

## DEVELOPMENTAL BIOLOGY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
V	21CZO5B	Core-VI	4	60	4	60	Nil	4

### COURSE OBJECTIVES:

- To study Ontogenesis, the development of animals including Regeneration and Parthenogenesis.
- To study Embryonic adaptations, Human reproduction and Reproductive technology in man.

### COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Students will develop an awareness on the process of fertilization and significance of parthenogenesis	K2 , K3
CO2	students will be able to gain knowledge on how to arrange sequences in developmental processes in order.	K2, K3
CO3	Students can understand the organ development and placentation.	K2,
CO4	The students will be able to apply the principles of the development in applied sciences like Biotechnology, Genetic engineering and Molecular Biology.	K3, K4
CO5	Students will be able to apply their knowledge in approaching modern techniques of reproductive biology.	K3,K4

**Knowledge Level:** K1- Remember; K2 – Understand; K3 – Apply K4 – Analyze.

### MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	M	M
CO3	M	S	S	S	S
CO4	S	S	S	S	S
CO5	S	M	S	S	S

S- Strong; M – Medium; L- Low

Distribution of Marks: Theory 100% and Problems Nil %

**UNIT I  
GAMETES and FERTILIZATION****(12 Hours)**

Basic concepts of developmental biology. Structure and types of Spermatozoa, Structure of Egg, Types of Mammalian eggs- Egg membranes. Polarity of Egg, Spermatogenesis- Spermiogenesis. Oogenesis-Pre-vitellogenesis and Vitellogenesis. Fertilization – mechanism, theories and significance – Parthenogenesis.

**UNIT II  
BLASTULATION and GASTRULATION****(12 Hours)**

Cleavage - Planes and Patterns, Factors controlling cleavage - Fate map and its construction. Blastulation – Morphogenetic movements – Cleavage and Gastrulation of frog and Cleavage and Gastrulation of chick.

**UNIT III  
ORGANOGENESIS****(12 Hours)**

Development of Brain, Eye and Heart in frog. Development of Nervous system in chick and Foetal membranes in chick. Placentation in Mammals. Development of Pro, Meso and Metanephric kidneys.

**UNIT IV  
APPLIED EMBRYOLOGY****(12 Hours)**

Organizer concept – Structure – mechanism of induction and competence. Nuclear transplantation - teratogenesis – Regeneration: types - events and factors. Embryonic stem cells and significance. Methods to culture embryo.

**UNIT V  
EMBRYOLOGICAL TECHNIQUES****(12 Hours)**

Oestrous, Menstrual cycle and menopause - Pregnancy – trimesters – development. *Erythroblastosis foetalis* - Twins – Monozygotic and Dizygotic twins. Merits and Demerits of Contraceptive devices- Male and Female Infertility – causes - Test tube baby and Assisted Reproductive Technology. Artificial Insemination- Cryopreservation- In vitro Fertilization (IVF)– Embryo transfer – Amniocentesis

**TEXT BOOKS**

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Arumugam, N	A Text Book of Embryology	Saras Publication	2003
2	Verma P.S., Agarwal., V.K	Developmental Biology	S. Chand and Company	2000
3	Veer Bala Rastogi and M.S. Jayaraj	Developmental Biology	Rastogi Publications	2002

## REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Balinsky, B.I	Introduction to Embryology	Saunders College Publishing	1981
2	Berrill, N.J	Developmental Biology	Tata Mc Graw Hill Publication Co.Ltd	1986
3	Clarke,G.L.	Elements of Ecology	John Wiley and Son Inc. New York and London	1954
6	Scott F. Gilbert	Developmental Biology	Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts	1997
7	Vijayaraghavan Nair K and P.V. George	A Manual of Developmental Biology	Academica	-
8	Vincent Terrence Robello, John P.C. and Prema A K	Developmental Biology	Zoological Society Study Material Series, Zoological Society of Kerala, Kottayam	2012

## WEB SOURCES:

[www.sciencedirect.co](http://www.sciencedirect.co).

[www.pebmed.com](http://www.pebmed.com)

[www.khansacademy.com](http://www.khansacademy.com)

[www.epatsala.com](http://www.epatsala.com)

[www.swayam.com](http://www.swayam.com)

## TEACHING METHODOLOGY

- Class room teaching
- Charts/ Models
- Power point Presentations
- Discussions
- Assignments
- Home test

## SYLLABUS DESIGNERS

- Dr. D. Sasikala, Assistant Professor and HOD
- Dr. V. Kiruthiga, Assistant Professor
- Dr. V. Rekha, Assistant Professor
- Dr. A. Vinodhini, Assistant Professor
- Dr. G. Vidhya, Assistant Professor