UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN ADVANCED ZOOLOGY AND BIOTECHNOLOGY

SYLLABUS WITH EFFECT FROM 2023-2024

LAB COURSE- SEMESTER – V & VI

Course Code	Course Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
321C61	**ANIMAL PHYSIOLOGY, BIOCHEMISTRY, DEVELOPMENTAL BIOLOGY, BIOSTATISTICS AND COMPUTER APPLICATIONS**	Core	-	-	Y	-	4	3+3	40	60	100

Learning Objectives	
CO1	To understand the physiological processes that regulate body functions.
CO2	To attain knowledge of important biomolecules such as carbohydrates, lipids, amino acids, proteins and enzymes and chromoatography procedure
CO3	To encourage students to appreciate and learn about the structure of gametes and to be familiar with different stages of development of the embryo in different organisms
CO4	To encourage students to know the diagrammatic representations of a data
CO5	To encourage students to appreciate and learn about the graphical representation in MS Excel

UNIT	**Details**	**No. of Hours**	**Course Objectives**
I	**ANIMAL PHYSIOLOGY** 1. Use of Kymograph unit, BP apparatus, Respirometer. 2. Survey of Digestive enzymes in cockroach. 3. Estimation of Oxygen consumption in a fish with reference to body weight. 4. Detection of nitrogenous waste products in fish tank water, frog tank water, bird excreta and mammalian urine.	18	CO1

II	**BIOCHEMISTRY** 1. Qualitative identification of functional groups present in given carbohydrates solutions- (Glucose,Fructose, Sucrose, Lactose, Starch) 2. Quantitative estimation of Protein (Biuret Method) 3. Separation of amino acids using paper chromatography	18	CO2
III	**DEVELOPMENTAL BIOLOGY** Study of the following prepared slides, museum specimens and materials. 1. Slides of mammalian sperm and ovum 2. Sections of testis and ovary showing the maturation stages of gametes. 3. Study of egg type- Frog' s egg 4. Slides of cleavage stages,blastula,gastrula and neurula of frog 5. Slides of different stages of chick embryo 18 hours (primitive streak stage], 24 hours, 48 hours, 72 hours and 96 hours 6. Placenta of sheep , pig and man	18	CO3
IV	**BIOSTATISTICS** 1. Determine the height and weight of pupils in a class (number of observations not less than 30) and prepare the (a) Frequency distribution table (b) Calculate the arithmetic mean (c) Correlate the height- weight relationship	18	CO4
V	**COMPUTER APPLICATIONS** 1. Graphical representation of the data on height and weight of pupils in MS Excel.2. Spotters- Mouse, Key board, Monitor, Printer.	18	CO5
	Total	**90**	

UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN ADVANCED ZOOLOGY AND BIOTECHNOLOGY

SYLLABUS WITH EFFECT FROM 2023-2024

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Appreciate the role of enzymes and factors that determines enzyme activity and identify the nitrogenous waste products of animals.	PO1,PO6
CO2	Evaluate and examine the various biochemical parameters and chromatography technique	PO1, PO8,PO5,PO6
CO3	Encourage students to appreciate and learn about the structure of gametes and to be familiar with different stages of development of the embryo in different organisms	PO1,PO4, PO6
CO4	Will be able to know the diagrammatic representations of a data	PO1,PO4, PO5, PO6
CO5	Appreciate and learn about the graphical representation in MS Excel	PO3, PO8
Text Books (Latest Editions)		
1.	Surya Nandan Meena, Milind Naik, 2019. Advances in Biological Science Research: A Practical Approach, Academic Press, New York, USA.	
2.	Agarwal R A., Anil K Srivastava.,Kaushal Kumar.,1978. Animal Physiology and Biochemistry, S. Chand & Co. Ltd., New Delhi Publishing., 377 PP.	
3.	Saxena J., Baunthiyal M., Ravi I., 2015. Laboratory Manual of Microbiology, Biochemistry and Molecular Biology, Scientific Publishers, India.	
4.		
5.	Chaitanya K.V., 2013. Cell and molecular biology: A Lab Manual, Phi Learning Pvt. Ltd., New Delhi, India.	
6	Andreas Hofmann, Samuel Clokie, 2018. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press, UK.	
7	Daniel, W.W. (2012) Biostatistics: A Foundation for Analysis in Health Sciences (10^{th} edition) John Wiley.	
8	User manual and online user manual of respective software for the most updated content	

References Books (Latest editions, and the style as given below must be strictly adhered to)		
1.	Andreas Hofmann, Samuel Clokie, 2018. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press, UK.	
2.	Leonard Davis, Mark Dibner, James Battey, 2012. Basic Methods in Molecular Biology, Elsevier Science Pubilshing Co., NY, USA.	
3.	Robert F. Schleif, Pieter C. Wensink, 2012. Practical Methods in Molecular Biology, Springer-Verlag, NY, USA.	
4.	Ian Freshney R., 2010. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, John Wiley & Sons, USA.	
5	Milton, J.S. and Tsokos, J.O. (1992) Statistical Methods in the Biological and Health Sciences (2 nd edition) McGraw Hill.	
6	Gurumani,N. 2005. Biostatistics, 2 nd edition, MJP Publishers India.	
Web Resources		
1.	https://www.jove.com/	
2.	https://vlab.amrita.edu/?sub=3&brch=77	
3.	http://cbii-au.vlabs.ac.in/	
4.	https://media.hhmi.org/biointeractive/vlabs/transgenic_fly/index.html	
5.	https://www.ibiology.org/biology-techniques/	
Methods of Evaluation		
Internal Evaluation	Continuous Internal Assessment Test	40 Marks
	Assignments	
	Seminars	
	Attendance and Class Participation	
External Evaluation	End Semester Examination	60 Marks
	Total	100 Marks
Methods of Assessment		
Recall (K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, Short summary or overview	
Application (K3)	Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain	
Analyze (K4)	Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge	
Evaluate (K5)	Longer essay/ Evaluation essay, Critique or justify with pros and cons	

Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	S							
CO 2	M							
CO 3				S		S		
CO 4				S	S	M		
CO 5			S					S

S-Strong(3) **M-Medium (2)** **L-Low (1)**