

Programme: M. Sc. (Zoology)

Course Code: ZOC-203

Title of the Course: Advanced Developmental Biology

Number of Credits: 3

Effective from AY: 2018-19

<u>Prerequisites for the course:</u>	Elementary knowledge of embryology, molecular biology, signal transduction.	
<u>Objective:</u>	To understand the overall chronology of the development and the role of various morphogens (protein/mRNA) in specification and determination of various organs and body axis formation.	
<u>Content:</u>	Module 1: Recognition of sperm and egg during fertilization; Prevention of Polyspermy; Activation of egg metabolism; Types of cleavage, Regulation of Cleavage; Gastrulation. Mechanism of cell cellular differentiation; Cellular communication: Paracrine factors and signal transduction cascade.	12 hours
	Module 2: Developmental dynamics of cell speciation: Specification of body axes in sea urchin-, nematode-, insect-, amphibian-, avian- and mammalian embryo.	12 hours
	Module 3: Induction and Competence; Cascade of induction during the formation of lens; epithelium-mesenchyme interaction. Pattern formation in Vertebrate Limbs, Formation of Limb Bud; Generation of the Proximal – Distal, Anterior – Posterior, Dorso - Ventral axis of the Limb	12 hours
<u>Pedagogy:</u>	Lectures/Tutorials/Assignments/Self-study.	
<u>References/Readings</u>	1. Carlson BM, Pattern's Foundation of embryology, Mc Graw Hill Inc.USA. 2. Gilbert SF, Developmental Biology, 5th ed Sinauer Associates Inc., Sunderland, USA. 3. Gilbert SF, Developmental Biology, 8th ed. onwards , Sinauer Associates Inc., Sunderland, USA. 4. Moody SA, Principles of Developmental Genetics, Academic Press. New York. 5. Waddington CH, Principles of Development and Differentiation, The MacMillan Co. New York.	
<u>Learning Outcomes</u>	1. Understanding the basic concept of the development. 2. Understanding the cyto-differentiation and cellular communication during the process of development. 3. Boosting their concepts and knowledge regulation of gene expression. 4. Learning the different stages of development of chick embryo 5. Gaining the knowledge to do experimental embryology through mini project work.	