

B.Sc. Zoology Honours**6 Semester Course****Lits of courses**

Sl No	Name of the Course	Semster	Course Code	Credit	Marks in the Course	Name of the Programme	Programme Code	Course outcome	Employability/Skill enhancement / Entrepreneurship development	Introdcuti on year of new course	BoS Date	Percentag e of Revision	BoS Date
1	General Characters, Diversification and Outline Classification of different Non-Chordate Phyla, Ultrastructure of a Cell	1	ZOOA- P1T	10	100	B.Sc. Zoology Honours	ZOOA	1. Development of clear concept on different invertebrate forms and their physiology. 2. Describing general taxonomic rules of non-chordate classification. 3. Classifying Protista up to phylum using examples from parasitic adaptation. 4. Development of concise ideas about the molecular aspects of cell functioning.	1. Regular class tets/continuous assesments are conducted to correlate between different bauplans of various invertebrate phyla and their utilities which is helpful for clear understanding. 2. Students are asked to prepare short write-ups on different topics from the syllabus to generate baseline knowledge for further multiple biological/medical disciplines.	2017-18	15.07.2017		

2	Demonstration including mounting & preparation; identification of non-chordate specimens; Cytology	1	ZOOA- P1P	4	50	B.Sc. Zoology Honours	ZOOA	1. Development of clear concept on different vertebrate forms and their physiology. 2. Classifying from Protochordates to Mammals properly. 3. Understanding complex vertebrate interactions. 4. Development of precise idea on early, late & post embryonic developmental phenomena in various model organisms. 5. Medical complications & their solutions during human development. 6. Learning principles and concepts of numerous elementary cytogenetic mechanisms including Mendelian and non Mendelian inheritance.	1. Students get chance for hands-on lab based training on microscopy & micrometry, which is helpful for forensic study or getting jobs in biomedical, pharmaceutical, pharmacological industries in future. 2. Students are trained to be more independent to generate new ideas for further academic research studying different physiological systems of invertebrates in-vivo and justifying the systematic positions of selected preserved invertebrate specimen based on their morphological features	2017-18	15.07.2017		
3	Functional anatomy of Chordates & Major aspects of Developmental Biology, Genetics	2	ZOOA- P2T	10	100	B.Sc. Zoology Honours	ZOOA	1. Development of clear concept on different vertebrate forms and their physiology. 2. Classifying from Protochordates to Mammals properly. 3. Understanding complex vertebrate interactions.	1. Students may correlate between different bauplans of various vertebrate taxa and their utilities and may gather a fundamental knowledge on principles of development-life cycle. 2. Various genetic crosses to are designed in classes to develop skill for analysing numerous biological phenomena, mostly adopting short question-answer method. 3. Evaluation by periodic tests & mock tests etc.	2017-18	15.07.2017		

4	Demonstration including mounting & preparation; Identification of Chordate Specimens; Genetics; Developmental Biology & Osteology	2	ZOOA-P2P	4	50	B.Sc. Zoology Honours	ZOOA	1. Gathering knowledge on different developmental processes & genetic mechanisms 2. Correlating the theoretical knowledge with practical curricula to develop a holistic idea on Vertebrate Zoology by considering their skeletal systems.	1. Lab based training is conducted to enhance skill for gathering knowledge on vertebrate anatomy, different developmental processes & genetic mechanisms. Evaluation includes regular submission of write-ups on each topic culminating lab note books finally.	2017-18	15.07.2017		
5	Principles of Ecology; Biodiversity; Wild life Management & Conservation, Molecular Biology	3	ZOOA – P3T	10	100	B.Sc. Zoology Honours	ZOOA	1. Learning the basic biological principles and processes to understand ecology and environment and their proper functioning. 2. Understanding distribution of fauna in different realms and their mutual interaction. 3. Studying interaction between biotic and abiotic factors. 4. Developing idea on numerous protected zones in wildlife, different conservation strategies and WPA. 5. Developing knowledge of underlying molecular mechanisms of various genetic and cellular phenomena.	1. Students get exposure for developing analytical skills to implement ecological knowledge in designing conservational strategies and wild life management. This, in turn, is beneficial for getting admission to national institutes like FRI, WII etc. for higher studies and research. 2. Foundation is built for the students to theoretically understand various genetic mechanisms and abnormalities by means of cutting edge molecular techniques. This serves as a 'concept building block' when evaluation is done through class tests and mock tests.	2018-19	05.02.2018		

6	Ecology, Genomics & Proteomics, Field Study Project	3	ZOOA – P3P	4	50	B.Sc. Zoology Honours	ZOOA	1. Conducting a local excursion to obtain and record various data and their subsequent analysis to holistically understand Ecology in silico. 2. Perform modern molecular genetic techniques to co-relate theoretical molecular genetics knowledge.	1. In field project, learning how to obtain ecological data in silico and their analysis using various statistical tools, students gather experience of assessing numerous parameters of different ecosystems. Moreover, while preparing GIS maps for different flora and fauna in field note books, they get training of handling software like Google Earth, QGIS 3.10, DIVA etc. 2. Developing skills in isolation of biomolecules (DNA and Protein) and their quantitative analysis using modern tools and techniques in labs help learners to move further to Molecular Biology research and to other biomedical industries.	2018-19	05.02.2018		
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7	Animal Physiology & Functional Histology, Biochemistry and Biochemical Instrumentation	4	ZOOA – P4T	10	100	B.Sc. Zoology Honours	ZOOA	1. Learning principles and concepts of basic physiological processes to relate the various levels of organization and interaction amongst them to ensure proper functionality of an individual. 2. Development of bio-chemical background in various life sustaining processes. 3. Developing physiological and biochemical understanding through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which they are composed. 4. Understanding interactions and interdependence of physiological and biochemical processes.	1. Students develop skills by theoretically understanding how and/or why an individual physiologically responds to various situations. Moreover, they become competent knowing how various physio-chemical techniques can be utilized to manoeuvre biomolecules, involved in life sustaining processes.	2018-19	05.02.2018		
8	Animal physiology and Histology, Enzymology, Qualitative Biochemical Assays	4	ZOOA – P4P	4	50	B.Sc. Zoology Honours	ZOOA	1. Learning the practical knowledges to analyse different biochemical samples and assess the presence of macro and/or micro molecules therein. 2. Estimation of various haematological and physiological parameters by means of elementary equipment's	1. Students develop skills by performing quantitative and qualitative biochemical estimations of unknown biochemical samples. 2. Hands-on training on routine assessment of human physiological parameters (viz. TC/DC/BP/Hb%) help students to get absorbed in various pathological labs.	2018-19	05.02.2018		

9	& Human diseases	5	ZOOA – P5T	5	50	B.Sc. Zoology Honours	ZOOA	1. Learning the fundamental basis of how organisms react to biological foreign agents. 2. Understanding different types of immunity. 3. Studying interactions of antigens, antibodies, complements and other immune components. 4. Understanding of immune mechanisms in disease control, vaccination, process of immune interactions. 5. Understanding the basis and mechanism of various parasite mediated and physiological diseases.	1. Skill development for the students is achieved by theoretically learning how humans resist pathogenic interference and how individuals can be benefitted by various immuneopreventive and immunotherapeutic approaches. 2. Evaluation includes periodic tests, mock tets, classroom quiz, write-up submission etc.	2018-19	03.12.2018		
10	tion Biology & Hom	5	ZOOA – P6T	5	50	B.Sc. Zoology Honours	ZOOA	1. Development of precise knowledge on how an individual react to various internal and external conditions by means of chemically integrating and modulating various physiological processes. 2. Understanding principles of bioluminescence & biological rhythm.	1. Foundation is built for theoretically understanding the release, mode of action, regulation and abnormal manifestation of various chemical messengers in vivo. 2. Evaluation includes periodic tests, mock tets, classroom quiz, write-up submission etc.	2018-19	03.12.2018		

11	to Biotechnology	5	ZOOA – P7T	6	50	B.Sc. Zoology Honours	ZOOA	1. Learning how the basic molecular genetic mechanisms can be modulated for various bio-medical, research and economic benefits. 2. Learning principles of animal cell & tissue culture.	1. Students become efficient to theoretically correlate the ideas of the cutting edge molecular and advanced biological tools with techniques and application of those in various aspects of human welfare.	2018-19	03.12.2018		
12	Immunology; Integration Biology & Homeostasis; Bioinformatics; Tools & Techniques of Biotechnology	5	ZOOA – P8P	5	75	B.Sc. Zoology Honours	ZOOA	1. Performing sophisticated experimentations using advanced Biotechnological tools & techniques 2. Develop the practical skills analyse different haematological and immunological samples to assess various parameters. 3. Learning basic principles of Bioinformatics	Students develop practical skill to perform the followings: 1. Human blood group determination from blood samples. 2. Quantitative estimation of various antigens from various biological samples. 3. Designing primer to clone the gene of interest by means of various biotechnological software. 4. Perform all the steps to clone the sequence of interest using advanced Biotechnological tools & techniques. All of the skills mentioned above are useful to get employment in pharmaceutical & biomedical sectors, especially at their R & D divisions.	2018-19	03.12.2018		

13	Laboratory/Industry	5	ZOOA – P9P	5	75	B.Sc. Zoology Honours	ZOOA	An exposure to pursue a project under a functioning laboratory condition. Developing expertise to handle different instruments.	1. Students inculcating basic ideas of fundamental research under able guidance.	2018-19	03.12.2018		
14	Science and Economic Zoology	6	ZOOA – P10T	8	75	B.Sc. Zoology Honours	ZOOA	1. Learning the theoretical skills to establish any biological phenomena by statistically assessing the experimental data 2. Learning the basis to understand life cycle & physiology of various bioresources and applying such knowledge scientifically for human welfare. 3. Understanding concepts of fisheries, fishing tools and site selection. 4. Understanding processes of Silk moth rearing, silk production & Mulberry cultivation, Lac culture, Apiculture etc. and their economic values. 5. Developing clear idea about pest management and its importance.	1. Learning to assess & analyse biological data as per need. 2. Theoretically learners can correlate the physiology, behaviour, problems of various bio-resources (fish, annelids, arthropods etc.) and their manipulation for earning revenues and/or human welfare.	2018-19	03.12.2018		

15	Elementary ideas on Systematics; Evolution and Adaptation; Animal Behaviour as a process of life	6	ZOOA – P11T	8	75	B.Sc. Zoology Honours	ZOOA	1. Learning the theoretical skills to taxonomic assessment of different animals correlating their evolutionary background as well as behavioural pattern. 2. Gaining knowledge regarding the various theories of evolution, evolutionary process such as variation, speciation, natural selection, origin of primates and man. 3. Learning basic principles of animal taxonomy, systematics, classification, speciation etc.	Development of skill to determine 'Evolutionary justification' of a group of organisms under investigation by means of their behavioural pattern and taxonomic status.	2018-19	03.12.2018		
16	Adaptation, dissertation, local excursion and grand viva voce	6	ZOOA – P12P	5	75	B.Sc. Zoology Honours	ZOOA	1. Presentation & defence of any zoological problem in a scientific and structured manner. 2. Correlating the theoretical strategies of rearing & managing economically important animals by visiting such centres.	1. Development of professional skill to present & scientifically defend a zoological problem. 2. Methodical preparation of taxonomic keys to determine the appropriate status of a selected specimen. 3. An interdisciplinary viva voce to groom and train the students for facing such interviews in future.	2018-19	03.12.2018		

17	Insects	6	OOA – P13DT	4	50	B.Sc. Zoology Honours	ZOOA	1. Developing a clear idea on physiology, taxonomy & social behaviour of insects. 2. Understanding the mechanism of pollination in details. 3. Understanding the importance of insects as different vectors.	1. Development of skill by theoretically learning 'Insect Biology' in details to assess the roles of different insect group as causing agents/control agents etc.	2018-19	03.12.2018		
18	Detailed study of Insect Morphology	6	OOA – P13DP	1	25	B.Sc. Zoology Honours	ZOOA	1. Developing a clear idea on anatomy of insects. 2. Developing skill on morphotaxonomy based on insect body. 3. Understanding insect diversity based on field study.	1. Better idea on insect anatomy is helpful for the students to pursue entomological research further and also to address different insect mediated problems affecting humans at large,	2018-19	03.12.2018		
19	Endocrinology	6	OOA – P13DT	4	50	B.Sc. Zoology Honours	ZOOA	1. Development of precise knowledge how an individual react to various internal and external conditions by means of chemically integrating and modulating various physiological processes. 2. Understanding how the actions of different hormones are regulated in cellular as well as molecular levels.	1. Skill enhancement by in depth understanding of the release, mode of action, regulation and abnormal manifestation of various chemical messengers in vivo.	2018-19	03.12.2018		
20	Endocrine System	6	OOA – P13DP	1	25	B.Sc. Zoology Honours	ZOOA	1. Developing clear idea on structure & function of different mammalian endocrine glands.	1. Understanding of proper functioning of different endocrinal pathways help learners to develop better ideas of mode of physiological actions in different organ systems.	2018-19	03.12.2018		

21	Gr. A. Non-Chordates Gr. B. Cell Biology, Genetics & Molecular Biology	1	ZOOG-P1T	2	50	B.Sc. Zoology Honours	ZOOA	1. Development of concept on different non-chordate forms and their physiology. 2. Describing general taxonomic rules of non-chordate classification. 3. Development of precise ideas about the molecular aspects of cell functioning.	1. Regular class tests/continuous assessments are conducted to correlate between different bauplans of various invertebrate phyla and their utilities which is helpful for clear understanding. 2. Students are asked to prepare short write-ups on different topics from the syllabus to generate baseline knowledge for further multiple biological/medical disciplines.	2015-16	28.02.2015		
22	Laboratory Course	1	ZOOG-P1P	1	25	B.Sc. Zoology Honours	ZOOA	1. Identification & knowledge gathering on cellular & sub-cellular levels of organisation. 2. Correlating the theoretical knowledge with practical curricula to develop a holistic idea on Invertebrate Zoology as well as cell biology.	1. Students are trained to be more independent to generate new ideas for further academic research studying different physiological systems of invertebrates in-vivo and justifying the systematic positions of selected preserved invertebrate specimen based on their morphological features	2015-16	28.02.2015		

23	Gr. A. Chordates Gr. B. Developmental Biology	2	ZOOG-P2T	2	50	B.Sc. Zoology Honours	ZOOA	1. Development of concept on different chordate forms and their physiology. 2. Describing general taxonomic rules of chordate classification. 3. Development of basic idea on early, late & post embryonic developmental phenomena in various model organisms.	1. The students may correlate between different bauplans of various vertebrate taxa and their utilities and may gather a fundamental knowledge on principles of development-life cycle. 2. Various genetic crosses to are desingned in classes to develop skill for analysing numerous biological phenomena, mostly adopting short question-answer method.	2015-16	28.02.2015		
24	Laboratory Course	2	ZOOG-P2P	1	25	B.Sc. Zoology Honours	ZOOA	1. Correlating the theoretical knowledge with practical curricula to develop a holistic idea on Vertebrate Zoology considering anatomy in specific. 2. Identifying different chordate animals following evolutionary hierarchy.	1. Lab based training is conducted to enhance skill for gathering knowledge on vertebrate anatomy, different developmental processes & genetic mechanisms. Evaluation includes regular submission of write-ups on each topic culminating lab note books finally.	2015-16	28.02.2015		

25	Gr. A. Histology, Endocrinology, Animal Physiology & Biochemistry Gr. B. Ecology, Animal Behavior, Biodiversity & Wildlife	3	ZOOG-P3T	2	50	B.Sc. Zoology Honours	ZOOA	1. Learning principles and concepts of basic endocrinal regulations to relate the various levels of organization and interaction amongst them to ensure proper functionality of an individual. 2. Development of bio-chemical background in various life sustaining processes. 3. Developing physiological and biochemical understanding through scientific enquiry into the nature of mechanical, physical, and biochemical functions of humans, their organs, and the cells of which they are composed. 4. Learning the basic biological principles and processes to understand ecology and environment and their proper functioning. 5. Understanding distribution of fauna in different realms and their mutual interaction. Studying interaction between biotic and abiotic factors	1. Students develop skills by theoretically understanding how and/or why an individual physiologically responds to various situations. Moreover, they become competent knowing how various physio-chemical techniques can be utilized to manoeuvre biomolecules, involved in life sustaining processes. 2. Students get exposure for developing analytical skills to implement ecological knowledge in designing conservational strategies and wild life management. This, in turn, is beneficial for getting admission to national institutes like FRI, WII etc. for higher studies and research.	2015-16	28.02.2015		
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26	Laboratory Course	3	ZOOG-P3P	1	25	B.Sc. Zoology Honours	ZOOA	1. Develop the practical skills analyse different immunological samples to assess various parameters. 2. Correlating the theoretical knowledge with practical curricula to develop a holistic idea on vertebrates by considering their skeletal systems. 3. Understanding various ecological and physiological parameters through hands-on experiments.	1. Skills on Immunology, Animal Physiology, Ecology & Environment etc. are helpful for further studies and research	2015-16	28.02.2015		
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27	Gr. A. Applied Zoology Gr. B. Evolutionary Biology, Parasitology & Immunology	4	ZOOG-P4T	2	50	B.Sc. Zoology Honours	ZOOA	1. Learning the basis to understand life cycle & physiology of various bioresources and applying such knowledge scientifically for human welfare. 2. Understanding concepts of aquaculture, fishing tools and site selection. 3. Understanding processes of silk moth rearing, silk production & Mulberry cultivation, Lac culture, Apiculture etc. and their economic values. 4. Developing clear idea about pest management and its importance. 5. Learning basic principles of animal taxonomy, systematics, classification etc. 6. Gaining knowledge regarding the various theories of evolution, evolutionary process such as speciation, natural selection etc. 7. Understanding different types of immunity.	1. Gaining theoretical knowledge in different fields of Economic Zoology like Aquaculture, Sericulture, Lac Culture, Poultry etc. is helpful for getting jobs in organizations like Central Silk Board etc. and related industries. 2. Knowledge on host-parasite interaction and various immune cells, immune responses etc. are helpful for further study and research.	2015-16	28.02.2015		
28	Laboratory Course	4	ZOOG-P4P	1	25	B.Sc. Zoology Honours	ZOOA	1. Develop the practical skills to analyse different haematological samples to assess various parameters. 2. Understanding the diversity of protozoa in the gut content of cockroach & their functions. 3. Learning the applied importance of different pests.	1. Hands-on training on routine assessment of human physiological parameters (viz. TC/DC/BP/Hb%) help students to get absorbed in various pathological labs. 2. In depth knowledge on pest management is also essential either to get jobs in related industries or freelance activities.	2015-16	28.02.2015		