UNIVERSITY OF MADRAS

M.Sc. DEGREE PROGRAMME IN ZOOLOGY

SYLLABUS WITH EFFECT FROM 2023-2024

431C2C

Course Objectives:		
The main objectives of this course is		
	Practical course aims at demonstrating significant cellular and molecular biological principles, quantitative and analytical approaches that enable the students to translate the theoretical foundation in cell biology, genetics and developmental biology into practical understanding.	
Course	**:**	**Core VI**
Course title	**:**	**Lab Course in Cell Biology and Developmental Biology**
Credits	**:**	**4**
Pre-requisite:		
Students should have acquired basic knowledge relevant to this particular lab course.		
Expected Course Outcome:		
Upon completion of this lab course, students		

1.	Acquire knowledge to differentiate te cells of various living organisms and become awares of physiological processes of cells e.g. cell divisions, various stages of fertilization and embryo development.	**K2**
2.	Understand and observe as well as correctly identify different cell types, cellular structures using different microscopic techniques.	**K3**
3.	Develop handling - skills through the wet-lab course.	**K6**
4.	Learn the method of culturing of *Drosophila* and identification of their wild and mutant strains	**K1 & K2**
5.	Acquire skills to perform human karyotyping and chromosome mapping to identify abnormalities	**K1 & K2**

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

CELL AND MOLECULAR BIOLOGY

1. Determination of cell size using micrometer
2. Mitosis in onion root meristematic cells of plants
3. Identification of various stages of meiosis in the testes of grasshopper
4. Detection of polytene chromosome in salivary gland cells of the larvae of the Chironomus
5. Detection of sex chromatin

6. Isolation of genomic DNA from eukaryotic tissue
7. Isolation of total RNA from bacterial cells/tissues
8. Agarose gel electrophoresis
9. SDS-Polyacrylamide gel electrophoresis

DEVELOPMENTAL BIOLOGY

i. Gametogenesis - Observation of gametes from gonadal tissue sections

1. Oogenesis:

   Section through ovary of fish, frog and mammals
2. Spermatogenesis:

   Section through testis of fish, frog and mammals

ii. Embryogenesis

Frog Embryogenesis - Cleavage stages, blastula, gastrula, neurula.

a. Observation and whole mount preparation of the chick blastoderm
b. Chick embryonic stage - 18 hours of development
c. Chick embryonic stage - 24 hours of development
d. Chick embryonic stage - 48 hours of development
e. Chick embryonic stage - 72 hours of development
f. Chick embryonic stage - 96 hours of development

iii. **Histological observation**: T.S of Heart, Eye and Brain of Chick Embryo

iv. **Cryopreservation** - Demonstration of cryopreservation of gametes of fin fish/shell fish

Mapping with Programme Outcomes*										
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	S	S	S	S	S	L	L	M
CO2	S	S	S	S	S	M	M	M	M	M
CO3	S	S	M	S	S	L	S	M	L	M
CO4	M	M	L	M	L	M	M	S	M	L
CO5	S	S	M	L	S	M	L	S	S	S

*S - Strong; M - Medium; L – Low