

## DEVELOPMENTAL BIOLOGY

Semester	Subject code	Category	Lecture		Theory		P	C
V	21CBT5D	Elective - I	4hrs per week	60	4 hrs per week	60	-	3

### COURSE OBJECTIVE:

- ✓ To understand the basic concepts of cell interactions involved in the development of whole organism in relation with plants and animals.

**COURSE OUTCOMES:** Upon successful completion of the course, students will able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1-K4)
CO1	To understand and remember the basics of cell function terms in relation with the developmental studies of plant and animals	K1 and K2
CO2	Understand the genetic level of cell-cell interactions, hormonal function for the development of whole organism	K2
CO3	Classify the function of different types of cells at all stages of development of whole organism	K3
CO4	Summarize the organ development in vertebrate animals	K1
CO5	Understand the organization of tissues and flowering in plants	K2

### MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	S	S
CO2	S	S	S	M	M	M
CO3	M	S	S	S	M	M
CO4	S	S	M	S	S	S
CO5	M	M	S	M	S	S

S-Strong, M-Medium, L-Low

**UNIT I****12 Hours****BASIC CONCEPTS OF DEVELOPMENT BIOLOGY:**

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 animal embryo sac development and double fertilization in plants, establishment of symmetry in plants; seed formation and germination.

**UNIT II****12 Hours****MECHANISM OF CELL INTERACTION AND DIFFERENTIATION**

Proximate tissue interaction, Cell interaction at a distance: Hormones as mediators of development, differentiation of neurons, Sex determination. Environmental regulation of normal development, Developmental mechanisms of evolutionary change.

**UNIT III****GAMETOGENESIS, FERTILIZATION AND EARLY DEVELOPMENT IN PLANTS AND ANIMALS****12 Hours**

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

**UNIT IV****12 Hours**

**MORPHOGENESIS AND ORGANOGENESIS IN ANIMALS:** Cell aggregation and differentiation in *Dictyostelium*; axes and pattern formation in *Drosophila*, organogenesis – vulva formation in *Caenorhabditis elegans*, limb development and regeneration in vertebrates, post embryonic development- larval formation, metamorphosis

**UNIT V****12 Hours**

**MORPHOGENESIS AND ORGANOGENESIS IN PLANTS:** Organization of shoot and root apical meristem, shoot and root development, leaf development and phyllotaxy, transition to flowering, floral meristems and floral development in *plants*

**Distribution of Marks:** Theory 80% and Problems 20%

**TEACHING METHODOLOGY:**

- Class room teaching
- Assignments
- Discussions
- Homework
- PPT presentations
- Seminars
- Models and charts

**TEXT BOOKS:**

S.no.	Authors	Title	Publishers	Year of publication
1.	Gilbert, Scott's.	Developmental biology	Sinauer Association, Inc., Publishers	2014
2.	Slack, JMW	Essential Developmental Biology	Blackwell Scientific Publications	2001
3.	John B. Armstrong, George M	Developmental biology of the axolotl	Oxford University Press	1989
4.	Brain K.Hall	Evolutionary Developmental Biology	Springer Science and Business Media	1998
5.	Scott F.Gilbert	Developmental Biology	Wantirina South	2020

**REFERENCE BOOKS:**

S.no.	Authors	Title	Publishers	Year of publication
1.	Wolpert. L	Principles of Development	Oxford University Press	1998
2.	Chattopadhyay.S	An Introduction to Developmental Biology	Books and Allied (P) Ltd	2016
3.	Balinsky, B.I.	An Introduction to Embryology	W. B. Saunders Co., Philadelphia	1981
4.	Michael JF Barresi	Developmental Biology	Sinauer Associates	2020
5.	Scott Gilbert	Developmental Biology	Academic Press	2020

**WEB SOURCES:**

1. [http://people.ualgary.ca/~browder/virtualembryo/dev\\_biol.html](http://people.ualgary.ca/~browder/virtualembryo/dev_biol.html)
2. <https://www.sciencedirect.com/bookseries/current-topics-in-developmental-biology>
3. <https://b-ok.cc/book/1195653/885982>
4. <https://www.e-bookdownload.net/search/developmental-biology>
5. <https://freebookcentre.net/Biology/Developmental-Biology-Books.html>

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