

SRI SARADA COLLEGE FOR WOMEN

(AUTONOMOUS)

Reaccredited with 'A' Grade by NAAC

Affiliated to Periyar University

Fairlands, Salem - 636016



DEPARTMENT OF ZOOLOGY

**B.Sc. ZOOLOGY
SYLLABUS**

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16
DEPARTMENT OF ZOOLOGY
COURSE STRUCTURE UNDER CBCS

(For the students admitted from 2019-20 onwards)

Total Credits: 140 + 15*

SEMESTER – I					
Part	Course	Course Title	Hours per Week	Credit	Paper Code
I	Language paper – I	Tamil / Hindi / Sanskrit paper- I	6	3	20ULTC1 20ULHC1 20ULSC1
II	Language paper – II	English paper –I	6	3	20ULEC1
III	Core – I	Invertebrata– I	4	3	20UZOC1
III	Core – II	Invertebrata–II	3	3	20UZOC2
	Core Practical – I	Core Practical – I (Invertebrata& Chordata)	3	-	20UZOQC1
III	Allied – I	Allied Chemistry –I	3	3	20UZOAC1
III	Allied – Practical	Allied Chemistry – Practical	2	-	20UZOAQC1
IV	Skill based subject - I	Skill based subject - I – Vermiculture	2	2	20UZOSC1
IV	Extension Activity	Group Project Based on Extension Activity	1	1	20UEXAC
V	<ul style="list-style-type: none"> • Articulation and idea fixation skills – 6 hours per semester (out of college hours) • Life skill promotion – 2 hours per semester (out of college hours – 1 credit extra) • Physical fitness practice 35 hours (out of college hours – 1 credit extra) 				
		Total	30	18 +2*	
SEMESTER –II					
I	Language paper – I	Tamil / Hindi / Sanskrit paper- II	6	3	20ULTC2 20ULHC2 20ULSC2
II	Language paper – II	English paper –II	6	3	20ULEC2
III	Core – III	Chordata	6	6	20UZOC3

III	Core Practical – I	Core Practical – I (Invertebrata & Chordata)	3	3	20UZOQC1
III	Allied – I	Allied Chemistry –II	3	3	20UZOAC2
III	Allied – Practical	Allied Chemistry – Practical	2	2+2	20UZOAC1
IV	Skill based subject – II	Skill based subject - II – Apiculture	2	2	20UZOSC2
IV	Environmental Studies	Environmental Studies	2	1	20UEVSC
IV	Environmental Studies	Group Project Based on Environmental Studies		1	20UEVSPC
V	<ul style="list-style-type: none"> • Articulation and idea fixation skills – 6 hours per semester (out of college hours – 1 credit extra) • Life skill promotion – 2 hours per semester (out of college hours – 1 credit extra) • Physical fitness practice 35 hours (out of college hours – 1 credit extra) • Certificate course – 25 hours (out of college hours – 1 credit extra) 				
		Total	30	26+4 *	
SEMESTER –III					
I	Language paper – I	Tamil / Hindi / Sanskrit paper- III	6	3	19ULTC3 19ULHC3 19ULSC3
II	Language paper – II	English paper –III	6	3	19ULEC3
III	Core – IV	Cell Biology	6	5	19UZOC4
III	Core Practical – II	Core Practical – II (Cell Biology & Genetics)	3	-	19UZOQC2
III	Allied – II	Allied Botany –I	3	3	19UZOAC3
III	Allied – Practical	Allied Botany – Practical	2	-	19UZOAC2
IV	Skill based subject – III	Skill based subject – III – Aquaculture	2	2	19UZOSC3
IV	Non- Major Elective I	Communicable diseases and	2	2	19UZONE1

		Management			
V	<ul style="list-style-type: none"> • Articulation and idea fixation skills – 6 hours per semester (out of college hours) • Life skill promotion – 2 hours per semester (out of college hours – 1 credit extra) • Physical fitness practice 35 hours (out of college hours – 1 credit extra) 				
		Total	30	18+2*	
SEMESTER -IV					
I	Language paper- IV	Tamil / Hindi / Sanskrit paper- IV	6	3	19ULTC4 19ULHC4 19ULSC4
II	Language paper- II	English paper -IV	6	3	19ULEC4
III	Core – V	Genetics	3	3	19UZOC5
III	Major Elective - I	Economic Entomology and Pest Management / Bioinformatics	3	2	19UZOEC1 19UZOESC1
III	Core Practical- II	Core Practical – II (Cell Biology & Genetics)	3	3	19UZOQC2
III	Allied	Allied Botany – II	3	3	19UZOAC4
IV	Allied Practical	Allied Botany Practical	2	2+2	19UZOAQC2
IV	Skill based Subject - IV	Skill based subject - IV – Clinical Laboratory Techniques (Practical)	2	2	19UZOSCQ
IV	Non- Major Elective II	Ornamental Fish Culture	2	2	19UZONE2
V	<ul style="list-style-type: none"> • Articulation and idea fixation skills – 6 hours per semester (out of college hours – 1 credit extra) • Life skill promotion – 2 hours per semester (out of college hours – 1 credit extra) • Physical fitness practice 35 hours (out of college hours – 1 credit extra) 				
		Total	30	25+3*	

SEMESTER -V					
III	Core Course - V	Developmental Biology	6	6	18UZ0C5
III	Core Course - VI	Ecology and Evolution	6	6	18UZ0C6
III	Core Course - VII	Biostatistics and Computer Application in Biology	5	5	18UZ0C7
III	Core Course (Practical)	Core Practical - III (Developmental Biology, Ecology and Evolution, Biostatistics and Computer Application in Biology)	3	*	18UZOQC3
III	Core Course (Practical)	Core Practical - IV (Animal Physiology, Microbiology and Immunology and Biochemistry)	3	*	18UZOQC4
III	Major Elective - II	Sericulture / Human Nutrition	5	5	18UZOEC2
IV	Non Major Skill Based - I	Public Health and Hygiene	2	2	18UZONSC1
IV	Value Education	Value Education	1	1	18UVENC
V	<ul style="list-style-type: none"> • <i>Life skill promotion – 2 hours per semester (out of college hours – 1 credit extra)</i> • <i>Physical fitness practice – 35 hours per semester (out of college hours – 1 credit extra)</i> • <i>Certificate course – 25 hours (out of college hours – 1 credit extra)</i> 				
	Total			31	25+3[#]
SEMESTER -VI					
III	Core Course - VIII	Core – VIII - Animal Physiology	18UZ0C8	6	6
III	Core Course -IX	Core – IX – Microbiology and Immunology	18UZ0C9	5	5
III	Core Course – X	Core – X – Biochemistry	18UZ0C10	5	5
III	Core Course (Practical)	Core Practical- III	18UZOQC3	3	3
III	Core Course (Practical)	Core Practical- IV	18UZOQC4	3	3
III	Major Elective - III	Biotechnology / Fundamentals of Toxicology	18UZOEC3	5	5
IV	Non Major Skill Based - II	Applied Zoology	18UZONSC2	2	2
IV	Value Education	Value Education	18UVENC	1	1

V	<ul style="list-style-type: none"> • <i>Life skill promotion – 2 hours per semester (out of college hours – 1 credit extra)</i> • <i>Physical fitness practice – 35 hours per semester (out of college hours – 1 credit extra)</i> 		
	Total	30	30+2#
	Grant Total	142+	18#

- ***Free and Open Source Software (FOSS) – 2 Hours per Semester (out of College hours)***
- ****Examination at the end of the year***
- ***# Extra credits***

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – I
(For the candidates admitted from the academic year
2019 – 2020 onwards Under CBCS pattern)
CORE - I- INVERTEBRATA- I (20UZOC1)

Hours/Week: 4

Course Credit: 3

Course Objective

1. Describe general taxonomic rules General characters, classification up to class level with examples and phylogenetic affinities of the invertebrate Phyla is included in the syllabus
2. Classify Protozoa and Porifera using examples from parasitic adaptation
3. Describe the Phylum Coelenterata and Ctenophora using examples and to study their economic importance
4. Classify Phylum Platyhelminthes and Aschelminthes using examples and to study their parasitic adaptations.
5. Describe the phylum annelid to Echinodermata and to discuss the significance of the phylum.

UNIT I

(12Hours)

Principles of taxonomy- classification of animal kingdom

Phylum: Protozoa: General Characters - Outline Classification upto class level with examples (*Entamoeba histolytica, Trypanosoma, Plasmodium*).

Type study: *Paramecium*

General Topic: 1. Nutrition in protozoa.

2. Locomotion in Protozoa

UNIT II

(12 Hours)

Phylum Porifera: General Characters - Outline Classification upto class level with examples (*Euplectella, Chalina, Spongilla*).

Type study: *Leucosolenia*

General Topic: 1. Canal system in sponges.

2. Skeleton in Sponges.

UNIT III

(12 Hours)

Phylum Coelenterata: General Characters - Outline Classification upto class level with examples (*Sea anemone, Hydra and Aurelia*).

Type study: *Obelia*

General Topic: 1. Polymorphism in Hydrozoa

2. Corals and Coral reefs

Phylum Ctenophora: General Characters - Outline Classification upto class level examples.

Type study: *Pleurobrachia*

General Topic: Affinities and Systematic position of Ctenophora

UNIT IV

(12 Hours)

Phylum Platyhelminthes: General Characters and Outline Classification upto class level with examples (*Planaria, Liver fluke, Schistostoma*).

Type study: *Taniasolium*

General Topic: 1. Parasitic adaptations of Platyhelminthes

2. Platyhelminth Parasites of Man and Domestic animals.

UNIT – V

(12 Hours)

Phylum Aschelminthes: General Characters and Outline Classification upto class level with examples (*Enterobius vermicularis*, *Ancylostoma duodenale*, *Wuchereria bancrofti*, *Dracunculus medinensis*)

Type study: *Ascaris*.

General Topic: 1. Parasitic adaptations of Nematodes.

2. Economic importance of Aschelminthes.

TEXT BOOK

1. Ayyar, E.K and T.N Ananthakrishnan, (1996). A Manual of Zoology, Volume I - Invertebrata, Part I and II. Viswanathan S. (Printers and publishers) Pvt. Ltd., Madras

REFERENCE BOOKS

1. Agarwal, V.K. (2000). Invertebrate Zoology, S. Chand Company.
2. Barnes. R.D. (1987). Invertebrate Zoology, W.B. Saunders College Publications.
3. Barrington, E.J, (1981). Invertebrate structure and function ELBS Editions.
4. Jordan. E.J. and Verma. P.S. (1995). Invertebrate Zoology, S.Chand and Company Ltd, New Delhi - 110 055.
5. Kotpal. R.L. (1992). Invertebrates, Rastogi Publications, Meerut - 250002
6. Tomar B.S and Bhatnagar, M.C (2002). Simplified Invertebrate Zoology. Jai Praksh Nath Publications, Garh Nauchand crossing, Garh Road, Meerut- 250 002 (U.P)
7. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
8. Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
C01	To remember the outline classification of invertebrates	K1
C02	To understand the structure and interrelationship between Invertebrate animals.	K2
C03	To deploy the each phylum with an example	K3
C04	To discuss the general topics of each phylum	K4
C05	To study the phylum and its economic importance	K1
C06	To understand the importance of the invertebrates	K2

K1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
C01	S	M	L	M	S	S	S	S	M	L	L	M
C02	S	L	S	L	M	S	S	S	S	M	S	M
C03	S	L	M	S	M	S	S	S	S	M	L	L
C04	S	M	L	L	M	S	S	S	S	M	L	L
C05	S	M	L	M	S	S	S	S	S	M	L	M
C06	S	M	L	M	M	S	S	S	S	L	L	M

S – Strong
M – Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – II
(For the candidates admitted from the academic year 2019 – 2020
onwards Under CBCS pattern)
CORE - II - INVERTEBRATA- II (20UZOC2)

Hours/Week: 3

Course Credit: 3

Course Objective

1. Describe general taxonomic rules General characters, classification up to class level with examples and phylogenetic affinities of the invertebrate Phyla is included in the syllabus
2. Classify Protozoa and Porifera using examples from parasitic adaptation
3. Describe the Phylum Colenterata and Ctenophora using examples and to study their economic importance
4. Classify Phylum Platyhelminthes and Aschelminthes using examples and to study their parasitic adaptations.
5. Describe the phylum annelid to Echninodermata and to discuss the significance of the phylum.

UNIT – I

(9 Hours)

Phylum Annelida: General Characters - Outline Classification upto class level with examples (Aphrodite, Amphirite, Arenicola).

Type study: Neries

General Topic: 1. Adaptive radiation in Polychaetes.

2. Feeding in Polychaetes.

UNIT II

(9 Hours)

Phylum Arthropoda: General Characters - Outline Classification upto class level with examples (Milliped, Scorpion, Limulus).

Type study: Cockroach

General Topic: Mouthparts of Insects

UNIT – III

(9 Hours)

Phylum Mollusca: General Characters - Outline Classification upto class level with examples (Dentallium, Octopus, Sebia).

Type study: *Pila globosa*

General Topic: 1. Torsion in Gastropods

2. Foot in Mollusca

UNIT IV

Phylum Echinodermata: General Characters - Outline Classification upto class level with examples

Type study: Star fish.

General Topic: Echinoderm Larvae and their significance.

UNIT V

(9 Hours)

Phylum Hemichordata: General Characters - Outline Classification upto class level with examples (Saccoglossus, Rhabdopleura, Cephalodiscus).

Type study: Balanoglossus

General Topic: Affinities of Hemichordates.

TEXT BOOK

1. Ayyar, E.K and T.N Ananthakrishnan, 1996. A Manual of zoology, Volume I ,Invertebrata), Part I and II. Viswanathan S. (Printers and publishers) Pvt.Ltd ., Madras.

REFERENCE BOOKS

1. Agarwal, V.K. (2000) Invertebrate zoology, S. Chand Company.
2. Barnes. R.D. (1987). Invertebrate Zoology, W.B. Saunders College Publications.
3. Barrington, E.J, (1981) Invertebrate structure and function ELBS Editions.
4. Jordan. E.J. and Verma. P.S. (1995). Invertebrate Zoology, S.Chand and Company Ltd, New Delhi - 110 055.
5. Kotpal. R.L. (1992). Invertebrates, Rastogi Publications, Meerut - 250002
6. Prasad. S.N.1976. Text book of invertebrate Zoology Kitalmahal, Allahabad.
7. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
8. Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the outline classification of invertebrates	K1
CO2	To understand the structure and interrelationship between Invertebrate animals.	K2
CO3	To deploy the each phylum with an example	K3
CO4	To discuss the general topics of each phylum	K4
CO5	To study the phylum and its economic importance	K1
CO6	To discuss the interrelationship between different Phyla.	K4

K1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	S	S	S	S	M	L	L	M
CO2	S	L		L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	S	M	L	L
CO4	S	M	L	L	M	S	S	S	S	M	L	L
CO5	S	M	L	M	S	S	S	S	S	M	L	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S - Strong
M - Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – II
(For the candidates admitted from the academic year 2019 – 2020
onwards Under CBCS pattern)
CORE PRACTICAL I (INVERTEBRATA& CHORDATA)-I (20UZOQC1)

Hours/Week: 3

Course Credit: 3

Course objectives:

- To get experience in anatomy through simple dissections
- To familiarize organ system
- To identify the various preserved specimen

I. DISSECTIONS

- a. Earthworm : Nervous system
 - b. Prawn : Nervous system
 - c. Cockroach : Digestive, Nervous and Reproductive systems.
 - d. Fish : Digestive System.
- Virtual dissections only.

II. MOUNTINGS

- (a). Earthworm : Body setae
- (b). Cockroach : Salivary glands
- (d) Mouth parts of :
 - i. Cockroach
 - ii. Mosquito
 - iii. Housefly
 - iv. Honeybee
- (e) Teleost fish : Ctenoid scales.
- (f) Teleost fish : Brain (Dorsal view and Ventral view.)

III. SPOTTERS

Examination of prepared slides and Museum specimens included in the type study under Phylum Invertebrata and Chordata

SPOTTERS LIST

I Classify Giving Reasons

1. Simple sponge
2. Sea anemone
3. Liverfluke
4. Ascaris
5. Amphioxus
6. Doliolum
7. Pigeon

II Draw labelled Sketches

8. Paramecium - Entire
9. Obelia – Medusa
10. Bipinnaria larva
11. Frog – Pectoral girdle
12. Frog – Pelvic girdle
13. T.S of Ascaris
14. T.S of Amphioxus through pharynx.

II Write Descriptive Notes on

15. Obeliacolony
16. *Taeniasolium*
17. Sepia
18. Echeneis
19. Chaetopterus
20. Draco
21. Owl
22. Manis

IV Comment on Biological significance

23. Sponge - Gemmule
24. Physalia
25. Peripatus
26. Hippocampus
27. Narcine
28. Axolotl Larva
29. Bat

V Relate structure and function

30. Sponge – Spicules
 31. Taenia – Scolex
 32. Nereis – Parapodium
 33. Starfish – Pedicellaria
 34. Chelone – carapace
 35. Pigeon- Quill feather
- IV. Certified and Bonafide practical record should be submitted at the time of practical examination.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To identify the Invertebrates and Chordates	K1
CO2	To recognise the taxonomy of Invertebrates and Chordates.	K2
CO3	To gain knowledge about biodiversity of organisms.	K3
CO4	To interpret the significance of specific structure and function.	K4
CO5	To implement the biological significance of Invertebrates and Chordates.	K1
CO6	To evaluate the conservation awareness of the biosphere.	K3

K1 Recall, K-2 Understand, K-3 Apply, K-4

Analyse Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	H	S	S	S	M	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	S	M	L	L
CO4	S	M	L	L	M	S	S	S	S	M	L	L
CO5	S	M	L	M	S	S	S	S	S	M	L	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S – Strong
M – Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – I
(For the candidates admitted from the academic year 2019 – 2020
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SKILL BASED SUBJECT - I – VERMICULTURE – SYLLABUS (20UZOSC1)

Hours/Week: 2

Course Credit: 2

OBJECTIVE:

- To understand the different species of earthworm
- To analyze the importance and application of earthworm in Agricultural field.
- To acquire knowledge on culture methods
- To apply knowledge on Solid waste management
- To Enhances the skill based knowledge on the field to be an entrepreneur.

UNIT – I

(6 Hours)

Earthworm:Taxonomic position and diversity–Morphological and Anatomical characteristics – Biology of composting earthworms *Eudriluseugeniae* and *Perionyx excavates*.

UNIT – II

(6 Hours)

Ecological grouping :epigeic, endogeic and anecicsspecies. Ecological roles and economic importance of earthworms – need for earthworm culture–environmental requirements – wormery.

UNIT – III

(6 Hours)

Breeding techniques : Indoor and outdoor cultures – monoculture and polyculture –Windrow method – Factors affecting Vermicomposting. Soil organic matter – organic matter decomposition – humus formation.

UNIT – IV

(6 Hours)

Nutrient value:Vermiwash and vermicompost –Therapeutic values of earthworm- effect of vermicompost on plants-earthworms for solid wastes management

UNIT – V

(6 Hours)

Applications of vermiculture: Use of vermicompostings in agricultural / horticultural practices - Economics of vermiculture – NABARD – Nationalised Banks supports for vermiculture.

TEXT BOOK

1. Mary Violet Christy A. (2008) Vermitechnology, MJP Publishers. 47,Nallathambi St, Triplicane, Chennai – 600 005.

REFERENCE BOOKS

1. Gupta, P.K. (2006). Vermicomposting for sustainable agriculture. Agrobios (India), Agro House, Behind Nasrani Cinema, Chopasani Road, Jodhpur – 342 002.
2. Ranganathan, L.S. (2006). Vermibiotechnology from soil Health to human health, Agrobios (India), Agro House, Behind Nasrani Cinema, Chopasani Road, Jodhpur – 342 002.
3. Talashilkar, S.C. and Dosani, A.A.K. (2005). Earthworms in Agriculture. Agrobios(India), Agro House, Behind Nasrani Cinema, Chopasani Road, Jodhpur – 342 002.
4. Sultan Mohamed hmed Ismail (2005). The Earthworm Book, Second Revised Edition. Mother India Press, Goa, India.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To acquire basic knowledge on Earthworm species	K1
CO2	To Understand / To Comprehend / To get Idea of Vermitechnology.	K2
CO3	To acquire knowledge on the steps involved in Vermiculture techniques and Vermicomposting	K3
CO4	To create awareness on applications of Vermiculture	K4
CO5	To analyse the nutrient value of worm cast and vermicompost	K5
CO6	To adopt eco friendly method of solid waste management and Able to become a self – employee	K6

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs

PO/ PSO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	M	M	S	S	S	S	M	L	L	M
CO2	M	S	M	M	M	S	S	S	S	M	S	M
CO3	L	S	S	M	M	M	S	S	S	M	L	L
CO4	L	S	L	S	S	M	S	S	S	M	L	L
CO5	L	M	L	S	S	S	S	S	S	M	L	M
CO6	L	M	L	S	S	S	S	S	S	L	L	M

S - Strong
M - Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – II
(For the candidates admitted from the academic year 2019 – 2020
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CORE - III – CHORDATA – SYLLABUS (20UZOC3)

Hours/Week: 6

Course Credit: 6

OBJECTIVES:

1. To keep in mind the outline classification of Chordata
2. To understand the morphology and anatomy of vertebrates
3. To execute interrelationship between each class
4. To understand the classification of various classes of Phylum chordata up to class level.
5. To analyze the phylogenetic affinities of the chordate Phyla .

UNIT – I

(18 Hours)

Prochordates: Amphioxus

Pisces : Shark

General topics: 1. Retrogressive metamorphosis in Ascidian
2. Accessory respiratory organs in fishes
3. Migration of fishes

UNIT – II

(18 Hours)

Amphibia : Frog (Excluding skeletal system)

General topics : 1. Origin of Amphibia
2. Parental care in Amphibia
3. Neoteny in Amphibia

UNIT – III

(18 Hours)

Reptilia: Calotes (Excluding skeletal system)

General topics : 1. Identification of poisonous and non-poisonous snakes of south India
2. Poison apparatus, biting mechanism in snake and First Aid.
3. Golden Age of Reptiles

UNIT – IV

Aves :

General topics:

Pigeon (Excluding skeletal system) **(18 Hours)**
1. Ratitae
2. Flight adaptations in Birds
3. Migration in Birds.

UNIT – V

Mammals :

General topics

Rabbit (Excluding skeletal system) **(18 Hours)**
1. Monotremes and marsupials
2. Aquatic mammals and their adaptations.
3. Flying mammals and their adaptations.

TEXT BOOK:

1. EkambaranathaAyyar M. and T.N.Ananthakrishnan, 1995. "A Manual of Zoology " Volume II, Part I & II (Chordata),Viswanathan S. (Printers and publishers) Pvt. Ltd.

REFERENCE BOOKS

1. Ally. Y. Waterman (1971) Chordate structure and function, The Mac. Millan Company.
2. Jolle. M. (1968). Chordate morphology. East west press. New Delhi.
3. Jordan E.H. and Verma P.S. (2000) Chordate zoology. Chand and company. New Delhi.
4. Kotpal. R.L.(1992) Modern Text Book of Zoology, Rastogi Publications, Shivaji Road, Meerut - 250 002.
5. Newman.H.H. (1981) The Phylum Chordata. Mac. Millan Company. Satish Book Enterprise, Motikatria, Agra.
6. Romer. A.S. (1959).The vertebrate body, W.B.Saunders Company, Philadelphia and London.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind the outline Classification of Chordata.	K1
CO2	To Understand the morphology and anatomy of Vertebrates.	K2
CO3	To inculcate the interrelationship between the classes.	K3
CO4	To discuss with special emphasis on the adaptations to their mode of life and environment	K4
CO5	To impart knowledge in Comparative anatomy and development systems of Chordates	K4
CO6	Able to get job in wild life, fisheries, live stocks and other areas	K6

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	M	S	S	M	L	L	M
CO2	H	H	H	M	H	M	S	S	S	M	S	M
CO3	H	H	H	M	H	M	S	S	S	M	L	L
CO4	M	H	M	H	H	H	S	S	S	M	L	L
CO5	L	M	M	H	M	H	S	S	S	M	L	M
CO6	L	M	M	H	M	H	S	S	S	L	L	M

S – Strong
M – Medium
L – Low

**SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – II
(For the candidates admitted from the academic year 2019 – 2020
onwards Under CBCS pattern)**

SKILL BASED SUBJECT - II – APICULTURE – SYLLABUS (20UZOSC2)

Hours/Week: 2

Course Credit: 2

COURSE OBJECTIVE:

1. To Understand the social life of honey bees and their behavior
2. To remember the types of bee hives
3. To apply knowledge on care and management of apiary
4. To identify major bee keeping challenges and opportunities
5. Purchase of Honey and Wax byproducts from bee keeping industry

UNIT – I

(6 Hours)

Honey bee:systematic position - Species of honey bees - Life history of honey bee - behaviour - Swarming - role of Pheromones

UNIT – II

(6 Hours)

Bee colony : Castes - Natural colonies and their yields - Types of bee hives - Structure - Location, Care and management

UNIT – III

(6 Hours)

Apiary : Care and management - Artificial bee hives - Types - Construction of space frames - Selection of sites - Handling – Maintenance.

UNIT – IV

(6 Hours)

Instruments employed in Apiary : Extraction instruments - Honey - Composition - Uses: Medicinal values – Bees wax and its uses –Economics of Bee culture.

UNIT – V

(6 Hours)

Diseases: Honey bee diseases and their control methods – Modern methods employing Honey bees for cross pollination in horticultural gardens - Apiculture as self-employment venture.

TEXT BOOK

1. Addison Webb (2004) Bee Keeping : For profit and pleasure. Agrobios, Jodhpur, India.

REFERENCE BOOKS

1. Cherian, R.J., Ramanathan, K.R. (1992). Bee keeping in India.
2. Mishra, R.C. (1985). Honey bees and their management in India, ICAIR.
3. Singh, S. (1982). Bee Keeping, ICAR.

Course Outcomes (CO)**On completion of the course, students should be able to**

CO Number	CO Statement	Knowledge Level
CO1	To remember the types of species and the steps involved in modern bee keeping techniques and its practical difficulties	K1
CO2	To Understand the medicinal values of honey and commercial products of apiary reveals the importance of apiculture	K2
CO3	To comprehend methodologies involved in bee keeping	K3
CO4	To apply modern tools in bee keeping techniques and its by products	K4
CO5	To get aware of medicinal values of honey	K5
CO6	To motivate the students for their self employment opportunities	K5

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse**Mapping of COs with POs:**

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	L	S	S	S	S	S	S	M	L	L	M
CO2	S	L	S	S	S	S	S	S	S	M	S	M
CO3	S	L	S	S	S	H	S	S	S	M	L	L
CO4	L	M	S	S	S	M	S	S	S	M	L	L
CO5	L	M	S	M	S	M	S	S	S	M	L	M
CO6	L	M	M	M	M	M	S	S	S	L	L	M

S – Strong**M – Medium****L – Low**

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – III
(For the candidates admitted from the academic year,
2019 – 2020 Onwards Under CBCS)
CELL BIOLOGY (19UZOC4)

Hours/Week: 6

Course Credit: 5

Course objectives:

- To enrich the knowledge of different instruments
- To instill knowledge across different organelles
- To study about the metabolic activity and the role of cell
- To aware about the DNA and RNA structure and functions
- To Aware about the cancer cell and its effects

UNIT – I

(18 Hours)

Microscopy and Cytological techniques: Compound, Phase Contrast and Electron Microscope. Cell as a unit of living organism. Cell theory, Theories of cell membrane Micrometry – Cell fractionation- Homogenization, Centrifugation Fundamentals of micro techniques- fixation, staining and microtome.

UNIT – II

(18 Hours)

Plasma Membrane: Ultra structure and functions.
Endoplasmic reticulum: Ultra Structure, and functions
Golgi complex: Ultra Structure and functions

UNIT – III

(18 Hours)

Mitochondria: Ultra Structure and functions.
Ribosome : Ultrastructure and functions
Lysosomes and Peroxisomes: Structure and functions,
Centrosome: Morphology, ultra structure and functions

UNIT – IV

(18 Hours)

Nucleus : Structure and functions of Nucleus,
Chromosomes : Ultra structure, composition and functions – Types of chromosomes.
Nucleic acids : DNA- structure and replication, RNA- structure and replication.
Protein synthesis

UNIT – V

(18 Hours)

Cell cycle, Interphase, Mitosis – Meiosis.
Cancer – Characteristic features of cancer cells – Carcinogens –
Cell Growth and Aging: Cell growth – subcellular changes – causes – theories.

TEXT BOOK

1. Verma P.S. and Agarwal V.K. (2006) Chand publication, 2017

REFERENCE BOOKS

1. De Robertis and De Robertis – Cell Biology and Molecular Biology” (7th Edition) (1980) W.B. Saunders.
2. Giese, A.C (1979) “Cell Physiology” (5th Edition) W.B. Saunders, Philadelphia, London.
3. Powar C.E. (1983) “Essentials of Cytology” (7th Edition) Himalaya Publishing house
4. Verma P.S. & Agarwal V.K (2006) Cell Biology , Genetics, Molecular Biology, Evolution and Ecology – S.Chand & Company LTD. Ram Nagar, New Delhi - 110055
5. Singh & Tomar, (2008). 9th revised edition Cell Biology – Rastogi Publications, Shivaji road, Meerut – 250 002, India.

Course outcome

CO Number	CO Statement	Knowledge Level
CO1	Understanding of the working principles, applications of microscopes and cytological techniques.	K1
CO2	Able to distinguish prokaryotes and eukaryotes.	K2
CO3	To deploy the structure and functions of cellular membrane and cell organelles.	K3
CO4	Develop deeper understanding of what life is and how it functions at cellular level.	K4
CO5	Understand the properties and treatment of cancer cells.	K3
CO6	To understand about the cell organelles and its applications	K3

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	L	M	M	M	S	S	S	M	L	L	S
CO2	M	S	M	M	L	S	M	S	S	M	S	M
CO3	M	M	S	S	M	S	M	S	S	M	L	L
CO4	M	M	M	M	M	M	M	S	M	M	L	L
CO5	M	M	M	M	S	M	M	S	S	M	L	S
CO6	S	S	S	S	S	S	M	S	S	L	L	M

S - Strong
M - Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – III& IV
(For the candidates admitted from the academic year 2019 – 2020
onwards Under CBCS pattern)
CORE PRACTICAL - II – (CELL BIOLOGY AND GENETICS) – SYLLABUS
(19UZOQC2)

Hours/Week: 3

Course Credit: 3

COURSE OBJECTIVE:

1. To understand the different types of blood cells and cell counting
2. Understand the process of Mounting
3. To identify the instruments and their uses
4. To get aware of syndromes

EXPERIMENTS

1. Micrometry
2. Human Blood smear
3. Cell Permeability
4. Study of Mitotic stages using Onion root tip.
5. Study of polytene chromosome in Salivary gland of Chironomous larva
6. Preparation of Human Buccal smear to identify Barr body
7. Study of Morphology of Drosophila
8. Sex identification.
9. Human blood grouping
10. Study of Mendelian traits in man

III SPOTTERS

1. Compound Microscope
2. Centrifuge
3. Homogenizer
4. Phase contrast microscope
5. Leptotene
6. Diplotene
7. Pachetene
8. Diakinesis
9. Zygotene
10. Normal karyotype male
11. Normal karyotype female
12. Klinefelter's Syndrome
13. Turner's Syndrome
14. Down's syndrome

Certified and Bonafide practical record work should be submitted at the time of Practical examination.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the principles and working mechanisms of microscopes	K1
CO2	Understand the different stages of mitosis and meiosis.	K2
CO3	Deploy slide preparation to observe Giant chromosome, epithelial and blood cells.	K3
CO4	Analyse inheritance of mendelian traits by direct observation among students.	K3
CO5	To access the practical experience in instrument handling.	K4
CO6	Students gain the practical skill for further research and job opportunities	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO 1	PO2	PO 3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	S	S	S	M	S	M	S	S	M	H	M	H
CO2	S	S	S	M	S	M	S	S	M	H	M	H
CO3	S	S	S	M	S	M	S	S	M	H	M	H
CO4	M	S	M	S	S	S	S	S	M	H	L	M
CO5	L	M	M	S	M	S	S	S	M	H	L	M
CO6	L	M	M	S	M	S	S	S	M	H	L	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – III
(For the candidates admitted from the academic year, 2019 – 2020
onwards Under CBCS pattern)

SKILL BASED III-AQUACULTURE(19UZOSC3)

Hours/Week: 2

Course Credit: 2

Course Objectives:

1. To Understand the social life of honey bees and their behavior
2. To remember the types of bee hives
3. To apply knowledge on care and management of apiary
4. To identify major bee keeping challenges and opportunities
5. Purchase of Honey and Wax byproducts from bee keeping industry

UNIT – I

(6hours)

Introduction and scope: Scope for Aquaculture in India and the world – physical and chemical characteristic features of water bodies-selection criteria for cultivable species-Cultivable organisms: indigenous and exotic cultivable species of fish

UNIT II

(6 Hours)

Fish farming: site selection- construction of fish pond-Types of farming: Extensive, intensive, semi intensive culture – Integrated fish farming – Advantages of poly culture, monosex and monoculture.

UNIT – III

(6hours)

Culture techniques: culture of carp species – Edible oyster culture – pearl oyster culture – Fresh water prawn culture– ornamental fish culture – common species for ornamental fish farming.

UNIT – IV

(6hours)

Fish disease management : Common bacterial, viral, fungal, protozoan and crustacean diseases, their symptoms and treatment – water quality maintenance – importance and composition of feeds – types of feed – wet and dry feeds.

UNIT V

(6hours)

Marketing the products: Marketing the fish to local markets and for export – Harvesting and transport –Government participation in Aquaculture – preservation of fishes canning and freezing.

TEXT BOOK:

1. C.B.L Srivastava , a text book of fishery science and indian fisheries (2006), Kitab Mahal distributions

REFERENCE BOOKS:

1. Bardah, Ryther and MC Larrey (1972). Aquaculture, John Wiley, New York.
2. David Cushing, (1971) Fisheries Resources of the sea and their Managements, OUP & ELBS Edition, London, 87 PP.

3. Jameson, J.D. and R. Santhanam (1996) Manual of ornamental fisheries and farming technology. Fisheries college and Research Institute, Thoothukudi.
4. Thingrao, A.V. G. (1991) Fish and Fisheries of India. Hidustan Publishing Co.
5. Rath. R.K (2000) Freshwater Aquaculture. Scientific Publishers (India) Po Box 91, Jodhpur.
6. Trivedi, K.K. (Ed) (1986) Fisheries Development 2000 A.D. Association of India Fisheries Industrial, Oxford and I.B.H. New Delhi.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the scope of aquaculture and cultivable organisms	K1
CO2	Acquire knowledge of various types and methods of aquaculture practices.	K2
CO3	Apply the modern techniques and methods of fishery industries.	K3
CO4	To analyse the different types of diseases and their treatments and to execute feed formulation for fishes	K3
CO5	To attained knowledge about importance of value added fishery products.	K4
CO6	To gain skill for employment opportunity.	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	L	M	S	S	S	M	L	L	S
CO2	L	S	L	L	S	S	M	S	S	M	S	M
CO3	S	L	S	L	M	S	M	L	S	M	L	L
CO4	S	L	S	S	L	M	M	S	M	S	S	L
CO5	S	L	M	L	H	M	M	S	S	M	L	S
CO6	M	L	S	L	L	S	M	S	S	L	L	M

S - Strong
M - Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – III
(For the candidates admitted from the academic year, 2019 – 2020
onwards Under CBCS pattern)

Communicable Diseases and Management (19UZONE1)

Hours/Week: 2

Course Credit: 2

Course objectives:

- To aware the students for various virus and its diseases which spreads in human with the help of study of host-parasite relationship.
- A Basic approach to the bacterial disease and their diseases.
- To aware the students for various protozoan and their diseases which spreads in human
- To aware about the causative organism, modes of transmission, symptoms of Taeniasis, Ascariasis and Elephantiasis .
To increase awareness about the immunity and related health issues.

UNIT I (6 Hours)

Viral diseases: Rabies, Mumps, Influenza, Measles, Hepatitis and AIDS.

UNIT II (6 Hours)

Bacterial diseases: Cholera, Tuberculosis, Tetanus, Diphtheria, Typhoid,

UNIT III (6 Hours)

Protozoan diseases: Malaria, Amoebiasis, Leishmaniasis and Trypanosomiasis

UNIT IV (6 Hours)

Nematode parasites: Taeniasis, Ascariasis and Elephantiasis .

UNIT V (6 Hours)

Immunology: Immune response: Humoral immunity and Cell mediated immunity, Vaccines and vaccination

TEXT BOOK

1. Medical microbiology by S.Rajan, 2007, M.J.P Publishers , Chennai

REFERENCE BOOKS

1. Charkravarty, A.K. (1996) : Immunology, Tata Mc Graw Hill Publishing Company Limited, New Delhi.
2. Deepak Kumar (2001) : Diseases and medicines in India: A Historical overview, Tulika, New Delhi.
3. Park, A. (2007) : Text book of social and preventive medicine. M/s Banarsidas Bhanot Publishers, 1167, Prem Nagar Jabalpur 482001 (India).
4. Sharma and Ratna (1984) : Introduction to Parasitology, Chand and Company Limited New Delhi
5. 5. Dennis, H. (2009). Agricultural Entomology. Timber Press

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the morphology , mode of transmission and control of viral diseases	K1
CO2	To study the morphology mode of transmission and control of bacterial diseases	K2
CO3	To describe the morphology mode of transmission and control of protozoan diseases	K1
CO4	To examine the morphology mode of transmission and control of parasitic diseases	K3
CO5	To study the importance of immune system	K2
CO6	To understand the general health awareness	K1

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – IV
(For the candidates admitted from the academic year, 2019 – 2020
onwards Under CBCS)
CORE -V - GENETICS (19UZOC5)

Hours/Week: 3

Course Credit: 3

Course Objectives:

1. Gives comprehensive and detailed understanding on the Mendelian and non Mendelian inheritance
2. To provide technical aspects of classical genetics
3. To analyze chromosomal basis of genetics and heritable traits
4. To reveal the genetic concepts that affect population, health and diseases
5. To apply the knowledge on the human welfare

UNIT – I

(15 Hours)

Mendel's Principles of Heredity: Basis of Mendelian inheritance and Mendelian laws – Monohybrid and dihybrid crosses- backcross and test cross – Phenotype and genotype - Incomplete dominance and co-dominance.

Interaction of Genes: Complementary factors, supplementary factors – polygenic inheritance skin colour in Man

Multiple Alleles: – Blood groups and their inheritance in man – Rh factor – Erythroblastosis foetalis.

UNIT – II

(15 Hours)

Linkage in Drosophila : Morgan's experiments, theories of linkage

Crossing over: Types, mechanisms, Cytological evidence for crossing over (Curtstern's experiment), Factors affecting crossing over.

Sex Determination: Sex determination in Man and Drosophila Gynandromorphism - Barr bodies.

Sex Linked Inheritance: Sex linked inheritance in Man (Colour blindness and Haemophilia). Sex influenced and sex limited characters – Holandric genes.

UNIT – III

(15 Hours)

Chemical Basis of Inheritance: Fine structure of gene – Cistron – Recon Muton – DNA and RNA – Genetic material – Genetic code.

Gene Regulation: Operon concept - Lac operon – Positive and negative regulation.

Microbial Genetics: Bacterial transformation – Bacterial conjugation – Transduction – Sexduction.

UNIT – IV

(15 Hours)

Mutation Gene mutation – Spontaneous and Induced – Molecular basis of mutation - Types of mutation – Mutagens, Mutable and Mutator genes – Chromosomal aberration - Numerical and structural.

Inbreeding, out Breeding and HeterosisAnimal breeding – Inbreeding – purelines – out breeding – Hybrid vigour, (Heterosis) – General effects of inbreeding and out breeding.

Extra Chromosomal Inheritance: Cytoplasmic inheritance – Maternal effect on Limnaea (shell coiling) – Kappa particles in Paramecium and milk factor in Mice.

UNIT – V

(15 Hours)

Population Genetics:Gene pool - Gene frequency – Hardy –Weinberg law - Genetic equilibrium - Factors affecting gene frequency.

In Born Errors of Metabolism:Metabolic disorders – Phenylketonuria – Alkaptonuria, Albinism

Syndromes in Man:Down's (Autosomal), Turner's and Klinefelter's (Allosomal)

Genetic Counselling: Positive and Negative Eugenics –Euphenics – Euthenics.

TEXT BOOKS

1. Verma, P.S. Agarwal, V.K. (2018) Genetics, S. Chand and company (Pvt) LTD, Ram Nagar, New Delhi.

REFERENCES

1. Anna C.Pai., Helen Marcus, Roberts (1981). Genetics its concepts and implications Prentice Hall Inc, Engle Wood Cliffs, New Jersey.
2. Benjamin Lewin (1983), Genes Wiley, Eastern limited, New Delhi.
Winchester, A.M. (1972) Genetics, Oxford and IBH Publishing Co.
3. Gardner, F. J (1938) Principles of Genetics, Wiley Easten.
4. Gupta. P.K. Genetics (1997) Rastogi Publications, Meerut.
5. Strickberger, W.M. (1977) Genetics, 2nd Edition, Mac Millan. Watson, J.D. (1986) Molecular Biology of the Gene (3rd Edition) W.B. Benjamin.
6. Alice Marcus (2009) Genetics, Ist edition, MJP publishers. India

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Design, execute and analyse the results of Mendelian and Genetic experiments in animal and plant models	K1
CO2	Provide outline on the heredity and hereditary factors involved in Linkage, crossing over, sex linked inheritance and sex determination.	K1
CO3	Gives understanding on the societal issues and enable to identify the relevant human genetical diseases and genetic counseling involved	K1
CO4	Understand the range of molecular events in mutation and comprehensive view on the in and out breeding	K2
CO5	Explain the key concepts in population , evolutionary and quantitative genetics	K2
CO6	Understanding the role of genetic mechanism in evolution	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	L	M	L	M	S	S	S	M	L	L	S
CO2	S	L	S	H	M	S	M	L	L	M	S	L
CO3	S	S	L	L	L	S	S	M	S	M	L	L
CO4	S	L	M	L	M	L	M	S	M	S	S	L
CO5	S	S	M	S	M	L	S	L	S	M	L	L
CO6	L	S	S	L	M	M	M	S	S	L	L	M

S – Strong
M – Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – I
(For candidates admitted from the academic year, 2018 – 2019 onwards
Under CBCS)
MAJOR ELECTIVE -I – ECONOMIC ENTOMOLOGY & PEST MANAGEMENT-
SYLLABUS (19UZOEC1)

Hours: 3Hrs/week

Course Credits: 3

COURSE OUTCOME:

- To understand the importance of Pest Management.

UNIT – I

9 Hours

General characters and classification of insects upto order level with examples. Pests of paddy (*Leptocorisa Varicornis*, *Tryporyza incertulas*), Sugarcane (*Pyrilla perpusilla*, *Chilo infuscatellus*), Coconut (*Oryctes rhinoceros*, *Rhynchophorus ferrugineus*), Brinjal (*Leucinodes orbonalis*, *Euzapharapticella*).

UNIT – II

9 Hours

Pests of stored products and their control:-Rice weevil, Wheat Weevil, Pulse Beetle - Household pests: Cockroach, flies and mosquito- Insects damaging other household goods -Termite, Black Ants and Silver fish

UNIT – III

9 Hours

Pest control methods: Natural, Applied, Cultural, Mechanical, physical, Legal methods- Integrated Pest Management (IPM) and its importance.

UNIT – IV

9 Hours

Chemosterilants – Pheromones- semiochemicals – Attractants - Repellents- Preparation of pesticides - Formulations - Packages - Pesticide spraying appliances.

UNIT – V

9 Hours

Beneficial and harmful insects. Economic importance of honeybees, silk worm and lac insect – Parasitic and predatory insects. Damages to plants, animals and man by insects. Pesticide Industry – Production and marketing.

TEXT BOOK:

1. David, B.V. and T.Kumarasamy, (1984). Elements of Economic Entomology, Popular Book Depot, Madras, 536 pp.
2. Ramakrishna Iyer, T.V., - Economic Entomology, Government Publications, Madras.

REFERENCE:

1. David, B.V., 1992. Pest Management and Pesticides Indian Scenario, Narmatha Publications, Madras
2. Metcalf, C.L. and Flint W.P. (1973) Destructive and useful insects, 4th Ed. Tata McGraw Hill Publishing Co. Ltd., New Delhi – 110 051, 1087pp.
3. Nayar, K.K. T.N.Anathakrishnan and B.V.David. (1992) General and Applied Entomology. Tata McGraw Hill Publishing Co.Ltd., New Delhi – 110 051.
4. Ramakrishna Iyer, T.V., - Economic Entomology, Government Publications, Madras.

5. Roya D.N. and Brown A.W.A. (Eds) (1981) Entomology Medical and Veterinary (3rd Ed.) The Bangalore Printing and Publishing Company, Bangalore – 18.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To identify the types of pests of Paddy, Sugarcane, Coconut and Brinjal	K1
CO2	To explain the insect pests of stored products.	K2
CO3	To discussbinomics and control of pests.	K1
CO4	To apply knowledge in the field of pest control.	K2
CO5	To distinguish organic and inorganic pesticides	K1
CO6	To apply knowledge in pesticide applications	K2

K-1Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	L	L	M	M	S	S	S	M	L	L	S
CO2	S	S	M	M	L	S	S	S	S	M	S	M
CO3	S	L	H	S	M	S	S	M	M	M	L	L
CO4	S	M	M	M	M	M	S	S	M	M	S	L
CO5	S	M	M	M	S	M	S	S	S	M	L	S
CO6	S	S	S	S	S	M	S	S	S	L	L	M

S – Strong
M – Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER –IV
(For the candidates admitted from the academic year 2018 – 2019 onwards
Under CBCS)
MAJOR ELECTIVE SUBJECT- I – BIOINFORMATICS (19UZOESC1)

Hours/Week:3

Course Credit: 3

COURSE OBJECTIVE:

To understand the basic principles and applications of bioinformatics.

Unit-I

(9 Hours)

computer networking LAN, WAN, MODEM and Fiberoptics Networks - introduction to internet, WWW, NICNET, ERNET, VSNL, ISDN.

Unit-II

(9 Hours)

Scope of bioinformatics – Useful bioinformatics sites – Bioinformatics in Pharmaceutical industry – Bioinformatics orientation in IT industry.

Unit-III

(9 Hours)

Database – Definition – Biological database – Primary Database (Genbank) – Protein Database (SWISS – PROT, TREMBL, NRL – 3D PIR MIPS) - Secondary database (PROSITE, Pfam, BLOCKS, PRINTS, IDENTIFY)- Composite database (NRDB, OWL MIPSX); - Protein structure database (PDB, MMDB)

Unit- IV

(9 Hours)

Pair wise alignment – Local and global alignment – BLAST, FASTA, Multiple sequence Analysis (MSA).

Unit- V

(9 Hours)

Evolution of bioinformatics – Potential of Bioinformatics – Human Genome Project – Bioinformatics in India – Future in Bioinformatics.

REFERENCE BOOKS

1. T.K. Attwood and D.J. Parry – Smith, Introduction to Bioinformatics, Pearson Education Ltd., New Delhi (2004).
2. Arthur M. Lesk, Introduction to Bioinformatics, Oxford University Press, New Delhi (2003).
3. S.SundaraRajan and R. Balaji, Introduction to Bioinformatics, Himalaya Publishing House - New Delhi (2002).
4. Irfan A. Khan and AtiyaKhanum, Emerging trends in Bioinformatics Ukaaz Publications, Andhra Pradesh (2002).

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To identify discuss about computer networking and internet	K1
CO2	To explain the scope of Bioinformatics and applications.	K2
CO3	To discuss about various databases.	K1
CO4	To explain pair wise alignment and multiple sequence analysis.	K2
CO5	To know the potential of Bioinformatics.	K1
CO6	To develop information in the genomic study	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	L	L	M	M	S	S	S	M	L	L	S
CO2	M	S	M	M	L	S	M	S	S	M	S	M
CO3	M	L	H	S	M	S	M	M	M	M	L	L
CO4	M	M	M	M	M	M	M	S	M	M	S	L
CO5	M	M	M	M	S	M	M	S	S	M	L	S
CO6	S	S	S	S	S	M	M	S	S	L	L	M

S - Strong
M - Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – IV
(For the candidates admitted from the academic year 2019 – 2020
onwards Under CBCS pattern)
SKILL BASED - IV – CLINICAL LABORATORY TECHNIQUES –
PRACTICAL SYLLABUS (19UZOSQC4)

Hours/Week:2

Course Credit: 2

COURSE OBJECTIVE:

1. To understand the different types of blood cells and cell counting
2. To know about Haemoglobin estimation and haemin crystals
3. To study the qualitative analysis of urine
4. To identify the instruments and their uses

I MAJOR EXPERIMENTS

1. Differential count of White blood corpuscles.
2. Enumeration of White Blood Corpuscles.
3. Enumeration of Red Blood Corpuscles.
4. Estimation of Haemoglobin in Human blood.
5. Preparation of Haemin crystals.
6. Qualitative analysis of albumin and sugar in urine.

II. MINOR EXPERIMENTS

1. Bleeding time of blood.
2. Clotting time of blood.
3. Specific gravity of urine.
4. Analysis of bile salts in urine.
5. Analysis of bile pigment in Urine.
6. Analysis of blood in Urine.

III SPOTTERS

1. Albuminometer
2. Ryles tube
3. Carwardine Saccharometer
4. Urinometer
5. Folin Wu tube
6. Glucometer
7. ESR stand
8. Wintrobe stand
9. Haemoglobinometer
10. Haemocytometer

Certified and Bonafide practical record work should be submitted at the time of Practical examination.

Course Outcomes (CO)**On completion of the course, students should be able to**

CO Number	CO Statement	Knowledge Level
CO1	Remember the differential count of white blood corpuscles	K1
CO2	Understand the enumeration of white blood corpuscles and red blood corpuscles	K2
CO3	Know the estimation of Haemoglobin and preparation of haemin crystals	K3
CO4	Remember various haematological and urinary tests	K3
CO5	Understand the qualitative analysis of urine	K4
CO6	Students gain the practical skill for further research and job opportunities	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse**Mapping of COs with POs:**

PO/ PSO CO	PO						PSO					
	PO 1	PO2	PO 3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	S	S	S	M	S	M	S	S	M	H	M	H
CO2	S	S	S	M	S	M	S	S	M	H	M	H
CO3	S	S	S	M	S	M	S	S	M	H	M	H
CO4	M	S	M	S	S	S	S	S	M	H	L	M
CO5	L	M	M	S	M	S	S	S	M	H	L	M
CO6	L	M	M	S	M	S	S	S	M	H	L	M

S – Strong**M – Medium****L - Low**

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – IV
(For the candidates admitted from the academic year, 2019 – 2020 onwards
Under CBCS pattern)

Non Major Elective - Ornamental fish culture (19UZONE2)

Hours/Week: 2

Course Credit: 2

Course Objectives

- To learn the rearing of ornamental fishes.
- Describe the Fish nutrition and its nutritional requirements.
- To study the breeding habits of fish
- To understand the diseases of fish
- To understand the ideas of construction of home aquarium.

UNIT I (6 Hours)

Scope of ornamental fish culture – ornamental fish farming in the world and India.

Popular Ornamental fishes : Gold fish, Guppies, angels and butterflyfishes

UNIT II (6 Hours)

Construction of Home aquarium – Materials needed – metals, wooden frame and frameless tanks, Aerators and filters – hand net – suction tube – Temperature control and lighting .

UNIT III (6 Hours)

Fish Nutrition : Feeding habits – Nutritional requirements of fish – Live feed, artificial feed – feed preparation.

UNIT IV (6 Hours)

Breeding habits: Water quality, Diet, Spawning – induced breeding and parental care, Monoculture and polyculture

UNIT V (6 Hours)

Common diseases of Ornamental fishes: Protozoan – Velvet, Bacterial – Fin rot, Viral – Spring viraemia of Carp, Fungal – Gill Rot, Deficiency diseases.

TEXT BOOK

1. Jayashree, K.V., Tharadevi, C.S., Arumugam, N. (2015). Home aquarium and ornamental fish culture. Saras Publication, Kanyakumari.

REFERENCE BOOKS

1. Jameson, J.D. and R. Santhanam (1996). Manual of ornamental fisheries and farming technology. Fisheries college and research institute, Thoothukudi.
2. Jhingran, A.V.G. (1991). Fish and Fisheries of India. Hindustan Publishing Company.
3. Thingra, A.V. G. (1991) Fish and Fisheries of India. Hindustan Publishing Co.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the ornamental fisheries in world wide	K1
CO2	To acquire knowledge about nutrient and feeding of fishes	K2
CO3	To relate the entire breeding patterns in fishes	K3
CO4	To study the different diseases and control measure	K1
CO5	To acquire knowledge on construction of home aquarium	K2
CO6	To acquire knowledge about fish culture and self employment opportunities	K2

K-1 Recall, K-2 Understand, K-3 Apply

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – III
(For the candidates admitted from the academic year, 2019 – 2020 onwards
Under CBCS pattern)
Allied Zoology- I (19UZOAC3)

Hours/Week: 3

Course Credit: 3

Course Objective

- Taxonomy and outline classification of animal kingdom is detailed in the syllabus
- To understand the diversity of animals and environment and interrelationship between man and animals
- General characters, structure, physiology and phylogenetic affinities of the invertebrate Phyla is included in the syllabus.
- General characteristics and classification of Phylum Chordata up to order level with important examples.
Structure, physiology and affinities of the chordate animal is included in syllabus

INVERTEBRATA

UNIT I

(9 Hours)

PROTOZOA: External morphology of Paramecium – Conjugation

PORIFERA: Cellular structure of Leucosolenia

COELENTERATA: External morphology of Obelia and its life history

General Topic: 1. Nutrition in protozoa.
2. Canal system in sponges.

3. Polymorphism in Hydrozoa

UNIT II

(9 Hours)

PLATYHELMINTHES: External morphology of Fasciola hepatica, Life history & its excretory system.

ANNELIDA: Leech- Digestive system and Excretory system

GENERAL TOPIC: 1. Human Helminth Parasites
2. Adaptive radiation in Polychaetes.

UNIT III

(9 Hours)

ARTHROPODA: External Morphology of Prawn and its appendages

MOLLUSCA- External morphology of pila, Respiratory system and Nervous system

ECHINODERMATA: Starfish- External features, Digestive system and respiratory system

GENERAL TOPIC:

1. Mouthparts of Insects
2. Torsion in Gastropods
3. Water vascular system & Larval forms in Echinodermata.

UNIT IV

(9 Hours)

CEPHALOCHORDATA: Amphioxus- External morphology and Digestive system

PISCES: Shark- External morphology , Digestive system and urinogenital system

AMPHIBIA: Frog -External morphology, Respiratory and circulatory system

GENERAL TOPIC:

REPTILIA: Calotes- External morphology, Nervous system and Excretory system.

GENERAL TOPIC:

1. Affinities of chephalochordata
2. Parental care in fishes
3. Parental care in Amphibia
4. Identification of poisonous and non- poisonous snakes

UNIT V

(9 Hours)

AVES- Pigeon – Digestive system, Respiratory system and Reproductive system

MAMMALS- Rabbit – External feature, Digestive system structure of brain, Dentition

GENERAL TOPIC:

1. Flight adaptation of birds
2. Aquatic mammals and their adaptations

TEXT BOOK

1. Arumugam. N (2005). Invertebrate and chordate Zoology. Saras Publication, Nagarcoil, Kanyakumari.

REFERENCE BOOKS

1. Barnes. R.D :(1968) Invertebrate Zoology – W.B. Saunders company
2. Jordan E.L and.VermaP.S(1983) Invertebrate Zoology, .Chand& Co.
3. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
4. Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition
5. Young, J. Z. (2004). The Life of Vertebrates. III Edition. Oxford university press.
6. Jordan E.H. and Verma P.S. (1987) Chordate zoology. Chand and company. New Delhi.
7. Kotpal. R.L.(1992) Modern Text Book of Zoology, Rastogi Publications, Shivaji Road, Meerut - 250 002.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the structure and inter-relationship between the species of invertebrates	K1
CO2	To deploy the entire phylum and various parasitic diseases	K2
CO3	To study the phylum and its economic importance	K1
CO4	To understand the structure and inter-relationship between chordates	K2
CO5	To study the phylum and characteristics of different animals	K1
CO6	To compare the vertebrate animal structure and functions	K3

K-1 Recall, K-2 Understand, K-3 Apply,

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – IV
(For the candidates admitted from the academic year, 2019 – 2020 onwards
Under CBCS pattern)
Allied zoology- II (19UZOAC4)

Hours/Week: 3

Course Credit: 3

Course objective:

- Understand the various cell types and cell divisions and to aware about the genetic disorders.
- To aware of the developmental process and reproductive techniques.
- To study the evolutionary process.
- Understand the Digestion and Excretion process, by studying the Organs of it.
- Describe the immunity and related health problems.

UNIT I

(9 Hours)

Cell Biology: Structure – Animal Cell, Cell division - Mitosis and Meiosis.

Genetics: Sex linked inheritance. Genetic Disorders – Turner’s, Klinefelter’s and Down syndrome. ABO Blood group, Rh factor

UNIT II

(9 Hours)

Developmental Biology: Fertilization - Cleavage and Gastrulation of Frog - Placentation in mammals..

UNIT III

(9 Hours)

Evolution: Lamarckism, Darwinism, cultural evolution of Man. Homologous, analogous and vestigial organs.

UNIT IV

(9 Hours)

Physiology: Digestive organs and its associated glands in man – Digestion of carbohydrate, protein, fat – Absorption.

Respiration - Types of Respiratory organs – Respiratory pigment Hb – Transport of respiratory gases

UNIT V

(9 Hours)

Immunology: Types of immunity – innate and acquired. Types and properties of immunoglobulins, Immunization schedule for children and pregnant mother.

TEXT BOOKS

1. Arumugam.N, (2005). Cytology, Genetics and Evolution. SarasPublication, Nagarcoil, Kanyakumari.
2. Arumugam.N, (2005). Embryology, Ecology and Physiology. SarasPublication, Nagarcoil, Kanyakumari.
3. Verma P.S.& Agarwal V.K (2006) Cell Biology , Genetics, Molecular Biology, Evolution and Ecology–S.Chand& Company LTD. Ram Nagar, New Delhi -110055

REFERENCES

1. Arumugam.N, OrganicEvolution (2007), SarasPublication, Nagarcoil, Kanyakumari.
2. Arumugam.N – Text book of Embryology, Saras publications.
3. Balinsky, B.T. (1981) An Introduction to Embryology. 5th Edition. W.B.Saunders Company, London.
4. Mariakuttikan, A. and Arumugam.N (2002) Animal Physiology, Saras Publications, Nagercoil, Kanyakumari.
5. Hall, B. K. and Hallgrimsson, B. (2008).Evolution.IV Edition. Jones and Bartlett Publishers

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the structure of the cell and its functions	K2
CO2	To study the development of animals	K1
CO3	To deploy the concepts of evolution	K1
CO4	To analyse the physiology and functions of different organs	K3
CO5	To study the importance of immune system	K1
CO6	To analyse the importance of various fields of zoology	K3

K-1Recall, K-2 Understand, K-3 Apply

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.

B.Sc., DEGREE COURSE- SEMESTER – IV

**(For candidates admitted from the academic year, 2018 – 2019 onwards
Under CBCS)**

ALLIED ZOOLOGY- PRACTICAL SYLLABUS (19UZOAQC2)

Hours: 2 Hrs/week

Credits: 2

COURSE OBJECTIVE:

- To remember the anatomical and morphological structure of animals and microorganism.
- To understand the ecological and biological importance of vertebrates and invertebrates
- To validate the practical efficiency in the animal kingdom structure and function

1. Dissections

a) Cockroach: Digestive system and Nervous system

b) Fish : Digestive system (Demonstration of anatomy)

2. **Mountings** : Mouth Parts of Cockroach, Honey bee,

Experiments

1. Human blood grouping
2. Estimation of Haemoglobin in human blood.
3. Preparation and examination of Haemin or Haematin crystals
4. Qualitative analysis of Carbohydrate and protein

3. Spotters

1. Paramecium – Entire
2. Simple Sponge
3. Obelia Colony
4. Obelia Medusa
5. Taeniasolium – Scolex
6. Starfish – Bipinnaria Larva

7. Shark – Entire
8. Shark - Placoid scales
9. Pigeon – Quill feather
10. Rabbit – Entire
11. Cleavage stages of frog (2 celled 4 celled and 8 celled stage)
12. Blastula of frog
13. Gastrula of frog with yolk plug (Entire and V.S)
14. Human Placenta.
15. Homologous Organs
16. Analogous organs
17. Vestigial organs

Certified and Bonafide Practical record should be submitted at the time of practical examination.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
C01	To remember the anatomical and morphological structure of animals and micro organisms	K1
C02	To understand the ecological and biological importance of vertebrates and invertebrates	K2
C03	To validate the practical efficiency in the animal kingdom structure and function	K3
C04	To interpret the significance of specific structure and function.	K3
C05	Analyse inheritance of mendelian traits by direct observation for the students.	K4
C06	To access the practical experience in handling instruments.	K3

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.

B.Sc., DEGREE COURSE - ZOOLOGY MAIN – SEMESTER – V

(For the candidates admitted from the academic year 2018 – 2019

onwards Under CBCS pattern)

CORE - V – DEVELOPMENTAL BIOLOGY – SYLLABUS (18UZOC5)

Hours/Week: 5

Course Credit: 5

COURSE OBJECTIVE:

- To acquire basic knowledge on embryogenesis of chordate species
- To have an integrated spectrum of knowledge about the normal developmental pattern of embryo
- To understand the organizer and regeneration
- Identify and define the landmark events and advances in developmental biology
- To familiarize with various tools and techniques of embryology

UNIT - I

(15 Hours)

Biogenetic law – Germplasm theory – Mosaic theory – Regulative theory.

Gametogenesis

Structure of typical mammalian sperm –types of sperm - spermatogenesis

Types of eggs - Oogenesis

UNIT – II

(15 Hours)

Fertilization:

Events of fertilization – Post fertilization changes – Theories of fertilization

Parthenogenesis: Natural, Artificial and significance of parthenogenesis

Cleavage

Planes and patterns of cleavage – Factors affecting cleavage – Morula – Blastula and kinds of blastula - Cleavage in frog.

UNIT – III

(15 Hours)

Gastrulation

Fate maps. Morphogenetic movements–Gastrulation in frog.

Organogenesis in Frog

Origin and development of organs – Development of brain, eye and heart.

Metamorphosis in Amphibia – Ecological – morphological – physiological – biochemical changes – Hormonal control

UNIT – IV

(15 Hours)

Gradient theory: Factors affecting and mechanism of gradients.

Organizer –Embryonic induction – Reciprocal induction – Mechanism of induction and competence

Regeneration –Types — Factors – Physiological changes – inductive interactions in Regeneration.

UNIT – V

(15 Hours)

Foetalmembranes:Foetal membranes in chick – Chorion – Amnion – Yolksac – Allantois

Placentation in mammals – Classification - Functions of placenta.

Reproductive Technologies (ART) – Artificial insemination – IVF – Embryo transfer

Birth Control – Necessity – Contraceptive devices and Pills

TEXT BOOK

1. Arumugam.N (2015). Text book of Embryology, Saras publications, Nagercoil.

REFERENCE BOOKS

- 1 Balinsky, B.T. (1981). An introduction to Embryology 5th Edition.W.B.Saunders Co. London.
- 2 Browder, L.W. (1980). Developmental Biology, Sannelegs College.
- 3 Davenport (1979). An outline of Animal development.Addison Wesley publishers Philippines.

4. Nelson (1953). Comparative vertebrate Embryology –McGraw Hill, New York
5. Mc. Even R.S. (1956). Vertebrate Embryology Henry Hult and Co. New York.
6. Pattern (1971.) Fundamentals of Embryology — McGraw Hill Book Co.New York
7. Philip Grant (1978). Biology of Developing systems Hold – Saunder international Edition.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic concepts and definitions of modern developmental biology	K1
CO2	Understand steps and advancements in the developmental biology	K2
CO3	Comprehend embryonic formation and developmental stages with suitable examples	K3
CO4	Apply functional knowledge on developmental biology into frontier sciences	K3
CO5	Analyze animal embryonic development and possibilities of birth control	K4
CO6	Acquire knowledge on development of embryos	K4

K-1Recall, K-2 Understand, K-3 Apply, K-4 Analyze

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	S	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	S	M	M	S	S	S	M	L	M
CO4	S	M	S	M	M	L	S	S	S	M	L	M
CO5	S	M	S	M	M	L	S	S	S	M	L	M
CO6	S	M	S	M	M	L	S	S	S	M	L	M

S – Strong

M – Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – V
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS)

CORE- VI ECOLOGY AND EVOLUTION (18UZOC6)

Hours/Week: 6

Course Credit: 6

Course Objectives:

1. To understand the inter-relationship between the organisms in population and communities
2. To acquire knowledge on Biogeochemical cycle
3. To remember the dynamics of population and community
4. To understand the origin and development of animals
5. To analyze the process of evolution

ECOLOGY

UNIT – I

(18 Hours)

Abiotic factors: Water, Air, Soil, Physical factors: Temperature and light and Biogeochemical Cycle: Nitrogen, Phosphorus and Carbon.

Biotic factors:

Animal association: Neutralism - Symbiosis – Commensalism and Mutualism, - Antagonism–Parasitism and Competition

UNIT – II

(18 Hours)

Population Ecology

Attributes of population: Density, Natality, Mortality, Age distribution, Population growth, Population equilibrium, Population fluctuations, Dispersal and Regulation of population.

Community Ecology

Characteristics of a community: Community diversity, Structure, Community dominants stratification, Community periodicity, Community inter-

dependence, Ecotone and edge effect, Ecological niche, Concepts of community and Ecological succession.

UNIT – III

(18 Hours)

Aquatic Ecology

Marine - zonation of sea- deep sea adaptations -Estuarine adaptations. Fresh water :Lentic and Lotic system

Terrestrial ecology: Biome - Types of Biome in India.

Environmental management

Wild life management – Sanctuaries and National Parks in India - Preservation and Conservation of Wild Life.

EVOLUTION

UNIT – IV

(18 Hours)

Abiogenesis and Biogenesis–Origin of life – Evidences: Palaeontological, (types of fossils and dating of fossils) Biochemical and physiological.

Lamarckism – Neo – Lamarckism, Darwinism – Neo – Darwinism and Modern synthetic theory.

UNIT – V

(18 Hours)

Isolating mechanisms: Premating and Postmating Isolation. Species concept – Allopatric and Sympatric Speciation

Evolution of man: Fossil history of man - Cultural evolution – Future evolution of man.

TEXT BOOK

1. Arumugam .N (2010). Concepts of Ecology, Saras Publications, Nagarcoil.
2. Arumugam.N (2009) Text book of Evolution, Saras publications, Nagercoil.

REFERENCE BOOKS

1. Allen W.C. Emerson, H.E. *et.al*(1949) – Principles of Animal Ecology, Saunders and Co. Philadelphia.
2. Clarke, George, (1954) Elements of Ecology, John Wiley and Sons, New York.
3. Eugene P. Odum, (1971) – Fundamentals of Ecology W.B. Saunders Co., Philadelphia
4. Edward O. Dodson (1964) Evolution, Published by W.D. Ten Broeck for Affiliated East west press Pvt. Ltd., C – 57, Defence Colony, New Delhi – 110 003.
5. Edwin H. Colbert (1980) III Edition, Evolution of the vertebrates, A. Wiley Inter science Publication, John Wiley and Sons, New York.
6. Julian Huxley (1974) Evolution, Revised III Edition. Geogre Allen and Unwin Ltd., Ruskin Houk S.E., Mugram Street, London.

Course outcome

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge of the abiotic factors of environment and biogeochemical cycle and Intra and interspecific relationships of animals.	K1
CO2	Understand the concept of population ecology, their characteristics and describe the population interactions.	K2
CO3	Develop knowledge about habitat ecology	K3
CO4	Acquire knowledge about the evolution theories of universe, elements, origin of life.	K1
CO5	To get aware on palaeontology	K4
CO6	Understand the process of cultural evolution of man.	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	L	L	S	S	S	L	L	M
CO2	S	L	S	L	M	L	S	S	S	M	S	M
CO3	S	L	M	S	M	M	S	S	S	M	L	L
CO4	S	L	M	L	L	M	S	S	S	M	L	L
CO5	S	M	M	M	S	M	S	S	S	M	L	M
CO6	S	M	L	M	M	L	S	S	S	L	L	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.

B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – V

(For the candidates admitted from the academic year, 2018 – 2019

onwards Under CBCS pattern)

CORE VII - BIOSTATISTICS AND COMPUTER APPLICATION IN BIOLOGY

(18UZOC7)

Course Objectives:

1. Apply knowledge to collect various biological data.
2. To understand the basic idea about the biostatistics and its applications.
3. To enlighten our student on various aspects of bioinformatics and its application.
4. To get awareness about the nature of emerging digital knowledge society.
5. Equip the learner to use tools and techniques for project work and research.

UNIT – I

(15 Hours)

Collection of Data: Primary, Secondary, Classification and tabulation

Diagrammatic and Graphic representation: Histogram, Frequency Polygon, Frequency curve, Ogive, Scatter or Dot diagram, Bar diagram, Pie chart.

Measures of Central tendency: Mean Median and Mode (Simple problems only).

UNIT – II

(15 Hours)

Measures of Dispersion: Range, Quartile deviation, Mean deviation, Standard deviation, Standard error and Co-efficient of variation.

Probability: Addition theorem and Multiplication Theorem - (Simple Problems only) Binomial distribution

UNIT – III

(15 Hours)

Tests of significance: Standard error of mean - Students t - test – Chi square test (Simple Problems only).

Correlation and Regression (Basic only).

COMPUTER APPLICATION IN BIOLOGY

UNIT – IV

(15 Hours)

Introduction to Computer: A brief history of computers - Types of computers. Input devices – Central Processing Unit – Output devices – Memory and storage systems.

UNIT – V

(15 Hours)

Bioinformatics: Scope- application – introduction to biological data. Biological databases – Sequence databases - NCBI, EMBL and DDBJ – Protein sequence database – SWISSPROT, PIR and PROSITE.

TEXT BOOKS :

1. Ramakrishnan.P (2001) Biostatistics, Saras publications, Nagarcoil,
2. Alexis Leon and Mathews Leon (1998), Fundamentals of Computer Science and Communication Bioinformatics Engineering. Leon Press, A-25, 4th Floor, Nelson Chambers, Nelson Manickam Road, Chennai – 600 029.
3. Alexis Leon and Mathews Leon (1999) Introduction to Computers, Leon Tech Word Press (1995).
4. Ranga M.M. (2003) Bioinformatics Agrobios (India) Todhpur – 342002.

REFERENCE BOOKS

1. Branab Kumar Banerjee (2006) Introduction to Biostatistics (A Textbook of Biometry) S.Chand& Company Ltd, New Delhi – 110 055.
2. Gopi A., Meena A. and Arumugam N. (2003) Bio statistics, Computer Application, information Technologies, Saras Publications, Nagercoil,
3. Gupta S.C. (1995) Fundamental of Statistics. Himalaya Publishing House, Ramdoot, Dr. Bhalerao Marg, Bombay – 400 004.
4. Palanisamy S. Mahoharan M. (2003), Statistical Methods for Biologists, Palani Paramount Publications, Palani – 624602.
5. Sat Guru Prasad (1992) Fundamentals of Biostatistics (Biometry) EMKAY, Publications, Delhi - 110005.
7. Fernandez J. Venkatasamy, Jothi Lingam. Basics of Computer Science, Mars Publishers (An Associate of SUJA Publishers) Madurai – 625012.
8. Rajaram V. (1999) Fundamentals of Computer, Prentice Hall of India Pvt. Ltd., New Delhi.

9. Taxali R.K. (2000) PC - Software for windows made simple. Tata Mc Graw Hill Publishing Company Ltd., New Delhi.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To gain the knowledge of basic concepts of biostatistics and Computer Applications in Biology	K1
CO2	To understand the formula and principles used in biology.	K2
CO3	To apply different data used in biological samples.	K3
CO4	To acquire the knowledge of Computers.	K1
CO5	To keep in mind the basic bioinformatic tools and its uses.	K2
CO6	To gain knowledge on tools and techniques for further research.	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	S	S	S	S	M	L	L	M
CO2	S	L	S	S	M	M	S	S	S	M	S	M
CO3	S	L	S	S	S	S	S	S	M	M	L	L
CO4	S	M	L	L	M	L	S	S	S	L	L	L
CO5	S	M	L	M	S	S	S	S	M	S	S	M
CO6	S	M	L	M	M	S	S	S	M	L	L	M

S – Strong

M – Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – V
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS)

CORE PRACTICAL III (DEVELOPMENTAL BIOLOGY, ECOLOGY
ANDEVOLUTION, BIOSTATISTICS AND COMPUTER APPLICATIONS IN
BIOLOGY) (18UZOQC3)

Hours/Week: 3

Course Credit: 3

Course objectives:

1. To obtain practical knowledge in Developmental Biology, Ecology and Evolution, Biostatistics and Computer applications in Biology
2. To understand the estimation of different water quality parameters.
3. To study the physico-chemical nature of environment.

I EXPERIMENTS:

1. Detection of nitrogenous waste products – Ammonia, Urea, Uric acid
2. Estimation of Oxygen content of water samples by Winkler's method
3. Estimation of Salinity of water samples
4. Estimation of Alkalinity of water samples
5. Estimation of Free carbon dioxide
6. Estimation of pH (using pH paper and pH meter)
7. Plankton Analysis: Marine/Fresh water plankton.
8. Demonstration of growth of chick embryo.
9. Demonstration of powerpoint preparation and Microsoft excel.
10. Demonstration of DNA/protein sequence -BLAST using NCBI database.

II SPOTTERS

1. Rainfall gauge
2. Maximum and minimum thermometer
3. Hygrometer – Dial type
4. Barometer – Dial Type

5. Homologous organs
6. Analogous organs
7. Vestigial organs
8. Fossils
9. Sperm of mammal
10. Blastula of frog
11. Yolk sac placenta of shark
12. Placenta of sheep
13. Mouse keyboard
14. Printer

III. Certified and Bonafide Practical record should be submitted at the time of practical examination.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Preparation, direct observation and appreciation of different stages of chick embryo development.	K3
CO2	Comprehend the physico- chemical nature of water through estimation of its chemical compounds.	K4
CO3	Comprehend the concept of “ontogeny” repeats “phylogeny” through observations.	K3
CO4	Basic understanding of the operative system and working knowledge of software commonly used.	K1
CO5	Apply the knowledge to collect various biological data.	K3
CO5	To learn about the DNA and protein sequencing	K4
CO6	To gain practical skill in the concerned subject	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	S	S	S	S	S	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	S	M	L	L
CO4	S	M	M	L	M	S	S	S	S	M	L	L
CO5	S	M	L	M	S	S	S	S	S	M	L	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S - Strong

M - Medium

L - Low

**SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16. B.Sc.,
DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – V & VI
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS pattern)**

**CORE PRACTICAL IV (ANIMAL PHYSIOLOGY, MICROBIOLOGY
AND IMMUNOLOGY, BIOCHEMISTRY) (18UZOQC4)**

Hours/Week: 3

Course Credit: 3

Course Objectives:

1. The student will be able to develop analytical skills To observe the working mechanism and application of instruments
2. To analyse the presence of major organic compound in samples
3. To estimate the presence of elements in water samples and evaluate quality of the samples
4. To enhance hands on practical practices and observations

EXPERIMENTS:

1. Survey of digestive enzymes in cockroach
2. Action of salivary amylase in relation to temperature.
3. Detection of nitrogenous waste products – Ammonia, Urea and Uric acid.
4. Qualitative analysis of carbohydrates proteins and fats
5. pH measurement of various samples
6. Rate of Oxygen consumption in a fish.
7. Hanging Drop Technique to observe the motility of Bacteria
8. Gram Staining and identification of types of bacteria
9. Preparation and identification of Fungal smear (Bread mould)
10. Preparation and identification of Yeast.
11. Demonstration: Isolation of bacteria from soil and water

III SPOTTERS

1. Haemoglobinometer
2. Haemocytometer
3. Spigmomanometer
4. Spectrophotometer
5. Volvox
6. *Mycobacterium leprae*
7. *Clostridium tetani*
8. Autoclave
9. Hot Air oven
10. Incubator
11. Inoculation needle
12. Colony Counter
13. Lymphoid organs: Thymus, lymphnode, bonemarrow, spleen.

IV. Visit to a Central research institute/ industry and study tour report.

V. Certified and Bonafide Practical record should be submitted at the time of practical examination.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Differentiate the processes and functions of the macromolecules namely the proteins and nucleic acids.	K3
CO2	Acquire analytical skills in comparing and contrasting the biochemical results with reference to its clinical relevance.	K2
CO3	Develop synthetic ability to design and derive new innovative experimental methodologies	K3

	in immunology and microbiology	
CO4	Increase the knowledge on principle, procedures of handling and maintenance of biological instruments and their applications	K3
CO5	To handle biological materials, maintenance of samples, chemicals and lab equipments	K2
CO6	To acquire knowledge on the preparation of salts, solvents and solutes for an experimental procedure	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	L	L	M	S	S	S	S	M	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	S	S	M	S	S	M	L	L
CO4	S	M	L	L	M	S	S	S	S	M	L	L
CO5	S	L	L	M	S	S	S	S	S	M	L	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S – Strong

M – Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – V
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS pattern)

MAJOR ELECTIVE II – SERICULTURE (18UZOEC2)

Hours/Week: 5

Course Credit: 5

Course Objectives:

- Enables the student to have a wide knowledge on the rearing techniques of mulberry
- Gives knowledge on Commercial economical and marketing fields of sericulture
- Encourages the student to fetch the entrepreneurial opportunities in the field of sericulture

UNIT - I Moriculture

(15 Hours)

History and Economic importance of sericulture in India

Moriculture : Distribution of mulberry - Harvesting and preservation of leaves –Diseases of mulberry – Pests of mulberry (Bihar hairy caterpillar, thrips only). Types of silkworm – Mulberry, Tasar, Muga and Eri – Morphology and life cycle of silkworm.

UNIT – II

(15 Hours)

Silkworm rearing: Rearing house - Environmental conditions required for rearing – Hatching. Rearing techniques – Chawki rearing and late age rearing – Mounting of worms and harvesting of cocoons – Silkworm diseases – Pebrine, Flacherie, Muscardine and Grasserie – Pests of silkworms – Uzi fly only.

UNIT – III

(15 Hours)

Breeding of mulberry : varieties of mulberry in India.

Breeding : Selection, Hybridization and selection, Mutation and polyploidy – Breeding for drought and disease resistance.

Breeding of Silkworm: Mutation and heterosis – Methods of Breeding - Inheritance of cocoon colour.

UNIT – IV**(15 Hours)**

Grainage techniques: seed production – Reproductive seeds, Industrial seeds, Hibernating eggs and non – hibernating eggs – Seed organization – Grainage: location, building and equipments. Selection and preservation of seed cocoons – Transportation and examination of seed cocoon – Emergence of moths – Preparation of layings (Egg sheet and loose eggs) washing of silkworm eggs – Mother moth examination – Preservation of multivoltine eggs – Acid treatment (Artificial hatching) – Incubation of eggs.

UNIT – V**(15 Hours)**

Silk reeling : Selection of raw material for reeling – Storage and preservation of raw material – Physical and commercial characters of cocoons. Stifling and drying - Cooking – various systems of reeling - Re-reeling – Cleaning – Lacing – Skeining – Book making – Baling – Byproducts of reeling. Marketing and the role of Central Silk Board in the development of sericulture.

TEXT BOOK:

1. Ganga .G and Sulochanachetty J.(1997) Introduction to sericulture. Oxford and IBH publishing Co. Pvt.Ltd. New Delhi, Bombay , Calcutta.

REFERENCE BOOKS

1. Dandin. S.B. Jayasural and Giridhar.K. (2003) “Hand Book of Sericulture Technologies , Central silk Board, CSB Complex, BTM Layout, Madivala, Bangalore – 560 068.
2. Krishnaswami.S. *et.al.* (1987) Manual on Sericulture Vol.I – Mulberry cultivation Oxford and IBH Publishing Co., Pvt. Ltd., New Delhi.
3. Krishnaswami.Set.al (1987). Manual on Sericulture Vol-II – Silkworm Rearing Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.

4. Krishnaswami, S. *et.al.*, Manual On Sericulture Vol III - Silk Reeling, Oxford and IBH Publishing Co., Pvt. Ltd., New Delhi
5. Narasimhanna. M.N.(1988) – Manual on Silkworm egg production central silk. Ullal.S.R. Narasimhanna .M.N (1994) Hand book of practical sericulture, board.BangaloreCentral silk board, Bombay.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Remember the rearing techniques of both mulberry and silkworm.	K1
CO2	To acquire knowledge on pre and post arrangements for silkworm rearing , cocoon production and equipments involved	K2
CO3	Comprehensive knowledge in the breed of mulberry and silkworm to select for farming its advantage and market demand	K3
CO4	Apply knowledge to procure good quality eggs from production centre, maintain preservation and incubation of eggs	K3
CO5	To understand the idea about agronomic practices involved in reeling and cocoon markets	K2
CO6	Enrich the students on the sericulture as an agro based industry and the entrepreneurial opportunities	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	S	S	S	S	M	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	M	M	L	L
CO4	S	S	L	L	M	S	S	S	S	L	S	L
CO5	S	M	L	M	S	S	S	S	S	M	S	M
CO6	S	S	L	M	M	S	S	S	S	L	L	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.

B.Sc. DEGREE COURSE – SEMESTER – V

**(For candidates admitted from the academic year 2018– 2019 onwards
under CBCS)**

MAJOR ELECTIVE SUBJECT – II – HUMAN NUTRITION (18UZOESC2)

Hours: 5 hrs/week

Course Credits :5

Course Objective:

- To create general health and dietary awareness

UNIT – I (15 Hours)

Introduction and scope. Carbohydrates, proteins and lipids –
Classification – Sources – Digestion and absorption – Daily requirements –
Essential amino acids – Essential fatty acids. Probiotics and prebiotics.

UNIT – II (15 Hours)

Vitamins and Minerals – Sources and functions – Deficiency status. Water
as a nutrient – Regulation of water balance.

UNIT – III (15 Hours)

Calorific values of food – Based metabolic rate – Energy requirements of
man, woman, infants and children.

UNIT – IV (15 Hours)

Nutritional value of foods : Cereals, fruits, milk, egg, meat, fish. Balanced
diet. Nutritional requirements : Infants, school children, pregnant and lactating
mothers and the aged – Health education – Malnutrition.

UNIT – V (15 Hours)

Nutritional anemia – Obesity and under weight – Diabetes mellitus –
Food allergy – A brief summary of therapeutic diets.

REFERENCE BOOKS :

1. Gopalan, C., B.S.Ramasastri and S.C.Balasubramanian. (1971) Nutritive value of Indian foods, National Institute of Nutrition, Hyderabad.
2. Gopalan, D and K.Vijayaragavan, (1971) Nutrition atlas of India. ICMR., New Delhi.
3. Ghosh,S. (1981) The feeding care of infants and young children. UNICEF, New Delhi.
4. Srilakshmi, B., (2002) Dietetics, New Age International (P) Ltd. New Delhi.
5. Swaminathan, M. (1989) Handbook of food and nutrition Bappco., Bangalore.
6. Swaminathan, M., (1974) Essentials of food and nutrition. Vol. I and II. Ganesh and company, Madras.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To recollect the concept of nutritive foods.	K1
CO2	To understand the concepts of vitamins and minerals	K2
CO3	To understand the energy values of various foods	K3
CO4	To study the nutritive value of foods	K2
CO5	To analyze the food deficiency diseases	K4
CO6	To learn about general health and deficiency diseases	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO	PO						PSO					
	CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	S	S	S	S	M	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	L	M	L	L
CO4	S	M	L	L	M	S	S	S	S	M	S	L
CO5	S	M	S	M	S	S	S	S	S	M	S	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S – Strong

M – Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – V
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS pattern)

NON MAJOR SKILL BASED I- PUBLIC HEALTH AND HYGIENE
(18UZONSC1)

Hours/Week: 2

Credit: 2

Course Objectives:

1. Describe the components of personal hygiene
2. Explains the elements and activities that are needed for planning personal hygiene
3. Promotes basic standard of living for healthy life
4. Enrich the students on healthy psychological development
5. Provides life oriented knowledge for a balanced family

UNIT – I

(6 Hours)

Concepts of health and well being– Physical – Mental – Social - Positive health – Quality of Life Index. Nutrition and Health -Balanced diet – Food Hygiene – Food intoxicants.

UNIT – II

(6 Hours)

Environment and Health: Water – Basic health needs – Water borne Diseases – Cholera, Dysentery - Ascariasis
Standards of Housing – Ventilation – Human requirements – Standards.

UNIT – III

(6 Hours)

Mental Health: Types – Crucial points in the life of human beings and its causes - prevention of mental illness. Smoking, alcoholism, drug abuse and deaddiction.

UNIT – IV

(6 Hours)

Health Education: Objectives – Principles – Practice of Health Education. Sex Education, Methods of family planning.

UNIT – IV**(6 Hours)**

Health Situation in India: Health Problems – Primary Healthcare in India – PHC National Programmes – National AIDS Control – National Malaria eradication – National Tuberculosis eradication Programme

TEXT BOOK

1. Sorna Raj, R and Kumaresan, V. (2009). Public Health and Hygiene. Saras Publication, Kanyakumari.

REFERNCE BOOKS

1. Park, J.E. and Park, K. (1990). Text Book of Preventive and Social medicine. 13th edition, Banarsidas. Bhanot. Jabalpur.
2. Swaminathan, M. (1989). Handbook of Food and Nutrition. Bappco, Bangalore.
3. Swaminathan, M. (1974). Essentials of Food and Nutrition, Vol I and II, Ganesh and Company, Madras.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember spectrum of health and health awareness.	K1
CO2	To understand the concepts of health and balanced diet	K2
CO3	To acquire knowledge on environment and health	K2
CO4	To analyse the mental health and self control	K1
CO5	To compare health education and health situation in India	K2
CO6	To apply the knowledge on the various stages of life	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – VI
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS pattern)

Core VIII - ANIMAL PHYSIOLOGY (18UZOC8)

Hours/Week: 5

Credit: 5

Course objectives:

1. to makes the student to know about structure and anatomy of organs
2. to observe the physiological functions and activities of internal organs
3. to analyse and relate the abnormalities and malfunctions associated
4. to undertasnd the molecular mechanisms involved in maintenance and control
5. to comprehend the biochemical regulations involved

UNIT – I

(15 Hours)

Digestion

Digestion of food - absorpction and assimilation

Respiration

Respiratory pigments – structure and properties of haemoglobin – transport of respiratory gases: O₂ transport, O₂ dissociation curve. CO₂ transport, Hb as a buffer – Control of Respiration.

UNIT – II

(15 Hours)

Circulation

Composition and functions of blood – Blood clotting, heart beat – Origin, conduction of heart beat in man – Blood pressure – Cardiac cycle- Cardiac output – Coronary Blood Vessels – Myocardial infarction.

Excretion

Nitrogenous waste products – Structure of the mammalian kidney and physiology of urine formation – acid base balance.

UNIT-III

(15 Hours)

Receptor Mechanisms

Photoreception – structure of retina – visual pigments, photochemistry: Mechano reception. phonoreception, pacinian corpuscles.

Muscle Contraction

Structure of skeletal muscle and myofibril – Molecular organisation, mechanism and chemistry of muscle contraction - Energetics of muscle contraction

UNIT – IV

(15 Hours)

Neural Conduction

Nerve impulse – properties, - Transmission of nerve impulse: Intra neuronal transmission – Interneuronal transmission – Neuromuscular junction – Reflex action : types of reflexes, Reflex arc – Reflex centre.

Endocrine Glands

Hypothalamus – pituitary – thyroid – parathyroid – thymus - adrenal cortex and medulla – pancreas - ovary and testis - structure, hormones and their hypo and hyper functions.

UNIT- V

(15 Hours)

Reproduction

Reproductive organs – reproductive cycle – hormonal control

Biological Rhytham- Diurnal circadian -circannual

TEXT BOOKS

1. Mariakuttikan A. and Arumugam N. Animal physiology (2002) Saras Publications.

REFERENCE BOOKS

1. Best and Taylor (1960). The living Body – Holt, Rinehart and Winston Inc.
2. Gordon, M.S. (1977). Animal physiology – Principles and adaptations – Collier Mac.Millan International Edition.P.699.
3. Hainworth F.R. (1981). Animal physiology – Adaptations and functions – Addition wesleypub.Co.P 669.
4. Hoar, S.W. (1987). General and comparative physiology Prentice Hall
5. Langley (1969). Homeostasis – Affiliated to East West Press Pvt. Ltd., New Delhi.

- 6 Prosser C.L. and Brown (1973). Comparative Animal physiology –W.B Saunders Philadelphia, London
- 7 Strand, F.L. (1978). Physiology, A regulatory system, approach, Collier Mac Millan – International Edition P. 602.
- 8 Yapp. (1970). Introduction to Animal Physiology oxford Clarendon press (New York).
9. IttaSambasiviah, Kamalakara Rao, A.P. and Augustine Chellappa, S. (1965). Text Book of Animal Physiology and Ecology. Guru Printers, Madras.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To remember the mechanism of digestion absorption and assimilation.	K1
CO2	To comprehend physiological activity of organ system.	K2
CO3	To apply functional knowledge on various organs and its status.	K3
CO4	Analyze the physiological disorders, syndromes and diseases.	K4
CO5	Evaluate the physiology of their own body and urge them to take precautionary measures to safe guard their health.	K4
CO6	To create knowledge the instrumentation applied and used in the field of physiology and medicine	K2

K-1Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	L	S	S	S	M	L	L	M
CO2	S	L	M	L	M	S	S	S	S	M	S	M
CO3	S	L	M	L	M	M	S	S	M	M	L	S
CO4	S	M	L	L	M	S	S	S	M	M	L	L
CO5	S	M	L	M	L	M	S	S	S	M	L	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.

B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – VI

(For the candidates admitted from the academic year,

2018 – 2019 onwards Under CBCS)

CORE – IX - MICROBIOLOGY AND IMMUNOLOGY (18UZOC9)

Hours/Week: 5

Course Credit: 5

Course Objectives:

1. Overview of the microbial world, its structure and function.
2. To familiarize the learner with the applied aspects of microbiology.
3. To understand the importance of Immune system.

MICROBIOLOGY

UNIT – I

(15 Hours)

History and scope of microbiology: Classification of microorganisms; Culture of microorganism: Culture media and types – Culture techniques, Maintenance and Preservation of bacterial culture.

UNIT – II

(15 Hours)

Bacteria: General Structure-Gram staining (Gram positive, Gram negative)

Bacterial growth: Growth rate – Growth curve – Factors affecting growth.

Virus: characteristic and symmetry of virus- Structure of T₄ bacteriophage

Medical Microbiology

Study of some common bacterial and viral diseases of man – Causative organisms, Mode of transmission, Pathogenicity, Symptoms and their preventive measures of Tuberculosis, Typhoid, Viral hepatitis and AIDS

IMMUNOLOGY

UNIT – III

(15 Hours)

History and scope of immunology

Types of Immunity: Innate, Acquired, Passive and active

Primary and secondary organs

Lymphocytes:T and B Cells, origin, differentiation and distribution in man

Vaccines and Toxioids : Preparation and immunization.

Antigen:Types –structure, properties and functions.

UNIT – IV

(15 Hours)

Antibody: Structure, types, distribution and biological functions.

Antigen-Antibody Reactions and immunological techniques:

Immunodiffusion, Immuno fluorescence and ELISA.

Humoral immunity

Antigen recognition – cell interactions – clonal proliferation – interleukins
– antibody synthesis – regulation of antibody synthesis.

Cell mediated immunity :Role of TC, TD, NK cells and macrophages.

UNIT – V

(15 Hours)

Autoimmune diseases : Grave's disease, Serum sickness and Rheumatoid arthritis.

Tumour Immunology: Tumour antigens, immune surveillance, tumour immunotherapy.

TEXT BOOKS

1. RiottsEssential Immunology, 2006. Wiley. Blackwell publications.
2. C.Powar, 2010. General microbiology by Himalaya Publishing house.

REFERENCE BOOKS

MICROBIOLOGY

1. Adams, M.R and Moss, M.U (1995) Food Microbiology, New Age International Publishes Pvt. Ltd. New Delhi.
- 2 Edward I . Alcamo (1997) – Fundamental of Microbiology. Addison Wesley Longman. Inc. California
3. Gerard J. Tortora, Berdell R. Furke Christine. Case. L (1982) – Microbiology An Introduction. The Benjamin / Cummings Publishing company.,Inc. California.
4. Larry Mc kane& Judy Kandel (1996) Microbiology . Essentials &Applications , Mc. Graw Hill Inc. USA.

5. Michael. J. PelcZar. Jr , Chan, E.C.S Noel R. Krieg (1993) Microbiology. Tata Mc Graw Hill publishing Co.Ltd. New Delhi
6. Prescott &Dunn's(1982) Industrial Microbiology CBS Publishers & Distributors, Delhi.

IMMUNOLOGY

7. Donald. M. Weir & John Stewart (1997). Immunology . Churchill Livingstone Pvt. Ltd. New York.
8. Ivan. M. Roitt (1988) Essential Immunology.BlackwellScientfic publication Pvt Ltd .New Dehli
9. Johi. K. J &Osamo.N.o(1994) Immunology. AgroBotanical Publishes pvt, Ltd, Bikankar.
10. Salle, A.J. (1974) Fundamental Principles of Bacteriology.

Course Outcomes (CO):

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To keep in mind about the scope of microbiology and immunology.	K1
CO2	To understand the classification of microorganisms and immunity.	K2
CO3	To apply the knowledge about food microbiology, Agricultural microbiology, Medical microbiology and distinguish Innate immunity and Acquired Immunity	K3
CO4	To analyse disease producing microorganisms and importance of Immune system	K4
CO5	To gain knowledge about Autoimmune diseases and Tumour Immunology	K2
CO6	To obtain various domains of Microbiology and Immunology.	K4

K-1Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	S	S	S	S	M	L	S	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	S	S	S	S	S	M	S	L
CO4	S	M	L	L	M	S	S	S	M	M	S	L
CO5	S	M	L	M	S	S	S	S	S	M	S	M
CO6	S	M	L	M	M	S	S	S	M	L	S	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – VI
(For the candidates admitted from the academic year, 2018 – 2019
onwards Under CBCS)

CORE - X – BIOCHEMISTRY (18UZOC10)

Hours/Week: 5

Course Credit: 5

Course Outcomes:

1. Understand the structure of Atoms and Molecules.
2. To know the term pH, buffer.
3. To understand the structure and functions of carbohydrates, Aminoacids, Proteins and Lipids.
4. To understand the metabolism of Carbohydrates, Proteins and Lipids.
5. To gain knowledge on role of Enzymes and Vitamins in day to day life.

UNIT – I

(15 Hours)

Atoms and Molecules: Structure Of atom-chemical bonds: primary bonds: covalent bond- ionic bond-secondary bonds: hydrogen bond- Vander walls interactions- hydrophilic and hydrophobic molecules.

Elements of life – water: structure, water as a solvent, ionization reaction - pH: Hydrogen ion concentrations- buffer system – (Bicarbonates and Phosphates) – Acids – Bases and salts: Biological functions.

UNIT II

(15 Hours)

Biomolecules:

Amino acids: General structure- classification based on structure and functions

Proteins: General structure- classification- biological functions and metabolism: Oxidative deamination – Transamination –Transdeamination

UNIT III

(15 Hours)

Carbohydrates: General structure- classification- biological functions and metabolism: Glycogenesis – Glycogenolysis – Gluconeogenesis – Glycolysis – Krebs cycle - Electron transport system and Oxidative phosphorylation

UNIT IV

(15 Hours)

Lipids: General structure- classification- biological functions and metabolism:β Oxidation of fatty acids - Ketogenesis
Urea and ornithine cycle- metabolism and biological significance

UNIT V

(15 Hours)

Enzymes: Definition – nomenclature – classification – characteristic features – mechanism of action: Induced fit and Lock and key Model - factors affecting enzyme activity – specificity – enzyme inhibition – co-enzyme – isoenzymes - anti enzymes. Enzyme Kinetics: Michaelis-Menten equilibrium.

Vitamins: Water soluble and Fat soluble: sources, biological functions and deficiency diseases.

TEXT BOOK:

1. J.L Jain, Nithin Jain and Sanjay Jain (2005) Fundamentals of Biochemistry 6th edition, Chand Publications

REFERENCE BOOKS

- 1 Stryer, Biochemistry (2001) 5th edition, W.H. Freeman and company , USA
- 2 Harpers illustrated biochemistry, a Lange medical book 26th edition (2001). The McGraw Hill company USA
- 3 Nelson and Cox Principles of Biochemistry(IV edition) (2001) Leninger Book publications
- 4 Vasantha Pattabhi & Goutham , Biophysics (2005) Narosa Publishing House Pvt Ltd New Delhi

- 5 P.K. Srivastava , elementary biophysics(2011) Narosa Publishing House Pvt Ltd New Delhi
- 6 Mohan P Arora , Biophysics (2007) Himalays Publishing House , Mumbai
- 7 Well J.H (1990) General Biochemistry, Willey Eastern Hall, Madras

Course Outcomes (CO):

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To acquire the knowledge about Atoms and Molecules as well as Elements of Water.	K1
CO2	To understand about Biomolecules (Amino acids and Proteins).	K2
CO3	To analyze the structure of Carbohydrates and its biological functions	K3
CO4	To gain knowledge about the structure of Lipids and its biological functions	K1
CO5	To understand the concept of Enzymes and Vitamins.	K2
CO6	Equip knowledge on various biochemical concepts in our body.	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	L	S	S	S	M	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	S	S	L	L
CO4	S	M	L	L	M	S	S	S	S	S	S	L
CO5	S	M	L	M	L	S	S	S	S	M	S	M
CO6	S	M	L	M	M	S	S	S	S	L	L	M

S – Strong
M – Medium
L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.
B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – VI
(For the candidates admitted from the academic year,
2018 – 2019 onwards Under CBCS)

MAJOR ELECTIVE III – BIOTECHNOLOGY (18UZOEC3)

Hours/Week: 5

Course Credit: 5

Course Objectives:

1. To understand the scope and significance of Biotechnology.
2. To understand the agricultural and animal Biotechnology.
3. To gain knowledge on microbial Biotechnology.
4. To understand the medical Biotechnology.
5. To gain knowledge on Environmental Biotechnology.

UNIT – I

(15 Hours)

Introduction – History and Scope

Genetic Engineering: Gene cloning vectors: Plasmids – pBR322, Lambda phage vector and cosmid. Construction and introduction of recombinant DNA into Host cell. Identification of Recombinants, Expression of cloned genes.

UNIT – II

(15 Hours)

Agricultural Biotechnology: Bio-fertilizers - Bio-pesticides - Single cell protein.

Animal Biotechnology: Cell, tissues and Organ culture – Cryopreservation - Transgenic animals and their uses.

UNIT – III

(15 Hours)

Microbial Biotechnology: Microbes in enzyme production - methods, immobilization and applications. Commercial production of amino acids – L-glutamic acid, Organic acids - Citric acid, Antibiotics – Penicillin. Toxins - production of β -exotoxin and mycotoxin,

UNIT – IV

(15 Hours)

Medical Biotechnology: Monoclonal antibodies, Gene therapy and its types, DNA finger printing - Human Genome project.

UNIT – V

(15 Hours)

Environmental Biotechnology: Bioreactors, Biosensors and Biochips, IPR.

TEXT BOOK

1. R.C. Dubey (2005) A text book of Biotechnology S. Chand and Company Ltd., Ram Nagar, New Delhi – 110055.

REFERENCES

1. Desmond S.T. Nicholl (2004) – An Introduction to Genetic Engineering Second Edition. Published by ManasSaikia for Foundation Books Pvt.Ltd., Mayapuri., phase – II, New Delhi – 110 064.
2. Gupta P.K (2001) Elements of Biotechnology, Rastogi publication, Meerut.
3. Kumar H.D. (1993) Molecular Biology and Biotechnology, Vikas publishing House Pvt. Ltd., New Delhi.
4. Kumar HD (1993) A text Book on Biotechnology East west affiliated press Ltd.,
5. S.B.Primrose (1994) Principles of Gene manipulation. An Introduction to Genetic Engineering Oxford. Blackwell Scientific Publications London Edinburgh Boston, Melbourne, Paris, Berlin, Vienna.

Course Outcomes (CO)

On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To get knowledge about the basic technology of Biotechnology.	K1
CO2	To Understand about Agricultural Biotechnology and Animal Biotechnology.	K2
CO3	To apply Microbial Biotechnology to produce commercial products.	K3
CO4	To acquire knowledge about Medical Biotechnology	K1
CO5	To know about Environmental Biotechnology and make interest in IPR.	K2
CO6	To gain knowledge on various application of Biotechnology	K4

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	S	L	M	S	S	S	S	M	S	S	M
CO2	S	S	S	L	M	S	S	S	S	S	S	M
CO3	S	S	M	S	M	S	S	S	S	S	M	L
CO4	S	S	S	L	M	S	S	S	S	S	S	L
CO5	S	S	S	M	S	S	S	S	S	S	S	M
CO6	S	S	S	M	M	S	S	S	S	S	S	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16.

B.Sc. DEGREE COURSE – SEMESTER – VI

**(For candidates admitted from the academic year 2018 – 2019 onwards
under CBCS)**

**MAJOR ELECTIVE SUBJECT - III - FUNDAMENTALS OF TOXICOLOGY
(18UZOESC3)**

Hours: 5 hrs/week

Course Credits :5

UNIT – I

(15 Hours)

Introduction – History and Disciplines of toxicology – Toxicants and their classification – Toxicity – Environmental Carcinogens.

UNIT – II

(15 Hours)

Major Anthropogenic Global Environmental Problems. Acid Rain, Greenhouse Effect, Smog, Ozone depletion, Eutrophication.

UNIT – III

(15 Hours)

Toxicity tests – Types – Acute, Sub-Acute, Chronic toxicity tests – Maximum acceptable toxicant concentration – Toxic Effects.

UNIT – IV

(15 Hours)

Toxicological Testing methods – Functional tests; Respiratory, Liver functional, Kidney functional tests – Dose Response. Relationship – Mode of action of toxicants – Modifying factors of toxicity of Xenobiotic chemicals.

UNIT – V

(15 Hours)

Selective toxicity – Biotransformation of toxicants – Bioaccumulation of Xenobiotics – Antidotal procedures – Environmental Impact and Risk Assessment.

REFERENCES :

1. Ariens. E.J., Simonis, A. MandOffermerier, J. (1976) Introduction to General Toxicology.
2. Gupta, P.K. and Salunkhe, D.K. (1985) Modern Toxicology Vol. I, II, III Metropolitan Book Co. Pvt. Ltd. New Delhi.
3. Kamleshwar Pandey, Shukla J.P. and Trivedi S.P. (2006) Fundamentals of Toxicology. New central Book Agency (p) Ltd, 8/1 Chintamani Das lane, Kolkata - 700009, India.
4. Omkar. Concepts of Toxicology. Naginchand and Co. Jalandhar (India)
5. Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics. Popular Prakashan, Mumbai (India).
6. Sharma. P.D. (2000) Toxicology, Rastogi Publications Meerut. U.P

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	To study basic toxicological principles and toxicants	K2
CO2	To analyse different major anthropogenic problems	K3
CO3	To describe different toxicity tests and their effects.	K1
CO4	To study different toxicological tests and their effects.	K4
CO5	To describe environmental impact and risk assessment.	K1
CO6	To apply different toxicological frameworks within the professional disciplines and have awareness about different risk assessment criteria	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse

Mapping of COs with POs:

PO/ PSO CO	PO						PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	S	M	L	M	S	S	S	S	M	L	L	M
CO2	S	L	S	L	M	S	S	S	S	M	S	M
CO3	S	L	M	S	M	S	S	S	S	S	L	L
CO4	S	M	L	L	M	S	S	S	S	M	L	L
CO5	S	S	L	M	S	S	S	S	S	S	L	M
CO6	S	S	L	M	M	S	S	S	S	L	L	M

S - Strong

M - Medium

L - Low

SRI SARADA COLLEGE FOR WOMEN, (AUTONOMOUS) SALEM – 16.

B.Sc., DEGREE COURSE - ZOOLOGY MAIN - SEMESTER – VI

(For the candidates admitted from the academic year, 2018 – 2019 onwards Under CBCS pattern)

Non Major Skill Based II - Applied Zoology (18UZONSC2)

Hours/Week: 2

Course Credit: 2

Course Objectives:

1. Create an interest on the Entrepreneurial opportunities in the field of Zoology.
2. Deal with rearing methods of silkworm, earthworm, honeybee
3. To develop skills in rearing methods of fish and poultry
4. To gain knowledge on the diseases, pests and their control
5. To comprehend management and economics of domestic animal and its byproducts

UNIT – I

(6 Hours)

Vermiculture and vermicomposting

Species of earthworm - food and feeding- advantages of vermiculture, -
Methods of vermiculture - Vermicomposting and applications of vermiculture.

UNIT – II

(6 Hours)

Apiculture

Species of honey bee – Social organisation of honey bee – Life history –
Selection of bees for apiculture – Bee keeping appliances (Newton's hive) with
accessories – Products of bee keeping – Economic importance of honey and
Bees wax.

UNIT – III

(6 Hours)

Fresh water Fish Culture:

Major carps: Fish seed – Types of hatching pits – Transport of fish fry to
Nursery ponds – Rearing ponds – Stocking ponds – Harvesting – Diseases.
Preservation of fish - By-products of fishing industries

UNIT – III**(6 Hours)****Poultry**

Fowl house – Food and feeding of Fowls – Breeding in Fowls – Selection of eggs – Treatment of eggs – Rearing of chickens – Diseases – Poultry products (Egg and Poultry meat).

UNIT – V**(6 Hours)****Dairy Farming**

Breeds of Dairy animals – Food and feeding – Diseases – Processing of milk – Milk products.

TEXT BOOK

1. Shukla, G.S. and Upadyay (1989). Economic Zoology, Rashtogi Publications, Shivaji Road, Meerut – 250 002.

REFERENCE BOOKS

1. Bhatnagar R.K and R.K Palta (1996) Earthworm vermiculture and vermi composting Kalyan publications, Ludiana, North Delhi.
2. Fexemore – P.G. & Alka Prakash (1995). Applied Entomology, Wiley Eastern Ltd., New age International, New Delhi.
3. Metcalf C.L. Flint, W.P. and Metcalf R.L. (1973) Destructive and useful insects – Their habits and control, (fourth edition) Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.
4. Nayar, K.K. Ananthakrishnan, T.N. and David, B.V. General and Applied Entomology, Tata Mc. Graw Hill.
5. Vasantharaj David, B. Muralinarayan, M C., and MeeraMuralinarayan (1992), Applied Entomology, Popular book Depot, Madras – 15.
6. Vasantharaj David, B. & Kumaraswami. T. (1988) Elements of Economic Entomology) IV Edition Popular Book Report Madras.
7. Vishwapremi, K.K.C (1991) Economic Zoology Akashdeep Publishing House Pvt. Ltd., New Delhi.

Course Outcomes (CO): On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the potential of vermicompost as fertilizer, in protecting environment and waste recycle	K2
CO2	Apply the knowledge on bee biology and management of the apiary	K3
CO3	Know the basis of technologies of fisheries and their importance in protein production	K1
CO4	Recall and apply information about the key components of poultry industry production	K4
CO5	Acquaint with breeds, management raising and Know the general composition of dairy products and ingredients	K1
CO6	To apply the knowledge and encourages to become an entrepreneur	K2

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse