

## DEVELOPMENTAL BIOLOGY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
III	21CPZO3B	Core-VIII	5	75	5	75	Nil	5

### COURSE OBJECTIVES

To understand the basic concept of embryonic development, gametogenesis, early development of embryo, organogenesis, apoptosis and reproductive technology.

### COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To understand the basic concept of Embryonic development.	K2
CO2	To study and understand about the gametogenesis, fertilization and early development in embryo	K2
CO3	To understand the morphogenesis, organogenesis, neoteny and regeneration in vertebrates.	K2
CO4	To analyze and understand the regenerate and development of immune system in vertebrates.	K2&K4
CO5	To imbibe current knowledge pertaining to apoptosis and reproduction.	K4

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

### MAPPING WITH PROGRAMME OUTCOMES

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

S- Strong; M – Medium ; L- Low

DISTRIBUTION OF MARKS: THEORY 100%

**UNIT- I** **15 Hours**

**BASIC CONCEPTS OF DEVELOPMENT**

Potency, commitment, specification, induction, competence, determination and differentiation; morphogenetic gradients; cell fate and cell lineages; stem cells; genomic equivalence and the cytoplasmic determinants; imprinting; mutants and transgenics in analysis of development. Experimental analysis in the early development of Amphibians (Spemann and Mangold).

**UNIT-II** **15 Hours**

**GAMETOGENESIS, FERTILIZATION AND EARLY DEVELOPMENT**

Production of gametes, cell surface molecules in sperm-egg recognition in animals; zygote formation, cleavage, blastula formation, embryonic fields, gastrulation and formation of germ layers in animals; embryogenesis, establishment of symmetry

**UNIT-III** **15 Hours**

**MORPHOGENESIS AND ORGANOGENESIS**

Cell aggregation and differentiation in Dictyostelium; axes and pattern formation in Drosophila, Amphibia and Chick; organogenesis – vulva formation in Caenorhabditis elegans. Development of eye lens, ear and heart in mammals. Limb development and regeneration in vertebrates; differentiation of neurons, post embryonic development- larval formation, metamorphosis; environmental regulation of normal development; sex determination.

**UNIT- IV** **15 Hours**

**NEOTENY AND REGENERATION**

Occurrence and significance – Regeneration: Regenerative capacity in the Animal Kingdom – Factors influencing regeneration – Stimulation and Suppression – Polarity and Gradients – Development of immune system in vertebrates.

**UNIT- V** **15 Hours**

**APOPTOSIS AND REPRODUCTIVE TECHNOLOG**

Apoptosis-aging and senescence - Asexual reproduction - Assisted Reproductive Technology (ART) – Male infertility – Sperm abnormalities. Artificial Insemination– Female infertility- Superovulation – IVF, ICSI, GIFT – Screening of genetic disorders.

**TEXT BOOKS**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Gilbert, B. F	Developmental Biology, VIII Ed	Sinaur Associates Inc. Publishers, Sunderland , Massachusetts USA	2006
2.	Balinsky, B.I	Introduction to Embryology. V Ed	Saunders, Toppan	1981
3.	Lewis Wolpert	Principles of Development. II Ed	Oxford University Press	2002
4.	Nakamura, O., &Sulo, J	Organizer, A milestone of a HalfCentury from Spemann	Elsevier/North Holland Biomedical Press	1978
5.	VasundaraRao	Developmental Biology - A Modern Synthesis	Oxford IBH, New Delhi.	1994
6.	Russo, V.E.A., Brody, S., Cove, D and Ottolenghi, S	Development. The Molecular Genetic Approach	Springer Verlag, Berlin	1992
7.	N.Arumugam	A Text book of Developmental Biology	Saras publication	2014

**REFERENCE BOOKS**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Dr. Subramanian A.	Development biology	Springer	2012
2.	A.K. Rathoure	Understanding embroyological origins	Brillion publishers	2017
3.	K.S. Madhavan	Developmental biology	Wave books publishers	2017
4.	Manuel mari	Beffa kay experiment in practical development biology	Cambridge university press	2005
5.	Oppenheimer, S.B	Introduction to Embryonic Development	Allyn and Bacon,Inc. U.S.A.	1980

**WEB SOURCES:**

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

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

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

[Wikipedia .org](http://Wikipedia.org)

[www.journals.elsevier.com](http://www.journals.elsevier.com)

**TEACHING METHODOLOGY**

- Class room teaching
- Assignments ,Seminars and Models
- Group Discussions
- Home test
- PPT Presentations
- Board and chalk
- Demonstration from the Video slides, Animated videos and interactive software.

**SYLLABUS DESIGNERS**

- Dr D.Sasikala, Assistant Professor & HOD
- Dr.V.Kiruthiga, Assistant Professor
- Dr V.Rekha, Assistant Professor
- DrA.Vinodhini, Assistant Professor
- Dr.G.Vidhya, Assistant Professor
- Dr. S. Vijayakumari, Assistant Professor