

Name of the Programme: M. Sc. Zoology

Course Code: ZOO-504

Title of the Course: Laboratory course I

Number of Credits: 03

Effective from AY: 2023-24

Pre-requisites for the Course:	Basic working knowledge of Animal Systematics, Animal Anatomy, Physiology and Molecular Biology.	
Course Objectives:	<ol style="list-style-type: none">1. To obtain Laboratory hands on training in areas of systematics and anatomy.2. To integrate theoretical knowledge with hands-on methods related to animal physiology.3. To provide hands-on training on extraction and purification of nucleic acid.4. To demonstrate PCR techniques using animal samples.5. To explain the in-silico designing of primers for genes.	
Content:	Animal Taxonomy and Systematics Systematic analysis with proper morphological keys and construction of Phylogenetic keys of the following: <ul style="list-style-type: none">- Malacofauna- Lepidoptera- Avifauna- Ichthyofauna- Araneae	11 x 2 lab hours
	Anatomy of Non Chordates Dissection/Mounting Exoskeleton and appendages of prawns Nervous system in cockroach / crab (collected from market) /visceral and pedal ganglia in bivalves. Digestive system in prawn (collected from market)/cockroach Comparative study of mouth parts in insects. Reproductive system in cockroach Respiratory system in cockroach Mounting of heart in bivalves	11 x 2 lab hours
	Animal Physiology Study of human lung volumes and capacities during before and after exercise using respirometer.	11 x 2 lab

	<p>Determination of metabolic rate using respirometer. Estimation of heart rate, pulse rate and blood pressure changes during exercise using the oscillometric technique. Study of ECG and its evaluation in normal and pathological variations. Evaluation of heart rate, blood pressure using ECG strip. Measurement of muscular fatigue using finger ergograph. Study of nitrogenous waste products of animals from different habitats. Analysis of coelomic fluid of bivalve / crab.</p> <p>Molecular Biology Extraction of nucleic acid from chicken liver. Isolation of DNA and RNA from nucleic acids. Qualitative analysis of purified DNA and RNA using UV spectrophotometer / Nanodrop. Separation of nucleic acids on agarose gel and relative quantification. Demonstration/ hands-on training of PCR technique using a chicken DNA sample. Demonstration / hands-on training of RT-PCR technique using chicken total RNA sample. Purine/Pyrimidine bases from nucleic acids using paper chromatography. Primer designing of any two housekeeping genes from <i>Gallus gallus</i>.</p>	<p>hours</p> <p>12 x 2 lab hours</p>
Pedagogy:	Practicals/tutorials/self-study/videos/presentations/mini projects/Group activities	
References/ Readings:	<ol style="list-style-type: none"> 1. R. S. K. Barnes, P. Calow, P. J. W. Olive, D. W. Golding and J. I. Spicer, The Invertebrates: A Synthesis, (Third edition), Blackwell Science, 2001. 2. C. Moyces and P. Schulte, Principles of Animal Physiology, Second Edition, Pearson International Edition, USA, 2013. 3. C. L. Prosser, Comparative Animal Physiology, Part A, Environmental and Metabolic Animal Physiology (Fourth Edition), Oxford, John Wiley & Sons Publication, 1991. 4. D. Randall, W. Burggren and K. E. French, Animal Physiology, (Fifth edition), New York, WH Freeman and Co, 2001. 5. K. Schmidt-Nielsen, Animal Physiology: Adaptation and Environment, 	

	<p>(Fifth Edition), Cambridge University Press, 2001.</p> <ol style="list-style-type: none"> 6. P. C. Withers, Comparative Animal Physiology, (First Edition), Fort Worth, Saunders College Publication, 1992. 7. A. S. Gerstein, Molecular Biology Problem Solver: A Laboratory Guide. John Wiley & Sons, 2004. 8. S. Carson, H. B. Miller, D. S. Witherow and M. C. Srougi, Molecular Biology Techniques: A Classroom Laboratory Manual. Academic Press, 2011. 9. T. S. Work and E. Work, (1999). Laboratory Techniques in Biochemistry and Molecular Biology. North-Holland Publishing Company, Amsterdam, Oxford 1999
Course Outcomes:	<p>The Learner will</p> <ol style="list-style-type: none"> 1. Classify organisms by using keys and field techniques. 2. Draw a correlation between physical activities and its influence of physiological parameters 3. Use medical instruments to check physiological parameters and interpret medical reports. 4. Compose the molecular studies for standardization of extraction and purification of Nucleic acid. 5. Formulate the PCR thermal profile to suit the sample chosen. 6. To design the primers for housekeeping genes

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