Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE & COMMERCE, BARAMATI, DIST – PUNE. AUTONOMOUS

POST GRADUATE DEPARTMENT OF ZOOLOGY

SYLLABUS
M.Sc. Zoology Part-II, SEMESTER-III

ACADEMIC YEAR 2023-2024

Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE & COMMERCE, BARAMATI.
AUTONOMOUS

Scheme of Course Structure (CBCS)
Faculty of Science
Post Graduate Department of Zoology
SEMESTER III

Class: M.Sc. II **Pattern: 40 (IA) + 60 (EA)**

Sr. No.	Code	Paper	Paper Title	Credit	Exam	Marks
1	PSZO 231A	**Theory**	**Entomology-I**	**4**	I / E	**40 + 60**
	PSZO 231B	**Theory**	**Animal Physiology-I**	**4**	I / E	**40 + 60**
	PSZO 231C	**Theory**	**Genetics-I**	**4**	I / E	**40 + 60**
2	PSZO 232	**Theory**	**Physiology, Biochemistry and Ecology of Insects**	**4**	I / E	**40 + 60**
3	PSZO 233	**Theory**	**Reproductive Physiology, Histology and Histochemistry of Mammals**	**4**	I / E	**40 + 60**
4	PSZO 234	**Theory**	**Economic Zoology**	**4**	I / E	**40 + 60**
5	PSZO 235A	Zoology **Practical-V**	**Practicals Corresponding to : PSZO 231A , PSZO 232**	**4**	I / E	**40 + 60**
6	PSZO 235B		**Practicals Corresponding to : PSZO 231B , PSZO 232**	**4**	I / E	**40 + 60**
7	PSZO 235C		**Practicals Corresponding to : PSZO 231C , PSZO 232**	**4**	I / E	**40 + 60**
8	PSZO 236	Zoology **Practical-VI**	**Practicals Corresponding to : PSZO 233 , PSZO 234**	**4**	I / E	**40 + 60**
			Skill Development	**2**	-	
			Certificate Course	**2**	-	

IA* - Internal Assessment

EA*- External Assessment

SYLLABUS (CBCS) FOR M.Sc. ZOOLOGY Sem. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**
Class: M.Sc. - II **Semester: III**
Course Name: Entomology-I **Course Code: PSZO 231A**
Number of Credits: 04 **Number of Lectures: 60**

Course Objectives:-

- Identification & classification of insects.
- General & specific morphology & anatomy of insects belonging to different orders.
- Develops the judicious skill of insect collection & preservation

Course Outcomes:-

- Identifies the insects and their taxonomic orders.
- Recalls the morphological & anatomical characters of different insect orders.
- Judiciously collects and preserves the insects.

UNIT	SUB UNIT	SYLLABUS	NO. OF LECTURES
1. Taxonomy, origin, evolution and morphology			03
2. General outline of classification of insects			20
	2.1	Apterygote insects (Protura, Diplura, Collembola and Thysanura)	
	2.2	Exopterygote insects (5-20 orders- Add names of all orders)	
	2.3	Endopterygote insects (21-29 orders- Add names of all orders)	
	2.4	Phylogenetics of insects	
3. Integument and its derivatives			02
4. Comparative study of insect tagmata			08
	4.1.	Head- Origin, structure and modification; Types of mouthparts and antennae, tentorium and neck sclerites	
	4.2.	Thorax- Areas and sutures of tergum, sternum and pleuron, pterothorax; Wings: structure and modifications, venation, wing coupling apparatus and mechanism of flight; Legs: structure and modifications	
	4.3.	Abdomen- Segmentation and appendages; Genitalia and their modifications	
5. Structure and modification of different systems:			18
	5.1.	Digestive system	
	5.2.	Respiratory system (Define?)	
	5.3.	Circulatory system	
	5.4.	Excretory system	
	5.5.	Reproductive system	

	5.6.	Nervous system	
6. Specialised topics in Entomology			05
	6.1.	The Sense organs	
	6.2.	Endocrine glands	
	6.3.	Exocrine glands	
7. Light and sound producing organs in insects			02
8. Techniques used in insect collection and preservation			02

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SYLLABUS (CBCS) FOR M.Sc. ZOOLOGY Sem. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**
Class: M.Sc. - II **Semester: III**
Course Name: Animal Physiology -I **Course Code: PSZO 231B**
Number of Credits: 04 **Number of Lectures: 60**

Course Objectives:-

- Interrelationship between external & internal environment of animal.
- Working mechanism of animal systems.
- Various techniques in clinical physiology.

Course Outcomes:-

- Discuss the impact of external & internal environment on functioning of animals.
- Explains the working mechanism of various systems in animal body.
- Explains the working principles of instruments used in clinical physiology.

UNIT	SUB UNITS	SYLLABUS	NO. OF LECTURES
1. Study of extrinsic and intrinsic factors affecting animal physiology:			**08**
	1.1	Extrinsic factors: • Atmosphere (Aquatic & terrestrial environment)	
	1.2	Intrinsic factor (Extracellular and intra cellular environment)	
	1.3	Homeostasis and its regulation: Tolerance and resistance, acclimatisation and acclimation; Regulatory mechanism of homeostasis.	
	1.4	Biological clock and their regulation: Circadian rhythms lunar and tidal rhythm, circa annual rhythm, photoperiodism	
2. Membrane physiology:			**09**
	2.1	Membrane structure and its dynamics	
	2.2	Resting membrane potential, Nernst equation, Goldman-Hodgkin- Katz potential, conductance, current and capacitance	
	2.3	Excitable cell membrane: Action potential, role of various ion channels, role of Na+ K+ pump	
3. Physiology of Digestion:			**09**
	3.1	Nutritional requirements (Concept of balanced diet), regulation of hunger, satiety	
	3.2	Digestion and absorption (Gastro-intestinal tract-Carbohydrate, lipids & protein- Scope)	
	3.3	Neuronal and hormonal control of digestion	
	3.4	Colorimetry and BMR	

4. Respiration:			**10L**
	4.1	Modes of respiration: Anatomy of respiratory system	
	4.2	Pulmonary respiration: Partial pressure, inspiration and expiration; Lung volume and capacities.	
	4.3	Gas exchange across the pulmonary and systemic capillaries	
	4.4	Gas transport: O_2 transport, CO_2 transport and abnormalities in the blood gas content	
	4.5	Neuronal control of respiration, role of central and peripheral receptors	
5. Muscle physiology:			**09L**
	5.1	Structure of skeletal muscle, twitch summation and tetanus, relation between muscle length and tension, velocity of contraction	
	5.2	Skeletal muscle fiber types, contractile machinery of smooth muscle	
	5.3	Molecular basis of skeletal muscle contraction, types of contraction	
6. Bioluminescence and animal electricity:			**07L**
	6.1	Bioluminescence: Phyletic distribution, structure of luminescent organs, biochemical and molecular mechanism.	
	6.2	Animal electricity: Electro receptors, electro organs and their structure and functions	
7. Buoyancy:			**05L**
	7.1	Definition & concept	
	7.2	Density reduction	
	7.3	Gas floats with examples	
	7.4	Swim bladder (Bottom dwelling and surface dwelling fish)	
8. Introduction to clinical physiology:			**03**
	8.1	Concept and Scope	
	8.2	Techniques in clinical physiology: Ultrasound, kidney functioning, liver functioning and various imaging techniques	
	8.3	Processes involved in clinical science	

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SYLLABUS (CBCS) FOR M.Sc. ZOOLOGY Sem. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**
Class: M.Sc. - II **Semester: III**
Course Name: Genetics - I **Course Code: PSZO 231C**
Number of Credits: 04 **Number of Lectures: 60**

Course Objectives: -

- Genetics of model organisms.
- Genetics of evolution.
- Techniques and methods of genetic analysis
- Biochemistry of conjugation and transformation

Course Outcomes: -

- Describes the genomics and genetics of model organisms.
- Explains the genetical basis of evolution.
- Implements the techniques and analyses the genetical data.
- Distinguishes between conjugation and transformation.

UNIT	SUB UNITS	SYLLABUS	NO. OF LECTURES
1. Model Genetic System: Life cycles and advantages of the following organisms commonly used in genetic studies			08
	1.1	T4	
	1.2	Neurospora	
	1.3	*E. coli*	
	1.4	*Saccharomyces cerevisea* and *Schizosaccharomyces pombe*	
	1.5	*Caenorhabditis*	
	1.6	*Drosophila*	
	1.7	Zebra fish	
	1.8	Mouse	
2. Advanced Population Genetics:			10
	2.1	Recapitulation of basic concepts and Hardy-Weinberg law.	
	2.2	Estimation of gene frequencies in population through mutation, derivation and genetic equations	
	2.3	Assortative mating, inbreeding and genetic drift	
3. Evolutionary genetics:			10

	3.1	Concept of continuous variation, phenotypic variance and its partitioning into subcomponents. -Genetic polymorphism -Genetics of speciation: Classical and modern concepts -Use of molecular information in understanding phylogenetic relationship	
	3.2	Quantitative inheritance in humans	
4. Applications of Molecular methodologies in genetic analysis:			12
	4.1	Introduction to gene localization on chromosomes	
	4.2	Chromosomal probes and paints	
	4.3	Introduction to reverse genetics	
5. Microbial Genetics:			12
	5.1	Conjugation	
	5.2	Conjugation by *Escherichia coli* F Factor	
	5.3	Fertility Factor or F Factor	
	5.4	Hfr Conjugation and Chromosomal Transfer	
	5.5	The F′ (F Prime) Factor	
	5.6	Interrupted Mating and Conjugational Mapping Transformation: Discovery of Transformation; Competence; Natural and artificial transformation	
6. Molecular biology of viruses:			8
	6.1	Introduction to virology	
	6.2	Baltimore classification and nomenclature of viruses; function of the virion, Structure of virus; Icosahedral symmetry (Triangulation numbers); Viruses with Envelopes: Viral Envelope components, simple enveloped viruses; Viroid's and prions.	

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SYLLABUS (CBCS) FOR M. Sc. ZOOLOGY Se. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**
Class: M. Sc. - II **Semester: III**
Course Name: Physiology, Biochemistry and Ecology of Insects
Course Code: PSZO 232
Number of Credits: 04 **Number of Lectures: 60**

Course Objectives:-

- Physiology and biochemistry of insect systems and organs.
- Ecological aspects of insects.
- Conservation of insects.

Course Outcomes:-

- Explains the working mechanisms of various systems & organs of insect.
- Analyses the impact of biotic and abiotic factors on insect population.
- Implements the strategies for insect conservation.

UNIT	SUB UNITS	SYLLABUS	NO. OF LECTURES
1. Integument:			03
	1.1	Structure and chemistry of integument	
	1.2	Sclerotization	
	1.3	Functions of integument	
	1.4	Pigmentation in insects	
2. Digestion and absorption:			03
	2.1	Carbohydrates	
	2.2	Lipids	
	2.3	Proteins	
3. Fat body:			04
	3.1	Structure, physiology and functions	
	3.2	Integration of carbohydrate, fat and amino acid metabolism	
4. Ventilatory mechanisms and their control:			03
5. Haemolymph:			03
	5.1	Physico-chemical characteristics of plasma	
	5.2	Haemocytes: Structure, types and functions	
	5.3	Physiology of circulatory system	

6. Muscles:			03
	6.1	Structure, physiology and biochemistry of flight muscles	
7. Osmoregulation and excretion			04
	7.1	Structure and function of Malpighian tubules	
	7.2	Mechanism of osmoregulation and nitrogen excretion.	
8. Insecticide degradation and resistance			03
	8.1	Role of Microsomal and extramicrosomal enzymes in degradation	
9. Moulting: Mechanism and regulation			02
10. Insect Ecology			12
	10.1	Insect and Climate: Temperature, photoperiod, rainfall, wind and climate change	05
	10.2	Insect Herbivores: Leaf shredding insects and insect defoliators; Feeding strategies of herbivorous insects; Plant defense mechanisms	07
11. Natural enemies and insect population dynamics			04
	11.1	Natural enemies	
	11.2	Impact of enemies on insect populations	
	11.3	Concept of niche & competition among insect Lotka-Volterra model	
12. Insect conservation			04
	12.1	Threats to insects	
	12.2	Conservation and restoration, prospects for insect conservation	
	12.3	Artificial breeding techniques	

REFERENCES

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SYLLABUS (CBCS) FOR M. Sc. ZOOLOGY Se. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**
Class: M. Sc. - II **Semester: III**
Course Name: Reproductive Physiology, Histology and Histochemistry of Mammals
Course Code: PSZO 233
Number of Credits: 04 **Number of Lectures: 60**

Course Objectives:-

- Process of mammalian reproduction.
- Problems and remedies in reproduction
- Techniques in histology.

Course Outcomes:-

- Explains the functioning of reproductive system.
- Identifies and discuss the problems of reproductive dysfunctions.
- Designs an experimental procedure to study histology.

UNIT	SUB UNITS	SYLLABUS	NO. OF LECTURES
1. Reproductive Systems:			04
	1.1	Anatomy of Male and female Reproductive System, Accessory organs and their function	
	1.2	Spermatogenesis, Function of Sertoli cells, Blood-testis barriers, Leydig cell; Capacitation	
	1.3	Sexual dimorphisms	
2. Reproductive patterns:			03
	2.1	Environmental factors and breeding	
	2.2	Continuous and seasonal breeders	
3. Sexual cycles:			05
	3.1	Puberty, oestrous and menstrual cycles	
	3.2	Ovarian event: Follicular phase	
	3.3	Uterine Events: Cycling of non-pregnant uterus and vagina	
4. Hormonal regulation:			05
	4.1	Hypothalamus –pituitary and gonad axis; other hormones	
	4.2	Hypothalamic GnRH, pituitary gonadotropins, testicular hormones, testosterone derivatives and inhibin	
	4.3	Ovarian hormones: Oestrogen and progesterone; Feedback relationships	
	4.4	Prostaglandins and their role in reproduction	

5. Gamete transportation and pregnancy:			04
	5.1	Conception and blastocyst formation, implantation and delayed implantation	
	5.2	Hormonal regulation of pregnancy	
6. Parturition: Birth process and its neuroendocrine control; Puerperium			03
7. Lactation: Mammary glands, milk synthesis and secretion; Hormonal regulation and suckling reflex			03
8. Reproductive dysfunctions:			03
	8.1	Climacteric, anatomical, endocrine and genetic disorders	
	8.2	Aging and reproduction	
9. Artificial control of reproduction:			04
	9.1	Increasing reproductive potential	
	9.2	Artificial insemination, in-vitro fertilization and embryo transfer, induced breeding, synchronization of oestrus and ovulation	
	9.3	Chemical and hormonal aspect, physical, physiological, surgical, chemical methods of contraception in male and female	
	9.4	Infertility: Causes and treatment	
10. Fundamentals of histology:			04
	10.1	Scope and importance of Histology and Histochemistry	
	10.2	Epithelial, connective, muscular, nervous and other specialized tissues	
11. Techniques in histology:			10
	11.1	Procurement of tissue samples and fixation	
	11.2	Fixatives: Types of fixatives and its effects on tissue	
	11.3	Processing of fixed tissue samples: Dehydration, clearing, infiltration, embedding and block making	
	11.4	Principles, design and functioning: Automated microtomes, ultra-microtome and cryostat; Problems and troubleshooting	
	11.5	Staining: Histochemical and immunohistologial methods	
	11.6	Mordants and mordanting, temporary and permanent preparations, whole mount preparation	
12. Fundamentals of histochemical techniques			08
	12.1	Detection of glycogen, neutral and acid mucopolysaccharides and basic proteins	

	12.2	Detection of nonspecific esterases, specific and nonspecific lipid.	
	12.3	Detection of acid and alkaline phosphatase	
13. Histology of mammalian tissue:			04
	13.1	Histological organization of stomach, intestine, lung, kidney, spleen, thymus, bone and bone marrow	

REFERENCES

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SYLLABUS (CBCS) FOR M. Sc. ZOOLOGY Sem. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**
Class: M.Sc.-II **Semester: III**
Course Name: Economic Zoology **Course Code: PSZO 234**
Number of Credits: 04 **Number of Lectures: 60**

Course Objectives:-

- Culturing of economically important animals.
- Use of animals in pharmaceuticals.
- Self-employment.

Course Outcomes:-

- Culture economically important animals.
- Explain use of animals in pharmaceutical industries.
- Design the set up for small-scale startup of sponge culture, apiculture, sericulture, lac culture, animal husbandry.

UNIT	SUB UNITS	SYLLABUS	NO. OF LECTURES
1. Role of protozoa in improving agriculture soil:			04
	1.1	**Soil protozoans:** a. Fungal-dominated soils b. Bacterial-dominated soils c. High clay-content soils **Role in agriculture-** a. Mineralizing nutrients b. Regulating Bacteria Population c. Fungi Controlling	
2. Sponge culture and its economic importance:			02
	2.1	Methods of sponge culture	
	2.2	Economic importance	
3. Importance of coral reef:			03
	3.1	Concept of coral reef	
	3.2	Formation of coral reefs	
	3.3	Types of coral reefs	
	3.4	Use of corals in • Medicine • Jewelry Ecotourism	
4. Role of helminthes in human welfare:			02
5. Nematodes:			03
	5.1	Parasitic Nematodes of soil, plants and animals	

	5.2	Methods of isolation, collection and identification	
6. Vermiculture in India:			04
	6.1	Introduction to vermiculture	
	6.2	Important species	
	6.3	Small and large scale vermiculture and precautions	
	6.4	Products	
7. Insects and human welfare:			10
	7.1	Apiculture	
	7.2	Sericulture	
	7.3	Lac culture	
8. Aquaculture:			14
	8.1	Prawn farming	
	8.2	Pearl culture	
	8.3	Fish farming and production of fish byproducts	
9. Animal Husbandry:			10
	9.1	Introduction to poultry industry	
	9.2	Introduction to dairy industry	
10	10.1	**Model organisms in pharmaceutical industry**	04
11	11.1	**Ethics and sustainable use of animals as an economic enterprise**	04

REFERENCES

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Name of the Program: M.Sc. Zoology **Program Code: PSZO**

Class: M. Sc. II **Semester: III**

Course Name: Zoology Practical-V (Practicals Corresponding to PSZO 231A and PSZO 232)

Course Code: PSZO 235A

Number of Credits: 04 **Number of Practicals: 10**

Course Objectives:-

- Develops the judicious skill of insect collection & preservation
- Dissection and study of various systems of insect.
- General & specific morphology & anatomy of insects belonging to different orders.
- Physiology and ecology of insect.

Course Outcomes:-

- Judiciously collects and preserves the insects.
- Explains process of dissection, performs it and distinguishes various systems and organs of insect.
- Recalls the morphological & anatomical characters of different insect orders.
- Explains the physiological and ecological aspects of entomology.

Section I –PSZO 231A Entomology-I (05)		
Sr. No.	**Title of the Practical**	**E/D**
1.	Methods of collection, preservation & presentation of insect 1P	E
2.	Dissection of digestive, nervous and reproductive system of laboratory cultured insect 2P	E
3.	Study of insect orders; (i) Apterygote insects, (ii) Exopterygote insects and (iii) Endopterygote insects inclusive of Taxonomy and diagnostic features upto family (at least one insect from each order) 4P	D
4.	Temporary mounting of mouth parts, antenna, wings and appendage of laboratory cultured insect 1P	E
Section II – PSZO 232 Physiology, Biochemistry and Ecology of Insects (05)		
1.	Estimation of oxygen consumption in dragon fly nymph 1P	E
2.	Study of heart and haemocytes of cockroach 1P	E
3.	Estimation of the trehalase activity in haemolymph of any insect 1P	E
4.	Determination of amino acid in haemolymph of any insect by chromatographic technique 1P	E
5.	Effect of temperature on water loss in cockroach 1P	E
6.	Von Wisselinghs test for presence of chitin in insect cuticle 1P	E
7.	Study of insect population by quadrate method 1P	E

Name of the Program: M.Sc. Zoology **Program Code: PSZO**

Class: M. Sc. II **Semester: III**

Course Name: Zoology Practical-V (Practicals Corresponding to PSZO 231B and PSZO 232)

Course Code: PSZO 235B

Number of Credits: 04 **Number of Practicals: 10**

Course Objectives:-

- Clinical analysis of samples.
- Physiological functioning of animal systems.
- Physiology and ecology of insect.

Course Outcomes:-

- Analyse the samples
- Explains physiological functioning of animal systems.
- Explains the physiological and ecological aspects of entomology.

Section I –PSZO 231B Animal Physiology-I (05)			
Sr. No.	**Title of the Practical**		**E/D**
1.	Estimation serum uric acid	1P	E
2.	Absorption spectra of blood pigment	1P	E
3.	Study of osmotic stress and volume change in earthworm	1P	E
4.	Estimation of carbohydrates in mammalian gut	1P	E
5.	Effect of starvation on liver and muscle glycogen in mouse	2P	E
6.	Measurement of lung capacity	1P	E
7.	Effect of pH, temperature and incubation on human salivary amylase activity	1P	E
8.	Effect of exercise on breathing rate, pulse rate and blood lactate of man	1P	D
9.	Mapping of taste areas on human tongue	1P	E
10.	Preparation of glycerinated muscle fibers and study of its properties	1P	E
11.	Introduction to Clinical Trials Registry- India (CTRI) database	1P	D
Section II – PSZO 232 Physiology, Biochemistry and Ecology of Insects (05)			
1.	Estimation of Oxygen consumption in dragon fly nymph	1P	E
2.	Study of heart and haemocytes of cockroach	1P	E
3.	Estimation of the trehalase activity in haemolymph of any insect	1P	E
4.	Determination of Amino acid in haemolymph of any insect by chromatographic technique	1P	E
5.	Effect of temperature on water loss in cockroach	1P	E
6.	Von Wisselinghs test for presence of chitin in insect cuticle	1P	E
7.	Study of insect population by quadrate method	1P	E

SYLLABUS (CBCS) FOR M. Sc. ZOOLOGY Sem. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**

Class: M. Sc. II **Semester: III**

Course Name: Zoology Practical-V (Practicals Corresponding to PSZO 231C and PSZO 232)

Course Code: PSZO 235C

Number of Credits: 04 **Number of Practicals: 10**

Course Objectives:-

- Techniques and methods of genetic analysis
- Physiology and ecology of insect.

Course Outcomes:-

- Implements the techniques and analyses the genetical data.
- Explains the physiological and ecological aspects of entomology.

Section I –PSZO 231C Genetics-I (Any 05)		
Sr. No.	**Title of the Practical**	**E/D**
1.	Analysis of metric trait and estimation of phenotypic variance. 1P	E
2.	Partitioning of phenotypic variance in genetic and nongenetic components in a simulated population. Estimation of DGD 1P	D
3.	Detection of extent of variation in a population – Biochemical (Enzyme, protein etc.) 1P	E
4.	To study population cage experiments using Drosophila: a) Genetic Drift b) Artificial selection- Experimental simulation and modeling 1P	D
5.	Extraction of Genomic DNA from *Drosophila*. 2P	E
6.	Microbial genetics: Basic methodology, colony count, growth curve 2P	E
7.	Microbial genetics: Isolation of Auxotroph (Estimation of frequency), Replica plate technique. 2P	E
8.	Bacterial transformation and blue white selection. Calculation of transformation efficiency. 2P	E
9.	Study of conventions of nomenclature of genes and gene products in different model systems. 2P	D
10.	Extraction of plasmid DNA of bacteria 2P	E
11.	Gene mapping by interrupted mating in bacteria 1P	D
12.	Isolation of mutant bacteria by UV Exposure 2P	E
Section II – PSZO 232 Physiology, Biochemistry and Ecology of Insects (05)		
1.	Estimation of Oxygen consumption in dragon fly nymph 1P	E
2.	Study of heart and haemocytes of cockroach 1P	E
3.	Estimation of the trehalase activity in haemolymph of any insect 1P	E
4.	Determination of Amino acid in haemolymph of any insect by chromatographic technique 1P	E
5.	Effect of temperature on water loss in cockroach 1P	E
6.	Von Wisselinghs test for presence of chitin in insect cuticle 1P	E
7.	Study of insect population by quadrate method 1P	E

SYLLABUS (CBCS) FOR M. Sc. ZOOLOGY Sem. III (w. e. f. June, 2023)

Name of the Program: M.Sc. Zoology **Program Code: PSZO**

Class: M. Sc. II **Semester: III**

Course Name: Zoology Practical-VI (Practicals Corresponding to PSZO 233 and PSZO 234)

Course Code: PSZO 236

Number of Credits: 04 **Number of Practicals: 10**

Course Objectives:-

- Anatomy and histology of mammalian reproductive systems.
- Equipments in apiculture, poultry and fishery.
- Techniques in study of nematodes.

Course Outcomes:-

- Explains anatomy and histology of mammalian reproductive systems.
- Develops handling skills of various equipments used in apiculture, poultry and fishery.
- Develops skills of collection, isolation and preservation.

Section I –PSZO 233 Reproductive Physiology, Histology and Histochemistry of Mammals (05)		
Sr. No.	**Title of the Practical**	**E/D**
1.	Anatomy of male and female reproductive system in rat/mice 1P	D
2.	Histology of male and female reproductive organs 1P	D
3.	Vaginal smear technique in mice 1P	E
4.	Ovarectomy in white rats 1P	D
5.	Study of placenta 1P	D
6.	Study of sperm morphology 1P	E
7.	Study of sperm count 1P	E
8.	Study of types tissue (Permanent slides) 1P	D
9.	Study of histology 2P	E
10.	Detection of acid phosphatase, alkaline phosphatase and esterases 1P	E
11.	Nucleic acid staining: Methyl Green Pyronine and Feulgen stain 1P	E
12.	Staining of Mucopolysaccharides 1P	E
13.	Staining of lipids by Sudan Black B 1P	E
Section II – PSZO 234 Economic Zoology (05)		
1.	Study of apiculture equipments 1P	D
2.	Temporary mounting of silk gland from silk moth larva 1P	E
3.	Study of poultry breeds and equipments used in poultry farm 1P	D
4.	A visit to pearl farming centre / apiculture centre / sericulture centre / poultry farm 1P	E
5.	Study of fishing crafts and gears 1P	E
6.	Collection and identification of locally available / cultured fishes 1P	E
7.	Sample collection, isolation, preservation and identification of soil / plant / animal nematodes 1P	E
8.	Setting and maintenance of bee box in college garden (activity based)	