

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS)

Reaccredited with 'B++' Grade by NAAC

(Affiliated to Periyar University)

SALEM-16



DEPARTMENT OF ZOOLOGY

CHOICE BASED CREDIT SYSTEM (CBCS)

LEARNING OUTCOME BASED CURRICULUM FRAME WORK (LOCF)

B.Sc. ZOOLOGY

2026-2029 BATCH

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INTRODUCTION

Zoology, the scientific study of animals, is a vast and fascinating field that encompasses the biology, behavior, ecology, evolution, and conservation of animals. From the simplest invertebrates to the most complex vertebrates, animals play a vital role in shaping our planet's ecosystems and influencing human lives.

Zoology is an important subject for understanding the complex relationships between animals and their habitats, as well as the impact of human activities on animal populations and ecosystems. Exploring the diversity of animal life can help us understand the development of life on Earth, the functioning of ecosystems, and the importance of conservation.

This branch of study has several applications, including conservation biology, wildlife management, animal husbandry, biomedical research, and environmental science. Understanding animal physiology and ecology allows us to create successful strategies for preserving endangered species, regulating wildlife populations, and encouraging sustainable use of natural resources.

Zoological studies help us to appreciate the beauty and complexity of animal life, from the delicate structures of insects to the majestic migrations of whales. By experiencing the wonders of the animal kingdom, we can inspire wonder, curiosity, and responsibilities for the natural world.

This Zoology programme has been planned to improve the knowledge, insights, and applications that benefit both humans and animals and increase the scope for higher education.

This programme offer numerous career opportunities and applications in various fields. By studying Zoology, individuals can gain a deeper understanding of the natural world and contribute to the conservation and management of animal population and ecosystems.

TANSCHÉ REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR UNDERGRADUATE EDUCATION	
Programme:	B.Sc. Zoology
Duration:	3 years [Under Graduate]
Programme Outcomes: (These are mere guidelines. Faculty can create POs based on their curriculum or adopt from UGC or University for their Programme)	PO1: Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study. PO2: Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups. PO3: Critical thinking: Capability to apply analytic thought to a body of knowledge; analyses and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development. PO4: Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non- familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations. PO5: Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints. PO6: Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and- effect relationships; ability to plan, execute and report the results of an experiment or investigation PO7: Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team PO8: Scientific reasoning: Ability to analyze interprets and draws

	conclusions from quantitative/qualitative data; and critically evaluates ideas, evidence and experiences from an open-minded and reasoned perspective. PO9: Reflective thinking: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society. PO10 Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data. PO 11 Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion. PO 12 Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups. PO 13: Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work. PO 14: Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way. PO 15: Lifelong learning: Ability to acquire knowledge and skills, including „learning how to learn“, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.
Programme Specific Outcomes: (These are mere guidelines.	PSO1 – Placement: To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions. PSO 2 - Entrepreneur: To create effective entrepreneurs by enhancing their critical thinking,

Faculty can create POs based on their curriculum or adopt from UGC or University for their Programme)	problem solving, decision making and leadership skill that will facilitate startups and high potential organizations PSO3 – Research and Development: Design and implement HR systems and practices grounded in researches that comply with employment laws, leading the organization towards growth and development. PSO4 – Contribution to Business World: To produce employable, ethical and innovative professionals to sustain in the dynamic business world. PSO 5 – Contribution to the Society: To contribute to the development of the society by collaborating with stakeholders for mutual benefit
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HIGHLIGHTS OF THE REVAMPED CURRICULUM

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising statistical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced statistical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Statistics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- The Statistical Quality Control course is included to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience, which connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the sixth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest curricular methods.

VALUE ADDITIONS IN THE REVAMPED CURRICULUM

Semester	Newly introduced Components	Outcome / Benefits
I	Foundation Course To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning abstract Statistics and simulating mathematical concepts to real world.	• Instill confidence among students • Create interest for the subject
I, II, III, IV	Skill Enhancement papers (Discipline centric / Generic / Entrepreneurial)	• Industry ready graduates • Skilled human resource • Students are equipped with essential skills to make them employable • Training on Computing / Computational skills enable the students gain knowledge and exposure on latest computational aspects • Data analytical skills will enable students gain internships, apprenticeships, field work involving data collection, compilation, analysis etc. • Entrepreneurial skill training will provide an opportunity for independent livelihood • Generates self – employment • Create small scale entrepreneurs • Training to girls leads to women empowerment • Discipline centric skill will improve the Technical knowhow of solving real life problems using ICT tools
III, IV, V & VI	Elective papers- An open choice of topics categorized under Generic and Discipline Centric	• Strengthening the domain knowledge • Introducing the stakeholders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature • Students are exposed to Latest topics on Radiation biology, Agricultural entomology, Medical Lab Technology,

		that require strong research and entrepreneurial background. Emerging topics in higher education / industry / communication network / health sector etc. are introduced with hands-on-training, facilitates designing of statistical models in the respective sectors
IV	DBMS and Programming skill, Biostatistics, Statistical Quality Control, Official Statistics, Operations Research	- Exposure to industry moulds students into solution providers - Generates Industry ready graduates - Employment opportunities enhanced
II year Vacation activity	Internship / Industrial Training	Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experience and also become responsible citizens.
V	Project with Viva – voce	- Self-learning is enhanced - Application of the concept to real situation is conceived resulting in tangible outcome
VI	Introduction of Professional Competency component	- Curriculum design accommodates all category of learners; ‘Statistics for Advanced Explain’ component will comprise of advanced topics in Statistics and allied fields, for those in the peer group / aspiring researchers; ‘Training for Competitive Examinations’ –caters to the needs of the aspirants towards most sought - after services of the nation viz, UPSC, ISS, CDS, NDA, Banking Services, CAT, TNPSC group services, etc.
Extra Credits: For Advanced Learners		To cater to the needs of peer learners / research aspirants
Skills acquired from the Courses		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Credit Distribution for UG Programme

Sem I	Cre	H	Sem II	Cre	H	Sem III	Cr	H	Sem IV	Cre	Hr	Sem V	Cr	Hr	Sem VI	Cre	Hr
Part1. Language - Tamil	3	6	Part.1 Language– Tamil	3	6	Part.1 Language – Tamil	3	6	Part.1. Language – Tamil	3	6	5.1Core Course– CVII	4	4	6.1 Core Course – CC X	5	6
Part.2 English	3	6	Part.2 English	3	6	Part - 2 - English	3	6	Part..2 English	3	6	5.2Core Course– CCVIII	4	5	6.2Core Course – CC XI	5	6
1.3 Core Course–I	3	3	2.3Core Course– CC III	5	6	3.3 Core Course – CC IV	3	3	4.3 Core Course– CC VI	5	5	5. 3.Core Course-CC - IX	4	5	6.3Core Course – CC XII	5	6
1.4 Core Course– C II	3	3	2.4 Core Lab Course–I	3	3	3.4 Core Course– CC V	3	3	4.4Core Lab Course– II	3	3	5.4.Core Lab Course– CC-III	-	3	6.4.Core Lab Course–CC- III	3	3
1.5Core Lab Course–I	-	3				3.5.Core Lab course – II	-	3	4.5. Elective IV Generic	3	3	5.5.Core Lab Course– CC-IV	-	3	6.5.Core Lab Course– CC-IV	3	3
1.6 Elective I Generic	3	3	2.5Elective II Generic	3	3	3. 6. Elective III Generic	3	3	4.6 Elective IV Generic Practical - III	2	2	5.6 Elective - Discipline Specific - V	3	3	6.6. Elective Discipline Specific -VI	4	4
1.7 Elective I Generic Practical	2	2	2.6 Elective I Generic Practical	2	2	3.7. Elective III Generic Practical - II	2	2	4.7. Skill Enhancement Course SEC-6	2	2	5. 7.Core Course–Project with viva-voce	4	5	6.7 Extension Activity	1	-
1.8 Skill Enhancement Course SEC-1	2	2	2.7 Skill Enhancement Course SEC-2	2	2	3.8. Skill Enhancement Course SEC-4, (Entrepreneurial Skill)	1	1	4.8. Skill Enhancement Course SEC-7	2	2	5.8 Value Education	2	2	6.8. Professional Competency Skill	2	2
1.9 Skill Enhancement -(Foundation Course)	2	2	2.8. Skill Enhancement Course– SEC-3	2	2	3.9 Skill Enhancement Course SEC-5	2	2	4.9 E.V.S	2	1	5.9. Summer Internship	2	15 Days			
						3.10. E.V.S.	-	1									
						3.11. Health &	1										
	21	30		23	30		21	30		25	30		23	30		28	30
Total– 141 Credits																	

**CONSOLIDATED SEMESTER WISE AND
COMPONENT WISE CREDIT DISTRIBUTION**

Parts	Sem I	Sem II	Sem III	Sem IV	SemV	Sem VI	Total Credits
Part I	3	3	3	3	-	-	12
Part II	3	3	3	3	-	-	12
Part III	11	13	11	13	19	25	92
Part IV	4	4	4	6	4	3	25
Total	21	23	21	25	23	28	141

Part I, II and Part III components will be separately taken into account for CGPA calculation and classification for the undergraduate programme and the other component. Part IV has to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.

Total Credits: 141

EXTRA CREDITS FOR EXTRA SKILLS

Total Extra Credits -28 (20% of the total credits)

**SRISARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16 DEPARTMENT
OF ZOOLOGY**

B.Sc. ZOOLOGY PROGRAMME STRUCTURE UNDER CBCS

(For the Students Admitted from the Academic Year 2026-2027 onwards)

Total Credits: 141 + Extra Credits (Maximum 28)

FIRST YEAR

SEMESTER - I

Part	Course Code	Course Title	Course Type	Hrs. / Week L/T/P	Credits	CIA	ESE	TOTAL
I	26ULTC1/ 26ULHC1/ 26ULSC1	Tamil/Hindi/ Sanskrit –I	Language	6	3	30	70	100
II	26ULEC1	English – I	English	6	3	30	70	100
III	26UZOCC1	Invertebrata-I	Core Course	3	3	30	70	100
	26UZOCC2	Invertebrata-II	Core Course	3	3	30	70	100
	26UZOCCQ1	Invertebrata and Chordata Practical	Core Course	3	-	40	60	100
	26UZOBGEC1	Botany – I	Generic Elective	3	3	30	70	100
	26UZOBGECQ1	Botany Practical		2	2	40	60	100
IV	26UZOSEC1	Animal Behaviour	Skill Enhancement Course	2	2	30	70	100
	25UZOSEFC	Economic Zoology	Foundation Course	2	2	30	70	100
Total				30	21			
*Extra Skills (Out of College Hours)						*Credits	*Marks	
Articulation and Idea Fixation						-	-	
Physical Fitness Practice						-	-	
Society Connect Activity						-	-	

***Extra credits are given for extra skills and courses qualified in MOOC / NPTEL**

PEDAGOGICAL APPROACHES TEACHING LEARNING STRATEGIES

- a) Chalk and talk
- b) Group-Learning and Teaching
- c) Individual Learning / Self-Study
- d) Game Based Learning
- e) Technology Based Learning
- f) Peer Teaching
- g) Learning Through Problem solving
- h) Project Based Learning

METHODS OF EVALUATION AND ASSESSMENT

Methods of Evaluation-Theory		
Internal Evaluation	Continuous Internal Assessment Test	30 Marks
	Assessment Components	
	Model Examination and Attendance	
External Evaluation	End Semester Examination	70 Marks
	Total	100 Marks
Methods of Evaluation-Practical		
Internal Evaluation	Laboratory work assessment (best 2 out of 3)	40 Marks
	Viva voce / Lab quiz, Class Performance	
External Evaluation	End Semester Examination	60 Marks
	Record	
	Total	100 Marks
REVISED BLOOMS LEVEL		
BL1	Exhibits memory of previously learned material by recalling fundamental facts, terms, basic concept and answers about the selection.	
BL2	Demonstrate understanding of parts and Idea free organizing, comparing, translating, interpreting, giving descriptors and stating main ideas.	
BL3	Solve problems in new situation by applying acquired knowledge, facts, techniques and rules in different or new way.	
BL4	Examine and break information into parts by identifying motives or causes. Make inference and find evidence to support generalizations.	
BL5	Present and defend opinion by making judgement about information, Validity of ideas or quality of work based on a set of criteria.	
BL6	Compile information together into different way by combining elements in a new pattern or proposing alternative solutions.	

Evaluation Pattern

An academic year is divided into two semesters. The first semester is from June/July to November/December and the second semester is from November/December to April/May. A semester consists of 90 working days.

Evaluation consists of both Continuous Internal Assessment (CIA) and End Semester Examinations (ESE). The entire Undergraduate and Postgraduate Programmes offered by our college have various assessments for continuous internal evaluation. Relevant types of internal assessment are developed suiting the needs and requirements of each specific course. The various assessment components are quiz, snap test, viva-voce, seminar, listening comprehension, reading comprehension, problem solving, map reading, group discussion, panel discussion, assignment, field visit, poster presentation, open book test, writing composition, case study, online test, Book Review, Projects etc.

The CIA marks are read out and signed by the students in the respective classes on the day specified in the calendar. CIA is mandatory for all the students.

Internal Assessment Modes (Theory Course)

Any six of the assessment components	15 marks
Cycle Test(2)	5 marks
Model Examination	5 marks
Attendance	5 marks
Total	30 marks

Internal Assessment Modes (Practical Course)

Laboratory work assessment (best 2 out of 3)	20 marks
Viva voce / Lab quiz	10 marks
Class Performance	10 marks
Total	40 marks

Society Connect Project (UG&PG)

Project Assessment	10 marks
Presentation and feedback from the society	10 marks
Participation in discussion	10 marks
Total	30 marks

Internal Assessment Modes (Project)

Project Assessment	15 marks
Participation in discussion	10 marks
Presentation	5 marks
Total	30 marks

PASSING MINIMUM

The candidate shall be declared to have passed the examination if the candidates secure not less than 28 marks out of 70 marks in the semester examination in each theory course and in total (CIA mark + Theory ESE) not less than 40 marks.

The candidates shall be declared to have passed the examination if she secures not less than 40 marks in total (CIA mark + Practical Exam mark) with minimum of 24 marks out of 60 marks in the Practical Exam conducted by the University. There is no passing minimum for the record notebook. However, submission of the record notebook is necessary. Candidate who does not obtain the required minimum marks for a pass in a Course/Practical shall be declared Re-Appear (RA) and the candidate has to appear and pass the same at a subsequent appearance.

Theory Course (Revised Bloom's Taxonomy)

Question Paper Model for UG

Intended Learning Skills	Maximum 70 marks Passing Minimum: 40 % Duration: Three hours
Memory Recall/ Example/ Counter Example/Knowledge about the Concept/ Understanding	Part-A (20×1=20 marks) Answer ALL questions Each question carries 1 marks
	Four questions from each UNIT
	Questions 1 to Questions 20
Description/Application(problem)	Part-B (5×4=20 marks) Answer ALL questions Each question carries 4 marks
	Either-or-Type Both parts of each question from the same Unit
	Questions 21(a) or 21(b) to Questions 25 (a) to 25 (b)
Analysis/Create/Evaluation	Part- C (3×10=30 marks) Answer ANY THREE questions Each question carries 10 marks
	There shall be FIVE questions covering all the five units
	Question 26 to Question 30

Each question should carry course outcomes and cognitive level For instance:

1. [CO1:BL2] Questionxxxx
2. [CO3:BL1] Questionxxxx

SEMESTER- I

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
26UZOC1	INVERTEBRATA-I	Core	Y	-	-	-	3	3	30	70	100
Learning Objectives											
❖	To understand the basic concepts of lower animals and observe the structure and functions.										
❖	To illustrate and examine the systemic and functional morphology of various group of invertebrates.										
❖	To differentiate and classify the various groups of animal modes of life and to estimate the biodiversity.										
❖	To compare and distinguish the general and specific characteristics of reproduction in lower animals.										
❖	To infer and integrate the parasitic and economic importance of invertebrate animals										
UNIT	Details							No. of Hours	Course Objectives		
I	Invertebrata: Classification, taxonomy and nomenclature. Protozoa: General characters and classification up to classes. Type study - <i>Paramecium</i> Parasitic protozoans (<i>Plasmodium</i> , <i>Entamoeba</i> , <i>Trypanasoma</i> &							9	CO1		
II	Porifera: General characters and classification up to Classes. Type study - Ascon & Sycon - Canal system in sponges.							9	CO2		
III	Coelenterata: General characters and classification up to classes. Type study - <i>Obelia</i> and <i>Aurelia</i> - Corals and coral reefs – Polymorphism.							9	CO3		
IV	Platyhelminthes: General characters and classification up to classes. Type study – <i>Fasciola hepatica</i> , <i>Taenia solium</i> , <i>Ascaris lumbricoides</i> . Parasitic adaptations.							9	CO4		
V	Annelida: General characters and classification up to Classes. Type study – <i>Nereis</i> and <i>Hirudinaria granulosa</i> . Metamerism, Nephridium and coelomoducts. Regeneration in Annelids							9	CO5		
	Total							45			

Course Outcomes			
Course Outcomes	On completion of this course, students will;		Knowledge level
CO1	Understand the basic concepts of invertebrate animals and recall its structure and functions.	PO1	K1,K2
CO2	Illustrate and examine the systemic and functional Morphology of various groups of invertebrata.	PO1, PO2	K2,K3
CO3	Differentiate and classify the animal’s mode of life in various taxa and estimate the biodiversity.	PO4, PO6	K2, K3
CO4	Compare and distinguish the various physiological processes and organ systems in lower animals.	PO4, PO5, PO6	K3,K4
CO5	Infer and integrate the parasitic and economic importance of invertebrate animals.	PO3, PO8	K4, K5
Text Books (Latest Editions)			
1.	Ekambaranatha Iyer, (2000). A Manual of Zoology, 10 th edition, Viswanathan, S., Printers & Publishers Pvt Ltd		
2.	Jordan, E. L. and Verma P.S, (1995). Invertebrate Zoology,12 th edn.S.Chand & Co.		
3.	Kotpal, R.L, (1992). Protozoa, Porifera, Coelenterata, Annelida, Arthropoda.		
References Books (Latest editions, and the style as given below must be strictly adhered to)			
1.	Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.		
2.	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, Black well Science		
3.	Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson		
4.	Hyman L.H, (1955). The invertebrates- Vol. I to Vol.VII– Mc Graw Hill Book Co.		
5.	Parker, J. and Haswell, (1978). A text book of Zoology Vol. I- Williams and Williams.		
Web Resources			
1.	https://www.nationalgeographic.com/animals/invertebrates/		
2.	https://bit.ly/3kABzKa		
3.	https://www.nio.org/		

4.	https://greatbarrierreef.org/	
Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	30 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	70 Marks
	Total	100 Marks
Methods of Assessment		
Recall(K1)	Simple definitions, MCQ, Recall, steps, Concept definitions	
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview	
Application (K3)	Suggest idea / concept with examples, Suggest formulae, Solve problems, Observe, Explain	
Analyze(K4)	Problem- solving questions, Finish a procedure in many steps, Differentiate Between various ideas, Map knowledge	
Evaluate (K5)	Longer essay / Evaluation essay, Critique or justify with pros and cons	
Create(K6)	Check knowledge in specific or off beat situations, Discussion, Debating or Presentations	

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO 1	S	M	M	M	M	M	M	M
CO 2	S	S	M	M	M	L	M	L
CO 3	M	M	M	S	M	S	L	L
CO 4	M	M	M	S	S	S	L	L
CO 5	M	M	S	M	M	L	M	S

S- Strong (3) M- Medium (2) L- Low (1)

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
26UZOCC2	INVERTEBRATA-II	Core	Y	-	-	-	3	3	30	70	100
Learning Objectives											
❖	To understand the structures and distinct features of invertebrate phyla.										
❖	To understand and able to distinguish the characteristic features of each phylum										
❖	To understand the economic importance of invertebrates										
❖	To understand the interaction of invertebrates with the environment.										
❖	To understand the evolutionary position of different groups of invertebrates										
UNIT	Details						No. of Hours	Course Objectives			
I	Arthropoda: General characters and classification up to Classes. Type study: <i>Penaeus indicus</i> . Affinities of <i>Peripatus</i> – Larval forms in Crustacea – characteristics of Centipede and Millipede.						9	CO1			
II	Mollusca: General characters and classification up to Classes. Type study: <i>Pila globosa</i> . Foot and torsion in Mollusca, – Cephalopoda as the most advanced invertebrate.						9	CO2			
III	Echinodermata: General characters and classification up to Classes. Type study: <i>Asterias</i> . Water vascular system in Echinodermata – Larval forms of Echinoderms.						9	CO3			
IV	Insect pollinators – predators, parasites. Insects associated with human diseases: Mosquitoes, housefly, bed bug, human head louse. Insects associated with house hold materials: Ants, Termites, Silver fish.						9	CO4			
V	Insect pests: Pest of rice: Rice stem borer (<i>Scirpophaga incertulas</i>) – Pest of Sugarcane: The shoot borer (<i>Chilo infuscatellus</i>) – Pest of coconut: The rhinoceros beetle (<i>Oryctes rhinoceros</i>) Pest of cotton: The spotted bollworm (<i>Earias insulana</i>)– Pests of vegetables: Brinjal - The shoot and fruit borer (<i>Leucinodes orbonalis</i>) – Pests of fruits: Citrus butterfly (<i>Papilio demoleus</i>). Artificial intelligence and the future of Zoology- AI in Species identification.						9	CO5			
	Total						45				

Course Outcomes			
Course Outcomes	On completion of this course, students will;		Knowledge level
CO1	Classify, Identify and recall the name and distinct features of invertebrate groups.	PO1	K1,K2
CO2	Explain, and relate the origin, structural organization and evolutionary aspects of invertebrates.	PO1, PO2	K2,K3
CO3	Analyze, compare and distinguish the developmental stages and describe the important biological process.	PO3, PO4, PO5	K3, K4,
CO4	Correlate the interaction of invertebrates with humans and critique its economic importance.	PO4, PO5, PO6	K3,K4
CO5	Summarize the physiology, ecological adaptations to stimulate and integrate the significance of invertebrates to the environment, humans, and Agriculture, and the Artificial Intelligence prospectives in the field of zoology	PO1, PO2, PO3, PO8	K4, K5
Text Books (Latest Editions)			
1.	Ekambaranatha Ayyar, and T. N. Ananthakrishnan, (2000). A Manual of Zoology. Vol1 (Invertebrata). Part II– Viswanathan Pvt. Ltd, 842pp		
2.	Jordan, E.L .and Verma P.S, (1995). Invertebrate Zoology, 12 th edn. S. Chand & Co.		
3.	Kotpal R.L. (2019). Modern Text Book of Zoology, Invertebrates 9 th Ed., Rastogi Publications, Gangotri, Shivaji Road, Meerut, 1004pp.		
4.	Vasantharaj David,B.(2001). Elements of Economic Entomology, Popular Book Depot, Chennai. 400 pp.		
5.	Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition, Belmont, CA: Thomson- Brooks / Cole, 928pp.		
References Books (Latest editions, and the style as given below must be strictly adhered to)			
1.	Barrington, E.J.W., (2012). Invertebrate structure and function. Boston–Houghton. Mifflin and ELBS, London.		
2.	Bhamrah, H. S. and Kavitha Junea, (2002). A text book of Invertebrates. Alilnol Publications Private Limited, 4374/4B.AnsariRoad, Dayaganj, New Delhi.		
3.	Hyman L. H, (1955). The invertebrates – Vol. I to Vol.VII–Mc Graw Hill Book Co.		
4.	Kotpal, (1992). Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata, R.L- Rastogi Publication.		
5.	Parker, J. and Haswell, (1978). A text book of Zoology Vol. I- Williams and Williams.		

6.	Srivastava, M.D. L and Srivastava, (1969). A text book of Invertebrate Zoology, U.S-Central Book Depot, Allahabad.	
7.	Verma, A. Invertebrates: Protozoa to Echinodermata. Narosa Publishing House Private Limited. 35-36 Greams Road, Thousand Lights, Chennai.	
Web Resources		
1.	https://www.nationalgeographic.com/animals/invertebrates/	
2.	https://bit.ly/3kABzKa	
3.	https://www.nio.org/	
4.	https://bit.ly/3IJdUX0	
Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	30 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	70 Marks
	Total	100 Marks
Methods of Assessment		
Recall(K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview	
Application (K3)	Suggest idea / concept with examples, Suggest formulae, Solve problems, Observe, Explain	
Analyze(K4)	Problem- solving questions, Finish a procedure in many steps, Differentiate Between various ideas, Map knowledge	
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons	
Create(K6)	Check knowledge in specific or off beat situations, Discussion, Debating or Presentations	

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO 1	S	M	M	M	M	M	M	M
CO 2	S	S	M	L	M	M	M	M
CO 3	M	M	S	S	S	M	L	M
CO 4	M	M	M	S	S	S	L	L
CO 5	S	S	S	L	M	L	L	S

S- Strong (3) M- Medium (2) L- Low (1)

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
26UZOCQ1	INVERTEBRATA AND CHORDATA LABCOURSE-I	Core	Y	-	-	-	3	3	40	60	100
Learning Objectives											
❖	To identify the different groups of invertebrate and chordate animals by observing their external characteristics.										
❖	To understand the organs, organ system and their functions in lower animals.										
❖	To get knowledge about the different modes of life and their adaptation based on the environment.										
❖	Able to dissect and display the internal organs and mount the mouthparts and scales of invertebrates and to know about the classification, adaptations and affinities of Chordate animals.										
Content	Details							No. of Hours	Course Objectives		
Major	Cockroach: Digestive system, Nervous system Prawn: Nervous system, Appendages Fish: Digestive system.							12	CO1 CO2		
Minor	Mounting: Earthworm - Body setae; Mouth parts - Honey Bee, House fly and Mosquito. Fish: Placoid and Ctenoid scales.							12	CO3		
	Classify giving reasons: (i).Protozoa: Paramecium, Plasmodium vivax (ii).Porifera: Sycon, Spongilla. (iii).Coelenterata: Obelia, Aurelia. (iv).Platyhelminthes: Planaria, Fasciola hepatica. (v).Nemathelminthes: Ascaris (Male & Female), Wuchereria. (vi).Annelida: Hirudinaria. (vii).Arthropoda: Scorpion, Limulus. (viii).Mollusca: Pila, Unio. (ix).Echinodermata: Asterias, Echinus. Specimens and Slides: (i) Hemichordata: Balanoglossus (ii). Protochordata: Amphioxus (iii). Cyclostomata: Petromyzon							12 12	CO4 CO5		

Spotters	(iv).Pisces: Hippocampus, Echieneis. (v).Amphibia: Bufo, Rana. (vi).Reptilia: Chamaeleon, Vipera russelli, Naja naja,. (vii).Aves: Archaeopteryx, Columba. (viii).Mammalia: Manis, Loris. Draw labeled Sketch: Obelia medusa, Taenia solium – scolex, Frog Skull and Lower Jaw, Pectoral girdle, Pelvic girdle, Pigeon – synsacrum. Biological Significance: Sponge-Gemmule, Peripatus, Bipinnaria Larva. Related Structure and function: Nereis- parapodium, Pila - radula, Pigeon-Skull and Lower Jaw, Skull of Rabbit.			
	Total		60	
	Course Outcomes			
	Course Outcome	On completion of this course, students will;		
	CO1	Identify and label the external features of different groups Of invertebrate and chordate animals.	PO1	
	CO2	Illustrate and examine the circulatory system, nervous System and reproductive system of invertebrate and chordate animals.	PO1,PO2	
CO3	Differentiate and compare the structure, function and mode of life of various groups of animals.	PO4,PO6		
CO4	Compare and distinguish the dissected internal organs of lower animals.	PO4,PO5,PO6		
CO5	Prepare and develop the mounting procedure of Economically important invertebrates and	PO3,PO8		
Text Books (Latest Editions)				
1.	Ekambaranatha Iyyar and T. N. Ananthakrishnan, (1995) A manual of Zoology Vol.I (Part 1, 2) S. Viswanathan, Chennai			
2.	Ganguly, Sinha and A dhikari, (2011). Biology of Animals: Volume I, New Central Book Agency; 3rd revised edition.1008pp.			
3.	Sinha, Chatterjee and Chattopadhyay, (2014). Advanced Practical Zoology, Books & Allied Ltd; 3 rd Revised edition, 1070pp.			
4.	Lal, S.S, (2016). Practical Zoology Invertebrate, Rastogi Publications.			
5.	Verma, P.S. (2010). A Manual of Practical Zoology: Invertebrates, S Chand,497pp.			
6.	Lal SS, (2009). Practical Zoology. Vertebrate, Rajpal and Sons Publishing, 484pp.			
7.	Verma P.S, (2000). A Manual of Practical Zoology: Chordates, S.Chand			
References Books				
(Latest editions, and the style as given below must be strictly adhered to)				
1.	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			
2.	Barnes, R.D.(1982). Invertebrate Zoology, V Edition. Holt Saunders International Edition.			
3.	Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson			

4.	Boradale, L.A. and Potts, E.A. (1961). <i>Invertebrates: A Manual for the use of Students</i> . Asia Publishing Home.	
5.	Lal, S.S. (2005). A text Book of Practical Zoology: Invertebrate, Rastogi, Meerut	
6.	Robert William Hegner, (2015). Practical Zoology, Biblio Life, 522pp.	
7.	Young, J,Z., (1972). The life of vertebrates. Oxford Uni. London.	
Web Resources		
1.	https://nbb.gov.in/	
2.	http://www.agshoney.com/training.htm	
3.	https://icar.org.in/	
4.	http://www.csrtimys.res.in/	
5.	http://csb.gov.in/	
Methods of Evaluation		
Internal Evaluation	Internal Assessment Test	40 Marks
	Observation Record	
	Attendance and Regulatory in Lab Participation	
External Evaluation	End Semester Practical Examination	60 Marks
	Total	100 Marks
Methods of Assessment		
Recall(K1)	Simple definitions, Dissection and mountings.	
Understand/ Comprehend (K2)	Explain the concept of animal adaptation and biological significance to respective model (specimen-Spotter) of life.	
Application (K3)	Define the morphological observation of selected animals.	
Analyze (K4)	Define the structure and functions of animal parts.	
Evaluate (K5)	Analysis the microscopic organisms.	
Create(K6)	Identify and draw selected parts of animal's origin.	

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO1	S	M	M	M	M	M	M	M
CO2	S	S	M	M	M	M	M	M
CO3	M	M	M	S	M	S	M	L
CO4	M	M	M	S	S	S	L	L
CO5	M	M	S	M	M	M	L	S

S-Strong (3)

M-Medium (2)

L-Low (1)

GENERIC ELECTIVE I : BOTANY-I

Title of the Course	GENERIC ELECTIVE – I (GE) : BOTANY – I					
Paper Number	Generic Elective - I					
Category	Core	Year	I	Credits	3	Course Code
		Semester	I			26UZOBGEC1
Instructional Hours per week		Lecture	Tutorial		Lab Practice	Total
		3	-		-	3
Pre-requisite		To study the basics of botany.				
Learning Objectives						
C1	To study morphological and anatomical adaptations of plants of various habitats.					
C2	To demonstrate techniques of plant tissue culture.					
C3	To familiarize with the structure of DNA, RNA.					
C4	To carryout experiments related with plant physiology.					
C5	To perform biochemistry experiments.					
Course outcomes: On completion of this course, the students will be able to: CO					Programme Outcomes	
1. Increase the awareness and appreciation of human friendly algae and their economic importance.					K1	
2. Develop an understanding of microbes and fungi and appreciate their adaptive strategies.					K2	
3. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.					K3	
4. Compare the structure and function of cells and explain the development of cells.					K4	
5. Understand the core concepts and fundamentals of plant biotechnology and genetic engineering.					K5	
UNIT		CONTENTS				
I		Algae: General characters of algae - Structure, reproduction and life cycle of the following genera - <i>Anabaena</i> and <i>Sargassum</i> and economic importance of algae.				
II		Fungi, Bacteria and Virus: General characters of fungi, structure, reproduction and life cycle of the following genera – <i>Penicillium</i> and <i>Agaricus</i> and economic importance of fungi. Bacteria - general characters, structure and reproduction of <i>Escherichia coli</i> and economic importance of bacteria. Virus - general characters, structure of TMV, structure of bacteriophage.				

III	Bryophytes, Pteridophytes and Gymnosperms: General characters of Bryophytes, Structure and life cycle of <i>Funaria</i> . General characters of Pteridophytes, Structure and life cycle of <i>Lycopodium</i> . General characters of Gymnosperms, Structure and life cycle of <i>Cycas</i> .
IV	Cell Biology: Prokaryotic and Eukaryotic cell- structure /organization. Cell organelles - ultra structure and function of chloroplast, mitochondria and nucleus. Cell division - mitosis and meiosis.
V	Genetics and Plant Biotechnology: Mendelism - Law of dominance, Law of segregation, Incomplete dominance. Law of independent assortment. Monohybrid and dihybrid cross - Test cross - Back cross. Plant tissue culture - <i>In vitro</i> culture methods. Plant tissue culture and its application in biotechnology.
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC–CSIR/GATE/TNPSC/ others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Texts	1. Singh, V., Pande, P.C and Jain, D.K. 2021. A Text Book of Botany. Rastogi Publications, Meerut. 2. Bhatnagar, S.P and Alok Moitra. 2020. Gymnosperms, New Age International (P) Ltd., Publishers, Bengaluru. 3. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd. Delhi. 4. Lee, R.E. 2008. Phycology, IV Edition, Cambridge University Press, New Delhi. 5. Rao, K., Krishnamurthy, K.V and Rao, G.S. 1979. Ancillary Botany, S. Viswanathan Pvt. Ltd., Madras.
Reference books:	1. Parihar, N.S. 2012. An introduction to Embryophyta – Pteridophytes- Surjeet Publications, Delhi. 2. Alexopoulos, C.J. 2013. Introduction to Mycology. Willey Eastern Pvt. Ltd. 3. Vashishta, P.C. 2014. Botany for Degree Students Gymnosperms. Chand & Company Ltd, Delhi. 4. Coulter, M. Jhon, 2014. Morphology of Gymnosperms. Surjeet Publications, Delhi. 5. Vashishta, P.C. 2014. Botany for Degree Students Algae. 2014. Chand & Company Ltd, Delhi. 6. Parihar, N.S. 2013. An introduction to Embryophyta – Bryophytes -, Surjeet Publications, Delhi. 7. Pandey B.P. 1986, Text Book of Botany (College Botany) Vol I & II, S.Chand and Co. New Delhi.

Web Resources	1. https://www.kobo.com/us/en/ebook/the-algae-world 2. http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html 3. http://scitec.uwichill.edu.bb/bcs/bl14apl/bryo1.htm 4. https://www.toppr.com/guides/biology/plant-kingdom/pteridophytes/ 5. https://arboretum.harvard.edu/wp-content/uploads/2013-70-4-beyond-pine-cones-an-introduction-to-gymnosperms.pdf 6. https://www.us.elsevierhealth.com/medicine/cell-biology 7. https://www.us.elsevierhealth.com/medicine/genetics 8. https://www.kobo.com/us/en/ebook/plant-biotechnology-1
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Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	3	1	3	3	3	3
CO4	3	3	2	3	3	3	2	3	2	3
CO5	3	2	2	2	2	2	2	1	2	1

S-Strong (3) M-Medium (2) L-Low(1)

GENERIC ELECTIVE I : BOTANY PRACTICAL

Title of the Course		GENERIC ELECTIVE I : BOTANY PRACTICAL				
Paper Number		Generic Elective Practical - I				
Category	Core	Year	I	Credits	2	Course Code
		Semester	I			26UZOBGECQ1
Instructional Hours per week		Lecture		Tutorial		Lab Practice
		-		-		2
Pre-requisite		Practicals pertaining to above subjects is important to get knowledge on various aspects of plants.				
Learning Objectives						
C1	To enhance information on the identification of each taxonomical group by developing the skill-based detection of the morphology and microstructure of microorganisms, algae, and fungi.					
C2	To comprehend the fundamental concepts and methods used to identify Bryophytes, Pteridophytes and Gymnosperms through morphological changes and evolution.					
C3	Understanding the structure and functions of cell.					
C4	Understanding the laws of inheritance, genetic basis of loci and alleles.					
C5	Understanding the core concepts of Biotechnology.					
Course outcomes: On completion of this course, the students will be able to: CO					Programme Outcomes	
1. Study the internal organization of algae and fungi.					K1	
2. Develop skill – based detection of microstructure of microorganisms.					K2	
3. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and					K3	
4. Understand structure and function of cell.					K4	
5. Understand the core concepts and fundamentals of plant biotechnology and genetic engineering.					K5	
EXPERIMENTS						
1. Make suitable micro preparation of the types prescribed in Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms. 2. Micro photographs of the cell organelles ultra structure. 3. Simple genetic problems. 4. Spotters - Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms, Cell biology and Biotechnology.						

Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Reference Books	1. Nancy Serediak and M. Huynh. 2011. Algae identification lab Guide. Accompanying manual to algae identification field guide, Ottawa Agriculture Agri food Canada publisher. 2. Mohammed Gufran Khan, Shite Gatew and Bedilu Bekele. 2012. Practical manual for Bryophytes and Pteridophytes. Lambert Academic Publishing.
Web resources	1. https://www.amazon.in/Practical-Manual-Pteridophyta-Rajan-Sundara/dp/8126106883 2. http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf 3. https://www.amazon.in/Manual-Practical-Bryophyta-SureshKumar/dp/B0072GNFX4

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	2	3	3	3	3	1	3	3	1	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	2	2	2	2	2	2	1	2	2

S-Strong (3)

M-Medium (2)

L-Low(1)

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
26UZOSEC1	SEC – I – (NME) ANIMAL BEHAVIOUR	Core	Y	-	-	-	2	2	30	70	100
Learning Objectives											
❖	To learn the origin and development of animal behaviour and to understand the influence of genetics, environment on animal behaviors’.										
❖	To understand the biological properties of animal behavior, with an evolutionary and ecological emphasis.										
❖	To Compare innate and learned behavior and differentiate between various thrimating system.										
❖	To impart the knowledge about visual and auditory communication; courtship, mate choice, and mating systems; social behavior and social systems; and animal personality.										
❖	To discuss how movement and migration behaviors are a result of natural selection.										
UNIT	Details							No. of Hours	Course Objectives		
I	Genetics and Behaviour : Genetic material, Genes and chromosomes, Genetic variation, Single and Polygenic inheritance of behaviour, Heritability of behaviour, Natural selection and behaviour, Frequency distribution of phenotypes, Darwinian fitness, Evolution of adaptive strategies.							6	CO1, CO2		
II	Evolution and Social Behaviour: Sexual selection, Altruism, Sexual strategy and social organisation, Animal perception, Neural control of behaviour, Sensory processes and perception, Visual adaptations to unfavourable environments.							6	CO1,CO2, CO4, CO5		
III	Animal and the Environment: Coordination and Orientation, Homeostasis and Behaviour, Physiology and Behaviour in changing environments, Animal Learning, Conditioning and Learning, Biological aspects of learning, and Cognitive aspects of learning.							6	CO1,CO2, CO3, CO5		
IV	Understanding Complex Behaviour: Instinct and learning, Displacement activities, Ritualization and Communication, Decision making behaviour in Animals, Complex behaviour of honey bees, Evolutionary optimality, Mechanism of Decision making. The mentality of Animals: Languages and mental representation, non-verbal communication in human, mental images, Intelligence, tool use and culture, Animal awareness and Emotion.							6	CO4, CO5		

V	Chronobiology : Organization of circadian system in multicellular animals; Concept of central and peripheral clock system; Circadian pacemaker system in invertebrates with particular reference to Drosophila; Photoreception and photo- transduction; The physiological clock and measurement of day length; Molecular bases of seasonality; The relevance of biological clocks for human welfare - Clock function (dysfunction).	6	CO4, CO5
	Total	30	
Course Outcomes			
Course Outcomes	On completion of this course, students will;		Knowledge level
CO1	Recall and record genetic basis and evolutionary history of behaviour.	PO1	K1,K2
CO2	Classify movement and migration behaviors and explain environmental influence upon	PO1, PO2	K2,K3
CO3	Analyze and identify innate, learned and cognitive behavior and differentiate between various mating systems.	PO3, PO4, PO5	K4,K5"/
CO4	Assess complexity involved in behavioural traits and evaluate hormones and their role in	PO4, PO5, PO6	K3,K4
CO5	Discuss the rhythmicity of behavioural expressions and the scientific concepts in behavior and behavioral	PO1, PO2, PO3, PO8	K4, K5
Text Books (Latest Editions)			
1.	David Mc Farland, 1985. Animal Behaviour, Longman Scientific & Technical, UK.576pp.		
2.	Harjindra Singh, 1990. A Text Book of Animal Behaviour, Anomol Publication,		
3.	Hoshang S. Gundevia and Hare Govind Singh, 1996. Animal Behaviour, S.Chand & Co, 280 pp.		
4.	Shukla, J.P 2010. Fundamentals of Animal Behaviour, Atlantic, 587pp.		
5.	Vinod Kumar, 2002. Biological Rhythms. Narosa Publishing House, Delhi.		
Suggested Readings			
1.	Michael D. Breed and Janice Moore, 2012. Animal Behaviour, Academic Press, USA, 359pp.		

2.	Aubrey Manning and Martin Stamp Dawkins, 2012. An Introduction to Animal Behaviour, 6th Edition, Cambridge University Press, UK. 458pp.
3.	Davis E. Davis, 1970. Integral Animal Behaviour, Mac Millan Company, London, 118 pp.
4.	Jay, C. Dunlap, Jennifer, J .Loros, Patricia J. De Coursey (ed). 2004. Chronobiology Biological time Keeping, Sinauer Associates Inc, Publishers, Sunderland, MA.

Web Resources

1.	https://www.ncbs.res.in/content/animal-behaviour
2.	https://bit.ly/3i6wUxR
3.	https://www.behaviour.univie.ac.at/
4.	https://www.ru.nl/bsi/

Methods of Evaluation

Internal Evaluation	Continuous Internal Assessment Test	30 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	70 Marks
	Total	100 Marks

Methods of Assessment

Recall(K1)	Simple definitions, MCQ, Recall steps, Concept definitions
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview
Application (K3)	Suggest idea / concept with examples, Suggest formulae, Solve problems, Observe, Explain
Analyze(K4)	Problem- solving questions, Finish a procedure in many steps, Differentiate Between various ideas, Map knowledge
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons
Create(K6)	Check knowledge in specific or off beat situations, Discussion, Debating or Presentations

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
26UZOSEFC	FOUNDATION COURSE - ECONOMIC ZOOLOGY	Core	Y	-	-	-	2	2	30	70	100
Learning Objectives											
❖	To understand the culturing techniques and production methods of different farm animals.										
❖	To know the life history of animals and disease control methods used in farming.										
❖	To understand the concept of breeding, cross breeding and the importance of high yield varieties.										
❖	To know about the marketing strategies.										
UNIT	Details							No. of Hours	Course Objectives		
I	Economic Entomology: Apiculture: Species of honey bees – Social organization of honey bee – selection of bees and location for apiary – Newton’s bee hive – products of bee keeping – enemies and diseases of honey bees. Sericulture: Species of silkworm – life history of mulberry silkworm – Rearing of silkworm – pests and diseases of silkworm.							6	CO1, CO2		
II	Vermiculture: Introduction: Types of earthworms – ecological classifications of earthworms – Physical, chemical and biological changes caused by earthworms in the soil – Natural enemies of earthworms. Vermicomposting: Methods, factors							6	CO1,CO2, CO4, CO5		
III	Aquaculture: Fresh water aquaculture: Carp culture – types of ponds – preparation – maintenance – harvesting and management. Integrated and composite fish culture. Prawn culture. Marine Aquaculture: Edible – pearl oyster culture. Ornamental fish culture: Aquarium fishes – Aquarium maintenance in home. Economic importance of Aquaculture.							6	CO1,CO2, CO3, CO5		

IV	Poultry Farming : Poultry industry in India – Poultry for sustainable food production and livelihood - Commercial poultry farming – Nutritive value of egg and meat- Broiler management (Definition; Housing and equipment; Brooding, feeding and health cover of broilers; Record keeping; Broiler integration) – Layer management (Brooder; Grower and layer management; Culling of layers; Marketing of eggs and meat). Role of Womens in backyard poultry farming.	6	CO4, CO5
V	Dairy Farming: Dairy farming –classification of breeds of cattle – Indigenous and exotic breeds – Selection of dairy cattle. Breeding – artificial insemination, Dairy cattle management – housing, water supply, cattle nutrition feeding standards, common contagious diseases. Milk - Composition of milk, milk spoilage, pasteurization, Role of milk and milk products in human nutrition. Advantages of dairy farming, Dairying as a source of additional income and employment.	6	CO4, CO5
	Total	30	
Course Outcomes			
Course Outcomes	On completion of this course, students will;		Knowledge level
CO1	Identify the breeds and varieties of poultry, fish, bees, and cattle and understand the basic aspects of farming.	PO1	K1,K2
CO2	Assess and integrate the available tools and techniques to increase the productivity in farms.	PO1, PO2	K2,K3
CO3	Analyse the pros and cons of different methods of farming and marketing strategies of products.	PO3, PO4, PO5	K4,K5"/
CO4	Evaluate the use of available resources in improving the breeds, vermicomposting, farm products etc..	PO4, PO5, PO6	K3,K4
CO5	Design new methods to improve farm animals with increased productivity and disease resistance and to construct new methods in vermicomposting.	PO1, PO2, PO3, PO8	K4, K5

Text Books (Latest Editions)	
1.	Sastry, N.S.R., C.K. Thomas and R.A.Singh, 2015. Livestock Production Management, 4 th Ed. Kalyani Publishers, New Delhi.
2.	Mary violet Christy, A. 2014. Vermitechnology, MJP Publishers, Chennai.
3.	ICAR, 2013. Handbook of Animal Husbandry, 4 th Ed. , ICAR Publication, Pusa, New Delhi.
4.	Awasthi, V.B., 2012. Introduction to General and Applied Entomology, third edition, scientific publishers, India.
5.	Vasanthraj David, B and Ramamurthy, V. V., 2012. Elements of Economic Entomology, Seventh edition, Namrutha publications, Chennai.
6.	Shukla & Upadhyay, 2014. Economic Zoology, 5 th edn. Rastogi Publication, Meerut, New Delhi.
7.	Gupta, S. M., 2010. Text book of fishery, Ann Backer, Mumbai.
8.	Gupta, S. M., 2010. Text book of fishery, Ann Backer, Mumbai.
Suggested Readings	
1.	Glenn Munroe, 2017. Manual of on-Farm vermicomposting and vermiculture, Holdanca Farms Ltd, Wallace, Nova Scotia.
2.	Hanifa, M.A., 2011. Aquatic resources and aquaculture, Dominant, New Delhi.
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Web Resources	
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2.	https://bit.ly/3tUTHBu

3.	https://bit.ly/3hVv96q	
4.	https://bit.ly/39nztH1	
5.	https://bit.ly/3CzasVO	
6.	https://agritech.tnau.ac.in/org_farm/orgfarm_vermicompost.html	
7.	https://bit.ly/3nYvgSF	
8.	http://caa.gov.in/farms.html	
9.	http://www.csrtimys.res.in/	
10.	http://www.agshoney.com/training.htm	
Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	30 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	70 Marks
	Total	100 Marks
Methods of Assessment		
Recall(K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview	
Application (K3)	Suggest idea / concept with examples, Suggest formulae, Solve problems, Observe, Explain	
Analyze(K4)	Problem- solving questions, Finish a procedure in many steps, Differentiate Between various ideas, Map knowledge	
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons	
Create(K6)	Check knowledge in specific or off beat situations, Discussion, Debating or Presentations	
