications, New Delhi.
- Jha, A.P. 1997. Genes and Evolution. Macmillan India Limited, New Delhi.

Part III		
SEMESTER – VI	CORE COURSE - XIV	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

CC-XIV: BIOTECHNOLOGY AND BIOINFORMATICS

Course Objectives:

- To enlighten our students on various aspects of biotechnology.
- To create knowledge on gene cloning techniques and production of beneficial products.
- To enlighten our students on introduction of bioinformatics and bioinformatics tools.

UNIT	CONTENT	TEACHING HOUR
	BIOTECHNOLOGY	
UNIT-I	Biotechnology – Definition, scope and applications of Biotechnology. Genetic Engineering: Molecular tools and gene cloning vectors (pBR 322 Plasmid, Ti plasmid, pSV plasmid and simian virus 40); Preparation of desired DNA; <i>In vitro</i> construction of rDNA; Transfer of rDNA into host cells - Transformation, Transfection, electroporation and shot gun method; Selection (Screening) of Recombinants - Immunochemical Method and Colony Hybridization.	18 hrs
UNIT-II	Genetic Engineering for Human Welfare: Insulin, Somatotropin (HGH), Human Interferons, Edible Vaccines their applications. Transgenic animals: Cattle, Poultry and Fishes. Animal Biotechnology: Requirements for Animal Cell Culture – Types, Maintenance and Storage of Cell Lines - Cryopreservation - Storage in Liquid Nitrogen.	18 hrs
UNIT-III	Molecular markers and their applications: Restriction Fragment Length Polymorphism (RFLP), Random Amplified Polymorphic DNA (RAPD) and Minisatellites or Variable Number of Tandem Repeats (VNTRs). Amplification of DNA (PCR) – Applications of PCR Technology. DNA sequencing methods: Sanger’s method DNA Finger printing – Applications of DNA finger printing	18 hrs

BIOINFORMATICS		
UNIT-IV	Bioinformatics: Definition, importance and applications of Bioinformatics. Biological Databases: Sequence databases:– Nucleic acid sequence databases: NCBI, DDBJ and EMBL; Structure of Nucleotide sequence databases: GenBank format – RNA databases. Protein sequence databases: SWISS-PROT, TrEMBL, PIR, UniProt; Structure of Protein Sequence Databases: SWISS-PROT format. Protein structural databases: PDB, SCOP, CATH.	18 hrs
UNIT-V	Bioinformatics Tools: BLAST, FASTA, Clustal W, PFAM, SCANPS, RasMol and PHYLIP; Sequence Alignment: Optimal, Global and Local alignments. Pair wise Sequence Alignment: Dot Matrix. Multiple Sequence Alignment: Definition, Uses of Multiple sequence Alignment. Phylogenetic analysis using bioinformatics tool.	18 hrs

Course outcome:

Biotechnology:

The student will be able to

- Understand the modern biotechnology practices and approaches with an emphasis in technology application.
- Apply the knowledge on gene cloning techniques and production of beneficial products

Bioinformatics:

The student will be able to

- Apply the knowledge to collect biological data from various Biological data.
- Familiar with various Applications of Bioinformatics tools.
- Analyze and apply the bioinformatics tools.

Biotechnology:

List of Text Books:

1. Arora, P.M.2003. Biotechnology. I Edition. Himalaya Publishing House, Mumbai.
2. Dubey, R.C. 2007. A Text book of Biotechnology. S.Chand and Company Ltd, New Delhi.
3. Ignacimuthu, S.J.2002. Basic Biotechnology. Tata Mc Graw – Hill Publishing Company, Ltd., New Delhi.
4. Kumerasan, V. 2009. Biotechnology (Revised Edition), Saras Publications, Nagercoil.

List of Reference Books:

1. Das, H.K. 2005. Text book of Biotechnology (Second edition). Wiley Dreamtech, India (P) Ltd., New Delhi.
2. Gupta, P.K.2001. Elements of Biotechnology and Genomics (I Edition) Rastogi Publications, Meerut.
3. Gupta, P.K.2004. Biotechnology and Genomics (1st Edition) Rastogi Publications, Meerut.
4. Lohar, P.S. 2005. Biotechnology. MJP Publishers, Chennai.

Bioinformatics

List of Text Books:

1. Lesk, A.M. 2007. Introduction to Bioinformatics (Second edition). Oxford University press, New Delhi.
2. Murthy, C.S.V. 2004. Bioinformatics. Himalaya Publishing House. New Delhi.
3. Smith H, J, Smith & William. 1988. Introduction to the Principles of Drug Design, 2nd ed, Wright, London.
4. Sundaralingam, R. and V.Kumaresan. 2008. Bioinformatics. Saras Publication. Nagercoil.
5. Sundararajan, S and Balaji, R. 2003. Introduction to Bioinformatics. Himalaya Publishing House, New Delhi.

List of Reference Books:

1. Attwood, T.K and Parry-Smith, D.J. 2001. Introduction to Bioinformatics. Pearson Education, New Delhi.
2. Bal, H.P. 2007. Bioinformatics: Principle and applications. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Gladis HelenHepsyba, S. and Hemalatha, C.R. 2009. Basic Bioinformatics, MJP Publishers, Chennai.
4. Krane, D.E and Raymer, M.L. 2006. Fundamental Concepts of Bioinformatics. Pearson Education, USA.
5. Lohar, P.S. 2009. Bioinformatics, MJP Publishers, Chennai.
6. Westhead, D.R., Parish, J.H and Twyman, R.M. 2003. Bioinformatics. Viva Books Private Ltd., New Delhi.

Part III		
SEMESTER – VI	CORE COURSE - XV	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 40
Credits: 5		External: 60

CC-XV: PRACTICAL-VI: GENETICS; EVOLUTION; BIOTECHNOLOGY AND BIOINFORMATICS

Course objectives:

To impart training on the techniques of genetics and biotechnology.

To give practice on the identification of adaptive modification in beak and feet of birds with evolutionary significance.

To train the students about biotechnology techniques and use of bioinformatics tools.

GENETICS

1. Observations on *Drosophila* - Sexes, Wild and Mutant.
2. Pedigree analysis – Human.

3. Survey of Mendelian traits in Man; Variations in finger prints.
4. ABO blood grouping and Rh typing.
5. Study on Normal Karyotype - male and female.
6. Chromosomal Disorder : Down syndrome, Turner and Klinefelter syndrome

EVOLUTION

1. Adaptive modification of the feet of birds.
2. Adaptive modification of the beak of birds.
3. Analogy and homology.

Spotters

1. Animals of evolutionary significance: Peripatus and Archaeopteryx.
2. Homologous organs: Fore limb modification in vertebrates.
3. Analogous organs: Wing modifications.
4. Colouration: Chameleon, Lycodon and Krait.
5. Mimicry: Monarch and Viceroy Butterfly.
6. Fossils: Nautilus and Ammonite.

BIOTECHNOLOGY

1. Quantitative estimation of DNA
2. Quantitative estimation of RNA

Demonstrations

1. Animal and Plant Tissue culture facilities including Inverted Microscope and CO₂ Incubator.
2. Ethanol production by using Fermenter.

Spotters

1. Plasmid.
2. Gene map– PBR322 vector.
3. Electrophoresis.
4. Inverted Microscope.

BIOINFORMATICS

1. Sequence retrieval from NCBI, EMBL, and DDBJ.
2. Sequence similarity analysis - BLAST,
3. Multiple sequence alignment - Clustal W
4. Phylogenetic analysis.

Spotters

1. Dendrogram
2. Cladogram

RECORD SUBMISSION

Visit to biotechnology Lab and biological importance places.

Submission of Educational Tour Report.

Course outcome:

The student will able to

- Distinguish different chromosomal aberrations in man.
- Ability to identify blood group.
- Familiarize knowledge of conventional biotechnological procedures.
- Familiar with various Applications of Bioinformatics tools.
- Analyze and apply the bioinformatics tools.

Part III		
SEMESTER – VI	Major Based Elective Course – II a	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

MEC-II a: AQUACULTURE AND FISH FARMING

Course Objectives:

- To train the students to maintain the water quality management in aquaculture.
- To impact the students to understand the culture practices of edible and ornamental fishes in aquaculture.
- To prepare the students to know about opening of commercially viable business opportunities in the field of aquaculture.

UNIT	CONTENT	TEACHING HOUR
UNIT-I	Water quality Management: Definition, Different types of water bodies -freshwater, brackish water and marine water. Water quality management in fish culture - O ₂ , CO ₂ , Salinity, pH, BOD, Plankton, Nitrogen, Potassium, Phosphorus, Temperature and Turbidity.	18 hrs
UNIT-II	Fish farming: Methods, design, Selection of site, Rearing and Culture of edible fishes- cultivable edible fishes. Culture of some important species: Culture of Indian major carps - Culture of common carps. Harvesting - precautions observed during harvesting - Fish spoilage, fish preservation. Nutritive value of fishes.	18 hrs
UNIT-III	Types of fish pond- nursery pond, rearing pond and culture pond. Spawning: Fin fish culture- collection of seeds- bundh breeding, induced breeding, culture practices. Edible oyster culture- collection of seeds-induced breeding, culture practices.	18 hrs
UNIT-IV	Ornamental fish culture: Common Species of ornamental fishes suitable for Aquarium - Varieties of Gold Fishes - Introduction of fishes in an Aquarium tank; Feeding: Appetite and feed intake, Maintenance. Breeding: Breeding of ornamental fishes - Selection and Conditioning of Fishes for Breeding - Water quality for breeding tanks - Egg scatters.	18 hrs
UNIT-V	Fish Diseases: Protozoan, Bacterial, viral and fungal diseases, Treatment, Preventive measures. Fish Vaccines, Safety and Potency of Fish Vaccines. Government organizations in Aquaculture: ICAR, CMFRI CIFRI, MPEDA, CIBA.	18 hrs

Course outcome:

Students will be able to

- Describe water quality management techniques.
- Explain how to set-up and maintain aquarium systems.
- Ability to setup the pond layout, construction and preparation, hatchery and nursery operations.
- Describe basic culture methodologies, common problems and solutions of commercially important species.
- Identify the pathogens, diseases and their treatments in fishes.
- Employ scientific techniques, practical skills and business management strategies to improve aquatic resource management.

Text book:

1. Arumugam.N. 2008. Aquaculture, Saras Publications, Kanyakumari.
2. Khanna, D.R. and Yadav. P.R. 2011. Biology of Fishes. Discovery publishing home, New Delhi.

References book;

1. Alexandra Adams. 2016. Fish vaccine. Springer Publications.
2. Rath, RK. 2000. Freshwater Aquaculture. Scientific Publishers, Jodhpur. India
3. Jhingran, AVG. 1991. Fish and Fisheries of India, Hindustan Publishing Co. Baradach,
4. JE, JH Ryther and WO McLarney, 1972, Aquaculture. The farming and Husbandary of Fresh water and Marine Organisms. Wiley Inter science, New York.

Part III		
SEMESTER – VI	MAJOR BASED ELECTIVE COURSE – II b	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

MEC-II b: ENDOCRINOLOGY

Course Objectives:

- To obtain sound knowledge in endocrine glands and their structure.
- To obtain sound knowledge in hormonal and their effects on the human body.
- The student will have been introduced to the significant endocrine pathologies to educate others on disease prevention where applicable.

UNIT	CONTENT	TEACHING HOUR
UNIT-I	Endocrine system: Introduction - Hormones- definition, concept of secretion, classification, biosynthesis and circulation in blood. Characteristic features of hormone- Mechanism of hormone action-cell signalling and Hormone Receptor - Endocrine glands.	18hrs

UNIT-II	Pituitary Gland: Structure of pituitary gland -Growth Hormone, Thyrotropin, Adrenocorticotrophic hormone, prolactin, luteotrophic hormone, gonadotropic hormone, Follicle Stimulating hormone and luteinizing hormone.	18hrs
UNIT-III	Thyroid gland: Structure and function. Thyroid hormones - Thyroid disease. Antithyroid agents. Parathyroid hormone - Parathyroid function and dysfunction.	18hrs
UNIT-IV	Islets of Langerhans: Structure; Insulin-Mechanism of action. Glucagon, somatostatin and pancreatic polypeptide. Hormonal function and dysfunction.	18hrs
UNIT-V	Adrenal gland: Structure - Glucocorticoids, Mineralocorticoids – Catecholamines - Abnormal secretion of adrenal hormones.	18hrs

Course outcome:

- Explain the endocrine secretion and their mechanism of action.
- Describe the structure and hormones of pituitary gland, and their function.
- Differentiate and explain the structure, function, dysfunction of thyroid, and parathyroid hormones.
- Explain the structure and function of pancreatic, and adrenal gland secretions.
- Relate the major endocrine hormones and their disorders.

List of Text Books

1. Radheshyam, R and Nirmal Kumar Pandey. 2013. Text book of endocrinology. Campus Books International, New Delhi.
2. Prakash, S and Lohar.2005. Endocrinology. MJP Publication, Chennai.

List of Reference Books:

1. Wilson and Foster. 1998. Textbook of Endocrinology –8th edn. D.W., Saunders, Philadelphia
2. Smith and Emil. 1982. Principles of Biochemistry – Mammalian Biochemistry – McGraw Hill, Chennai.
3. Estelle Jones, 2015. Mechanisms of Hormone Action. Foster Academics, Auckland.
4. Robert, K. Murray., Daryl K. Granner., Peter A. Mayes and Victor W. Rodwell. 2003. Harper's Illustrated Biochemistry –. 26th ed. McGraw Hill, Chennai.
5. Henry M. Kronenberg, Shlomo Melmed, Kenneth, S. Polonsky and Reed Larsen, P. 2005. Williams Textbook of Endocrinology. Elsevier - Health Sciences Division. USA.

Part III		
SEMESTER – VI	MAJOR BASED ELECTIVE COURSE – III a	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

MEC-III a: ECONOMIC ENTOMOLOGY

Course objectives:

- To provide the concepts of beneficial insects; predators and parasitoids, pollinators, scavengers, weed feeders, insects of medicinal and aesthetic value.
- To enable the students know about principles and practices of biological control.

UNIT	CONTENT	TEACHING HOUR
UNIT-I	Beneficial insect: Pollinators, predators, soil builders, parasitoids and scavengers. Sericulture - biology and culture of silkworm. Apiculture - biology and culture of honey bee. Lac culture – biology and culture of Lac insect.	18 hrs
UNIT-II	Insects and Diseases: Biology of insect vectors and control of Housefly, Mosquito, Flea and Sandfly. Mode of transmission and epidemiology of relapsing fever, plague, malaria, dengue, encephalitis and filariasis. Pest of domestic animals.	18 hrs
UNIT-III	Insect Pest: Classification - biology, damage caused and control methods of pest of paddy, groundnut, sugarcane, cotton and wheat. Pests of stored products. Primary and Secondary and Minor pests, Secondary pest outbreak. Pest resurgence.	18 hrs
UNIT-IV	Principles of insect control: Prophylactic measures – cultural, mechanical, physical and chemical methods. Pesticides – classification, types of formulation, mode of action, toxicity. Insecticide resistance and Environmental safety. Biological control – Parasites, Predators, Microbial agents and Botanicals. Non conventional methods – IGR, Repellents, Antifeedents, Pheromones, Chemosterilants, Irradiation, Genetic and Quarantine.	18 hrs
UNIT-V	Integrated Pest Management (IPM): Definition and Integration of methods. Potential components need for IPM and its application. Insect plant interactions. Pest – Predator Complex an Ecological balance. Pest resistant crops – Transgenic crops.	18 hrs

Course outcome:

The student will be able to

- Describe classification, biology and control of insect vector and control.
- List the types of pesticides, modes of actions, and efficacy.
- Identify the insect pests of crops, vegetables, fruits, stored grains and household pests.
- Enhance the productivity of agricultural crops through insect pest management.
- Explain the IPM

List of Text Books:

1. Ambrose, D. P. 2004. General Entomology. Kalyan Publishers, West Bengal.
2. Metcalf, C. V and Flint, W. P. 1979. Destructive and Useful Insects: Their Habitats and Control. Tata Mc Graw Hill Publications, New Delhi, India.
3. Vasantharaj David, B. 2001. Elements of Economic Entomology. Popular Book Depot, Chennai, India.
4. Vasantharaj David, B. and T. Kumaraswamy. 2002. Elements of Economic Entomology. Popular Book Depot, Chennai, India.

List of Reference Books:

1. Ananthakrishnan T. N. 2002. Insect Plant Interactions. Oxford and IBH, New Delhi.
2. Chapman, R. F. 1988. The Insects Structure and function. Cambridge University Press, U.K
3. Rathinasamy, T. K. 1986. Medical Entomology. S Viswanathan and Co., Madras, India.

Part III		
SEMESTER – V	MAJOR BASED ELECTIVE COURSE – III b	COURSE CODE:
Instruction Hours: 6 hrs/week		Internal: 25
Credits: 5		External: 75

MEC-III b: WILDLIFE BIOLOGY

Course objectives:

- To make the pupil aware about importance of natural resources and wildlife.
- To understand basic biological principles and appreciate the interdependence of the natural world.
- To understand the scientific method and its application in wildlife biology.

UNIT	CONTENT	TEACHING HOUR
UNIT-I	Wildlife: Definition, importance, causes for depletion, methods of conservation of forests. Rare, threatened, vulnerable, Endangered and Extinct animals: Salient features of Indian wildlife protection act (1972). Role of NGOs in wildlife conservation: IUCN, WWF, BNHS.	18 hrs

UNIT-II	Wildlife management: Concepts, principles and Planning. Wildlife Management plans. Evaluation of Wildlife habitat: Reconnaissance type technique – vegetative analyses techniques.	18 hrs
UNIT-III	Sanctuaries, National parks and Zoos: Aim and management of Sanctuaries, National parks and Zoos. Brief account of Mudumalai sanctuary, Point Calimere, and Gir sanctuary - Kealodo National Parks, Kaziranga National parks and, Gulf of Mannar Marine National parks. Project Tiger - Tiger reserves.	18 hrs
UNIT-IV	Study of Tracks and Signs of Wildlife. Determination of age and Sex in birds (Gallinaceous and water birds) and mammals (Small and Large mammals).	18 hrs
UNIT-V	Population Estimation: Direct count (Total counts, Drive counts, Transect methods): Indirect counts (call count, track count, pellet count, pugmark, camera trap) – Mark-recapture method.	18 hrs

Course outcome:

The student will be able to

- Explain the depletion of wildlife and its importance.
- Discuss the rare and endangered wildlife.
- Explain the wildlife protection Act (1972)
- Explain the national parks and sanctuaries.
- Describe the age and sex determination in birds.

List of Text Books:

1. Dasmann, R.F. 1964. Wildlife Biology, John Wiley and Sons New York.
2. Giles, R.H.Jr. (Ed.). 1984. Wildlife Management Techniques 3rd edition. The Wildlife Society, Washington. D.C. Nataraj Publishers, Dehra Dun. India.
3. Saharia, V.B. 1982. Wildlife of India, Nataraj Publishers, Dehra Dun.

List of Reference Books:

1. Robinson, W.L. and Eric, G. Bolen, 1984. Wildlife Ecology and Management. Max Millan Publishing Co, New York.
2. Rodgers, W.A. 1991. Techniques for Wildlife census in India – A field Manual: Technical Manual – TM – 2. WII, Dehra Dun.
3. Teague, R.D. (Ed.). 1987. A manual of wildlife conservation. D.D. Nataraj Publishers, Dehra Dun.

Part IV		
SEMESTER – VI	SKILL BASED COURSE III	COURSE CODE:
Instruction Hours: Self study		External: 100
Credits: 2		

SKBC-III: SERICULTURE

UNIT-I: Silk producing organisms: Non-mulberry Silk worm, Tasar silk worm, Muga silk worm and Eri silkworm – Uses of silk -

UNIT-II: The Mulberry Silk worm - *Bombyx mori*: Commercial races of India; **Rearing Facilities:** Rearing house - Rearing appliances - Appliances used for feeding - Bed cleaning - disinfection and maintaining optimum culture conditions.

UNIT-III: Rearing methods: Chawki rearing of young age worms in India - paraffin paper rearing - box rearing - new net method - co-operative rearing - Storage of cocoons - Cocoon Marketing.

UNIT IV: The Central Silk Board (CSB): Functions of CSB – Magnitude of Silk production in the world–Sericulture in India.

UNIT V; Moriculture: Optimum conditions for mulberry growth; Methods of propagation: Vegetative propagation - Irrigation, manuring, pruning, harvesting and storing of mulberry leaves.

Course outcome:

The student will be able to

- Compare the non-mulberry and mulberry silk worms.
- Understand the rearing methods of silk.
- Explain the storage of cocoon and cocoon marketing.