INTRODUCTION TO DEVELOPMENTAL BIOLOGY

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PRE-REQUISITES : Knowledge of basic biology, molecular biology and genetics will be essential.

INTENDED AUDIENCE : 3rd year and beyond for UG/dual degree and PG any year; should have a basic knowledge of biology

COURSE OUTLINE :

How organisms develop from the single cell called zygote is a central theme of biology. Not surprisingly the questions of developmental biology attracted attention from Aristotle's time, and are being intensely pursued by many laboratories around the world. The proposed course titled as Introduction to Developmental Biology aims to provide a thorough grounding on the fundamental concepts of developmental biology and introduce the students to early embryonic development.

ABOUT INSTRUCTOR :

Prof K. Subramaniam received his Ph.D. from the Indian Institute of Science in 1994. His postdoctoral training was at the Johns Hopkins University School of Medicine. Prof Subramaniam joined the faculty of IIT–Kanpur in the Department Biological Sciences; Bioengineering in 2002. He was an International Senior Research Fellow of the Welcome Trust during 2003-09, and is a Fellow of the Indian Academy of Sciences. He joined the Department of Biotechnology, IIT Madras in 2014. His laboratory investigates the self-renewal and differentiation decisions in adult stem cell systems using the C.elegans germline stem cells as a paradigm

COURSE PLAN :

Week 1**:** Developmental Anatomy – life cycle; comparative and evolutionary embryology; fate mapping

Week 2**:** Differential gene expression

Week 3**:** Differential gene expression; Basic concepts of genetics

Week 4**:** The concept of model organisms; Core genetic techniques

Week 5**:** Cell-Cell communication in Development – basic concepts of morphogenesis and cell signaling

Week 6**:** Cell-Cell communication in Development – the signaling pathways

Week 7**:** Axis specification during Drosophila embryogenesis

Week 8**:** Axis specification during Drosophila embryogenesis

Week 9**:** Plant Development

Week 10**:** Early mammalian development – Cleavage and gastrulation

Week 11**:** Early mammalian development – Axis formation

Week 12**:** Developmental mechanisms of evolutionary change