ALLIED ZOOLOGY

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| **Course code** | | **1AK** | **ANIMAL DIVERSITY** | | **L** | **T** | | **P** | **C** |
| **Core/Elective/SBS/Allied** | | | **Allied Course-I** | | **4** | **0** | | **0** | **3** |
| **Pre-requisite** | | | Basic Knowledge on Diversity of Animal | | **Syllabus**  **Version** | | **2022 –**  **2023** | | |
| **Course Objectives:** | | | | | | | | | |
| 1. To give a preliminary knowledge of the animal diversity and structural organization of animals. 2. To enlighten the students about the diverse forms of Invertebrate and Vertebrate animals. 3. To help the students to distinguish various animals and to understand their evolutionary significance. | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Identify and understand animal diversity. | | | | | | | K2 | |
| 2 | Understand the diversity and basic taxonomy of Non chordates and Chordates. | | | | | | | K2 | |
| 3 | Understand the economic importance of animal diversity. | | | | | | | K4 | |
| 4 | To recognize how different body designs solve biological problems related to  physiological and environmental challenges. | | | | | | | K5 | |
| 5 | To realize the role of vertebrates in biological communities, ecological interactions,  and conservation problems | | | | | | | K3 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | | |
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| **Unit:1** | | **ANIMAL TAXONOMY** | | | **10 hours** | | | | |
| Principles of Animal Taxonomy –Kingdom Protozoa –Salient features.  Type study: Paramecium - Habitat, Morphology and Conjugation. Life cycle of Plasmodium. Salient features of Phylum Porifera. | | | | | | | | | |
| **Unit:2** | | **COELENTERATA,PLATYHELMINTHES**  **AND ANNELIDA** | | | **12 hours** | | | | |
| Outlines of Kingdom Animalia. Salient features of Phylum Coelenterata, Platyhelminthes,  Aschelminthes, Annelida with any two examples. Colonial organization of Obelia, Parasitic adaptations in Helminthes. External features of Earthworm. | | | | | | | | | |
| **Unit:3** | | **ARTHROPODA, MOLLUSCA**  **AND ECHINODERMATA** | | **12 hours** | | | | | |
| Salient features of Phylum Arthropoda, Mollusca and Echinodermata with any two examples.  Type study: Cockroach – External features, Mouthparts, Digestive, Nervous and Reproductive system. Economic importance of Mollusca. | | | | | | | | | |
| **Unit:4** | | **FISHES AND AMPHIBIA** | | **12 hours** | | | | | |
| Characters and classification up to Subphylum of Chordates. Salient features of Fishes and Amphibia. Type Study: Frog - External features, Digestive System, Circulatory System,  Urinogenital System and Brain. | | | | | | | | | |
| **Unit:5** | | **REPTILES, AVES AND MAMMALS** | | **12 hours** | | | | | |
| Salient features Reptiles, Aves and Mammals with two examples. Type study: Rabbit - Morphology, | | | | | | | | | |

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| Digestive System, Circulatory System, and Urinogenital Systems. | | | |
| **Unit:6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Expert lectures, online seminars – webinars | | | |
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|  | | **Total Lecture hours** | **60 hours** |
| **Text Book(s)** | | | |
| 1 | Nair NC, Leelavathy S, SoundaraPandian N and Arumugam N. (2013). *A Text Book of*  *Invertebrates,*Saras Publication Nagercoil, Tamilnadu. | | |
| 2 | Thangamani A, Prasannakumar S, Narayanan LM, Arumugam N. (2013). *A Text Book of*  *Chordates,* Saras Publication, Nagercoil, Tamilnadu. | | |
| **Reference Books** | | | |
| 1 | Jordon EL and Verma PS. (2009), *Invertebrate Zoology*, 15th edition, S Chand and Co, Zoology  Delhi. | | |
| 2 | Kotpal RL. (2014).*Invertebrates – Animal Diversity – I,* 11th edition, Rastogi Publications,  Meerut. | | |
| 3 | Verma PS. (2010). *Chordate Zoology*, Reveised edition, S Chand Publishers, New Delhi. | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | <https://www.acs.edu.au/courses/invertebrate-animals-730.aspx> | | |
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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | M | M | M | M |
| **CO2** | S | M | M | S | S | S | M | L | L | L |
| **CO3** | S | M | M | S | S | S | S | L | S | M |
| **CO4** | S | S | M | M | M | S | S | L | S | S |
| **CO5** | S | S | M | S | S | S | M | L | S | S |

\*S-Strong; M-Medium; L-Low

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| **Course code** | | **2AK** | **PHYSIOLOGY, CELLULAR AND DEVELOPMENTAL BIOLOGY OF ANIMALS** | | **L** | **T** | | **P** | **C** |
| **Core/Elective/SBS/Allied** | | | **Allied Course-II** | | **4** | **0** | | **0** | **3** |
| **Pre-requisite** | | | Knowledge about Physiology and Developmental  Biology of Animals | | **Syllabus**  **Version** | | **2022 –**  **2023** | | |
| **Course Objectives:** | | | | | | | | | |
| 1. To give a brief introduction to the Cellular and Physiological aspects of animals. 2. To gain knowledge on Microscopes and Cytological techniques. 3. To give an insight to Developmental biology and Immunology of animals. 4. To give idea about Teratogenesis, Invitro fertilization, Stem cells and Amniocentesis. | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Understand the nature and basics concepts of physiology of animals. | | | | | | | K2 | |
| 2 | Understand the basic physiological process related to  metabolism and major requirements. | | | | | | | K2 | |
| 3 | Analyze the role of endocrine glands in animals. | | | | | | | K3 | |
| 4 | Acquire knowledge on various stages of development of animals. | | | | | | | K3 | |
| 5 | Gain basic understanding about immunity and its types. | | | | | | | K4 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | | |
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| **Unit:1** | | **DIGESTION AND RESPIRATION** | | | **12 hours** | | | | |
| Digestion of Carbohydrates, Protein and Lipids. Types of blood cells - Respiratory pigments –  Structure and function of Hemoglobin - Transport of carbon dioxide. | | | | | | | | | |
| **Unit:2** | | **EXCRETION AND NERVOUS SYSTEM** | | | **10 hours** | | | | |
| Mechanism of Blood Clotting (Brief outline), Ammonotellic Ureotellic and Uricotellic animals – Structure of Nephron and formation of Urine (Brief outline). Structure of Neuron and conduction  of Nerve impulse. | | | | | | | | | |
| **Unit:3** | | **MUSCLES AND HORMONES** | | **12 hours** | | | | | |
| Types of Muscles – Structure of Striated Muscle – Sliding Filament Theory.  Role and deficiency of Pituitary hormones, Thyroxine, Insulin and Glucagon, Estrogen, Progesterone, Androgens and Aldosterone. | | | | | | | | | |
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| **Unit:4** | | **EMBRYOLOGY** | | **12 hours** | | | | | |
| Structure of Human Sperm and Graffian follicle – Types of vertebrate eggs –Brief outlines of  mechanism of fertilization – Cleavage, Blastula and Gastrula of frog. | | | | | | | | | |
| **Unit:5** | | **IMMUNITY** | | **12 hours** | | | | | |

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| Types of Immunity – Antigen and antibody reaction –Structure of Immunoglobulin. AIDS:  Causative factors –Symptoms and Prevention. Principle of ELISA. | | | |
| **Unit:6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Expert lectures, Online Seminars - Webinars and Field Visits. | | | |
|  | | **Total Lecture hours** | **60 hours** |
| **Text Book(s)** | | | |
| 1 | Arumugam N.(2017). *Developmental Zoology,* Saras Publication, Nagarcoil, Tamilnadu. | | |
| 2 | Ajoy Paul. (2016). *Textbook of Immunology,* Books and Allied (P) Ltd, Kolkata. | | |
| 3 | Prasanakumar S, Meena A, Meyyan Pillai RP, DulsyFathima, Narayanan LM and Nallasingam K. (2017). *Animal Physiology and Biochemistry,* Saras Publication, Nagarcoil,  Tamilnadu. | | |
| **Reference Books** | | | |
| 1 | Lal SS and Sanjeev Kumar.(2015). *Immunology*, Rastogi Publication, Meerut. | | |
| 2 | Sastry KV and Priyanka Mathur. (2018). *Animal Physiology and Biochemistry,* Rastogi  Publication, Meerut. | | |
| 3 | Yadav PR. (2001). *A Text Book of Embryology,* Campus Books International, New Delhi. | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | <https://www.edx.org/learn/physiology> | | |
| 2 | <https://onlinecourses.nptel.ac.in/noc20_bt35/preview> | | |
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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | M | M | M | M |
| **CO2** | S | M | M | S | S | M | M | L | L | L |
| **CO3** | S | M | M | S | S | S | S | L | S | M |
| **CO4** | S | S | M | M | M | S | S | L | S | S |
| **CO5** | S | S | M | S | S | S | M | L | S | S |

\*S-Strong; M-Medium; L-Low

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| **Course code** | | **2PK** | **ALLIED ZOOLOGY PRACTICAL** | **L** | **T** | | **P** | **C** |
| **Core/Elective/SBS/Allied** | | | **ALLIED ZOOLOGY** | **0** | **0** | | **2** | **0** |
| **Pre-requisite** | | | Practical Knowledge of Animal Diversity,  Microbiology and Physiology | **Syllabus**  **Version** | | **2022 –**  **2023** | | |
| **Course Objectives**: | | | | | | | | |
| 1. To learn and be familiar with the Laboratory techniques. 2. To understand the taxonomic position, body organization and evolutionary relationship of animals. 3. To inculcate the significance of various non chordates and chordates. | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Gain practical skills in the use of tools, technologies and methods used in  microbiology and physiology labs. | | | | | | K2 | |
| 2 | Apply knowledge in handling different organisms. | | | | | | K3 | |
| 3 | Analyze and observe various specimens using Microscope. | | | | | | K4 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | |
| **MAJOR PRACTICAL** | | | | | | | | |
| 1. Qualitative detection of carbohydrate, Protein and lipids. 2. Qualitative detection of excretory products (Ammonia, Urea, Uric acid). | | | | | | | | |
| **MINOR PRACTICAL (Any Two)** | | | | | | | | |
| 1. ABO blood group. 2. Hanging drop preparation to observe motility of Paramecium. 3. Identification of polymorphonuclear leukocytes in human blood smear. | | | | | | | | |
| **SPOTTERS** | | | | | | | | |
| **Identification and Description of :**   * Paramecium, Paramecium Conjugation, Binary fission * Obelia Colony, Obelia Medusa * Liverfluke, Tape worm, Ascaris male and female * Earthworm, Cockroach/Prawn, Drosophila * Pila, Starfish * Amphioxus * Shark, Scales of Fishes, * Frog, Frog Egg, Blastula and Gastrula. * Quill feather | | | | | | | | |

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| **QUESTION PATTERN: TOTAL MARKS: 25 MARKS.**  **Major: 08, Minor: 05, Record: 04, Spotter: 08 (4 spotters each carry 2 marks).** | |
| **Total Practical Hours 30(Each Semester) x 2 = 60 Hours Per Year** | |
| **Text Book(s)** | |
| 1 | Arumugam N. (2013). *Developmental Zoology*, Saras Publication, Nagercoil, Tamilnadu, India. |
| 2 | Das S. (2020).*Microbiology Practical Manual,* CBS Publication, Delhi. |
| 3 | [Jayasurya, Arumugam N,](https://www.sapnaonline.com/shop/author/jayasurya) [Dulsy Fatima. (2013). *Practical Zoology Vol 3,*](https://www.sapnaonline.com/shop/author/dulsy-fatima)Saras Publication, Nagercoil, Tamilnadu, India. |
| 4 | Singh HR and Neerajkumar. (2014). *Animal Physiology and Biochemistry*, Vishal Publishing Co. Jalandhar, Delhi. |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | M | S | L | M | S | L | S | S |
| **CO2** | S | S | M | M | M | L | M | L | S | S |
| **CO3** | S | S | L | S | M | L | L | L | S | S |

\*S-Strong; M-Medium; L-Low