BSS 553DEVELOPMENTALBIOLOGY

39hrs

Course Outcomes:

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

CO 1. Gain in-depth knowledge in the field of developmental biology
CO 2. Understand how gametes are produced, both in plants andanimals.
CO 3. Comprehend the process of cell differentiation at the molecularlevel.
CO 4. Understand how the early developmental events occur invertebrates.
CO 5. Know how the genes play a role in axis specification andembryogenesis.

Unit I (13 hours)

Introduction: Chief events in animal development; History of thoughts and conceptual developments; experimental embryology; the concepts of differential gene activity. Gametogenesis in animals: Spermatogenesis; Oogenesis; Molecular events during fertilization. Gametogenesis in a few plant systems; early development in a typical plant.

Unit II (13 hours)

Cell differentiation: Definition and concept, Mechanism of gene action during cell differentiation; Factors influencing cellular differentiation. Creating multicellularity Cleavage types; gastrulation; Fate maps; Concepts of determination; Morphogenetic cell movements-cell adhesion and contact inhibition. Competence and induction, totipotency; Nuclear transfer experiments.

Unit III (13 hours)

Morphogenetic determinants in egg cytoplasm; Germ cell determinants and germ cell migration; Early vertebrate development-cell movements, Gastrulation, germ layers – ectoderm, endoderm and mesoderm. Neurulation and organogenesis; Developmental patterns in metazoans; Body axes - establishment of body axes in mammals; Genetics of axis specification in *Drosophila*; Homeobox concept - homeotic genes

References:

1. Davidson, E. H.(1976). Gene activity in Early Development. Academic Press. NewYork.
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3. Russo, V.E.A., Brody, S., Cove, D., Ottolenghi, S.(1992). Development - the Molecular Genetic Approach. Springer Verlag-Berlin.
4. Cartwright, T. (1994). Animal cells as Bio-reactors. Cambridge University Press, New York.
5. Malacinski, G. M. (1988) Development genetics of higher organisms, as primer in developmental biology. MacMillan Press, NewYork
6. Berrill, N.J. (1981) Developmental Biology. Tata McGrawHill.
7. Tyler, M. S. (2000) Developmental Biology: A guide for experimental study. Sinauer Associates, MA,USA.
8. Sussman M. (2011) Animal growth and development. PrenticeHall
9. Buttery P.J., Lindsay, D. B., Haynes, N, B.(1986) Control and Manipulation of animal growth.Elsevier, London.