

## CURRICULUM DESIGN AND DEVELOPMENT

NAME OF THE DEPARTMENT:

- 1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs, which is reflected in the Programme outcomes (POs), Programme Specific Outcomes(PSOs) and Course Outcomes(COs) of the Programmes offered by the University (Write description in a maximum of 500 words)

### PROGRAMME SPECIFIC OUT COMES (PSO)

After completing Masters in Zoology, there are numerous career opportunities for candidates in the public as well as private sectors. Students have job opportunities in the field of Zoology like Animal behaviourist, Conservationist, Wildlife Biologist, Zoo Curator, Wildlife Educator, Fisheries Inspector, Entomologist in Agriculture Departments etc. Students can be inducted as Zoology faculty in high and higher education departments as teaching professionals. Besides this students can also set up their own ventures in the fish/pond culture, Aquarium keeping, formulation of value added edible animal products, setting up of APIARY, setting of diagnostic labs as lab technical experts etc. This various modules of this course helps the students to qualify various competitive exams like IAS/IFS/IPS/KAS etc. Students who want to pursue Doctorate/Research programme can qualify various research aptitude exams like NET/GATE/JRF/SET etc.

S.No.	Course No. <i>(provide complete code)</i>	Course Title	Course Outcome (CO)
<b>Semester-I</b>			
<b>These courses enable the students to develop a basic concept and understanding of the following subjects and their applicability</b>			
1.	PSZOTC-101	Ecology & Environmental Biology	The concept of basic theories and principles of ecology, critical understanding of the concepts like population dynamics, community structure and abundance, species interactions, energy flow, productivity, succession, biological invasions etc, critical understanding of the human influence on environment, the practical aspects based on research/field trainings.
2.	PSZOTC-102	Fundamentals of Genetics	Basic concepts of chromosomes, their special forms and aberrations, structure of genetic material, basic hereditary principles; mutations and DNA repair mechanism fundamentals of DNA replication, protein synthesis and control of gene expression.

3.	PSZOTC-103	Ichthyology	The fish classification, structure and adaptations in relation to diverse habitat conditions in fishes, the basic concepts of feeding, reproductive & respiratory ecology in fishes, parental care and adaptive capabilities to special environment in fishes etc
4.	PSZOTC-104	Immunology	The basic knowledge about immune system and its role in improving general health and immunity, critical concepts of immune system, immune cells and immunological techniques, tumour immunology and transplantation immunology .
5.	PSZOTC-105	An Introduction to Insect Diversity	The basic knowledge about the morphology, taxonomic diversity and physiology of insects, Critical understanding of the key concepts of insect ecology, biology and its relationship with various biotic and abiotic factors, practical and applied aspects of entomology.
6.	PSZOTC-106	Lab Course -I	To develop a broad knowledge about the external morphology, identification and classification and adaptations of local fishes to their environment, to provide hands-on –training to the students for analysis of various physico-chemical parameters of water, biotic communities (phytoplankton, zooplankton, fishes).
7.	PSZOTC-107	Lab Course -II	The practical portion is planned to provide hands on training regarding various cytological, molecular and immunological techniques; to make students aware about the identification and collection of locally available insect species, and their various anatomical and morphological features.

**Semester-II These courses enable the students to develop a basic concept and understanding of the following subjects and their applicability**

1.	PSZOTC-201	Cell Biology & Research Instrumentation	The structural and functional unit of life, the basic concepts of cell biology: cell cycle, cell communication, cell signaling and cell death, principles and working of various instruments for the study of cell architecture, cellular components and cell machinery.
2.	PSZOTC-202	Functional Anatomy of Animals	Comparative functioning of the organ systems across the animal world, the insights into developmental and physiological adaptations vs evolutionary strategies, coordination of various biological systems within diverse animal groups.
3.	PSZOTC-203	Basic Endocrinology	The comparative morphology and physiology of neuro-endocrine systems in invertebrates and vertebrates, the basic information about the endocrine glands & their secretions, the working principles of hormones and their related deficiency diseases.
4.	PSZOTC-204	Biotechnology	The basics and applied aspects of biotechnology and animal tissue culture, the advanced biotechnological practices and approaches, technology application in medical, industrial, environmental and agricultural areas.
5.	PSZOTC-205	Biodiversity, Conservation & Management	The basic concepts of biodiversity and its use for human welfare, critical understanding of Indian biodiversity and its zoogeographical distribution, threats to biodiversity and conversational scope and strategies.

6.	PSZOPC-206	Lab Course -I	Students can gain hands-on experience of various high-tech devices for biochemical analysis/ /testing/characterization techniques; will be able to know about the histology of various endocrine glands of different vertebrates and invertebrates, will become familiar with commonly used labware and instrumentation of a biochemical and molecular biological laboratory, learn the requirements for sterile work, and will be able to store biological samples properly
7.	PSZOPC-207	Lab Course -II	Students get an accurate depiction of how various organs both function and correlate with each other; Will provide the student with theoretical information and practicum experience in molecular biology techniques, get hands on experience by developing lab skills, conducting experiments and going on field trips.

**Semester-III These courses enable the students to develop a basic concept and understanding of the following subjects and their applicability**

1.	PSZOTC-301	Animal Physiology	Basic concepts of physiology i.e.digestion,respiration,excretion,cardiovascular,excretory,nervous and muscular systems, gastrointestinal disorders, respiratory stresses vs environment, the mechanisms that work to keep the human body alive and functioning.
2.	PSZOTC-302	Fundamentals of Biochemistry	Structure, types and classification of proteins, carbohydrates and fats, enzymes and mechanism of enzyme action, metabolic pathways of various bio-molecules and their functional significance.
3.	PSZOTC -303	Biosystematics, Taxonomy & Evolution	The importance and application of biosystematics, evolution with reference to various theories of organic evolution, the major events in evolutionary time scale, concepts, origin and mode of speciation, evolution of man in lieu of evidences favoring biological evolution.
4.	PSZOTOC-304	MOOC through SWAYAM	To provide the students high quality learning experience using multimedia on anytime, anywhere basis, to acquaint the students with online mode of learning using ICT platform, to diverse the knowledge of students through open learning and help them to access, different disciplines online and thus promoting interdisciplinary knowledge, to provide the students a hybrid model of learning that adds to the quality of classroom teaching.
5.	PSZOTOC-307	Ecofriendly pest management	This has direct applicability as entomopathogenic nematodes (EPN) formulation can be made commercially available. This product (EPN formulation) is a living entity and requires skilled training. Young Entrepreneur can take up this work and give training to farmers
6.	PSZOPC-305	Lab Course -I	Laboratory exercises are intended to illustrate concepts and add an active learning component to animal physiology courses.
7.	PSZOPC-306	Lab Course -II	Students will acquire practical knowledge regarding the techniques used to investigate the properties of macromolecules, they learn how to measure the macromolecular concentration of solutions by spectrophotometry, practical knowledge of the taxonomy will facilitate the identification of unknown organisms,

**Semester-IV These courses enable the students to develop a basic concept and understanding of the following subjects and their applicability**

1.	PSZOTC-401	Reproductive & Developmental Biology	The gonads and their role in reproductive process, the factors and breeding behavior in non mammalians and mammalians, the mechanism, patterns and processes involved in cleavage, blastulation and gastrulation, the key concepts of neural tube formation, organ formation in birds and mammals, metamorphosis in amphibians.
----	------------	--------------------------------------	---

2.	PSZOTC-402	Aquaculture	Various forms and practices of aquaculture, aquaculture practices with special emphasis on culture of aquatic organisms, preparation and management of different types of ponds for carp culture, types of fish feed, their composition and formulation techniques.
3.	PSZOTC-403	Microbiology	Microorganisms and their application in health, industries and agriculture, transmission mechanism and clinical presentations of common diseases, agriculture / soil microbiology and bioremediation.
4.	PSZOTE-404	Limnology	Limnological aspects of inland freshwater resources, relation of inland water resources with the terrestrial ecosystem, biological diversity of lentic and lotic water bodies, conservation, management and rehabilitation aspects of wetlands.
5.	PSZOTE-405	Fish & fisheries	Present status and future potential of fish resources of India, fish: its biotic and abiotic environment, fish breeding: culture and captive breeding techniques, fish nutrition: requirements, processing and preservation techniques, fish aquarium : setting and health management .
6.	PSZOTE-406	Molecular Genetics & Cytogenetics	Analysis of human chromosomes by using classical and advanced cytogenetic techniques, genetics of human disorders by Pedigree analysis and karyotyping, genetic and molecular basis of human genetic diseases, human genome project, human cloning, single gene and multifactorial disorders.
7.	PSZOTE-407	Entomology	Importance of beneficial and non-beneficial insects, applied aspects of insects and their services to human welfare, insect behaviour, insect plant interactions, insect pest management and their control measures.
8.	PSZOTO-408	Biological Anthropology	biological anthropology: historical background, scope and application, history of human evolution / principles and processes of human evolution, human biology; genetics, epidemiology and susceptibility to various diseases.
9.	PSZOPC-409	Lab Course -I	Improve the theoretical knowledge about reproductive and developmental biology of various animals, understand the eco-biology and life cycle of various fish and shellfish in natural and laboratory conditions, focuses on applying techniques and methods related to molecular biology, microbial culture
10.	PSZOPC-410	Lab Course -II	<ul style="list-style-type: none"> <li>• Provide hands-on –training to the students for the qualitative and quantitative estimation of various physico-chemical variables and planktonic communities;</li> <li>• Lead the students to analyse a variety of aquatic organisms such as crustaceans, molluscs and certain types of fish.</li> <li>• Will make the students aware about the genetics of various human diseases and their inheritance pattern.</li> <li>• The practical portion is planned to direct students towards the collection, identification, and mode of damage of insect pests of crops, fruits, vegetables, stored grains, and households.</li> </ul>

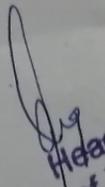
find following links

**Documents to be attached in support of 1.1.1**

- BOS minutes with approved syllabi
- Sample teaching/lecture plan
- Proof of PO, PSO, CO approved by Convener BOS

<https://www.jammuuniversity.ac.in/sites/default/files/inline-files/Zoology-1-4-CBCS.pdf>

[https://www.jammuuniversity.ac.in/cms/sites/default/files/inline-files/Zoology-CBCS-2019\\_0.pdf](https://www.jammuuniversity.ac.in/cms/sites/default/files/inline-files/Zoology-CBCS-2019_0.pdf)

  
Head  
Deptt. of Zoology  
University of Jammu  
Jammu