



Course Title: Developmental Biology and Endocrinology
Course Code: BIOT 403
Credit Units: 04

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
03	-	2	-	4

Course Objectives:

The objective of the course is to develop knowledge of early embryonic development in humans and the important role played by different hormones during various developmental stages under physiological and pathological conditions.

Pre-requisites: Human physiology, Cell biology and Molecular Biology

Student Learning Outcomes:

- Students will gain a good basic knowledge of the biological events of early human developmental biology and endocrinology.
- Comprehend to pathophysiology of the development events associated abnormalities in Hormonal Secretions.
- Students will have basic knowledge of assisted reproductive technology

Course Contents/Syllabus- Theory:

	Weightage (%)
Module I Basics of Developmental Biology	20
The origins of developmental biology, Concepts in early stage development, Developmental signals in cell division & differentiation, Cell commitment & differentiation, Determination & induction of cell fate, Importance of hormones in growth and Human health. Significance of endocrine system in the developmental Biology in human	
Module II Endocrine system and reproductive physiology	30

Different types of Hormones and their biological characteristics, Role of hypothalamus, anterior and posterior pituitary in hormone release, Role of hormones in reproductive system, fertilization and gametogenesis. Regulation of gonadotropins in reproductive physiology, Hormonal changes at puberty and Adolescence and their feedback control	
Module III Early Embryonic Development	30
Conversion of germ cells into male and female gametes, fertilization, mechanism of fertilization, acrosomal reactions, sperm capacitation, vitellogenesis, sperm specificity, egg-sperm metabolism, fast and slow block to polyspermy, concept of pattern formation, axis formation, origin and specification of fate map Blastulation, formation of bilaminar disc, Cleavage patterns, gastrulation (General principles and outline of the physiology) , Neurulation, origin and fate of neural crest cells, formation of trilaminar disc	
Module IV Pathology related to Hormonal disturbances in Humans	10
Pathological disorders due to the hormonal imbalance (poly cystic ovaries, hypertension, insulin resistance, menstrual cycle disturbances, endometriosis, male and female infertility), Anxiety and Depression, Iodine deficiency. Teratological defects, Neural tube defects and congenital diseases.	
Module V Assisted Reproductive technology	10
Invitrofertilization	
Lab Experiments	

1. Pattern of cleavages in different organisms (Discoidal cleavage in chick)
2. Study of embryonic and Post embryonic development using a model system (/Zebra Fish chick/frog)
3. Mounting of chick embryo and preparation of permanent slide
4. Filter paper ring method of in vitro isolation of chick embryo
5. Gross anatomy and histology of chick embryo till 96hrs.
6. Estimation of human chorionic gonadotropin hormone in a given biological sample
7. Estimation of Follicle stimulating hormone and luteinizing hormone in a given biological sample
8. To check the pregnancy using strip method
9. Study the permanent slides of mammalian ovary and testes and preparation

Pedagogy for Course Delivery:

Lectures: 39
 Tutorial: 0
 Presentation/ Seminar: 4
 Class Test: 02
 Total: 45

Lab/ Practical details, if applicable:

Tutorial: 0
 Practical: 28
 Class Test: 01
 Viva: 01
 Total: 30

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
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75	25	100
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Theory Assessment (L&T):

Continuous Assessment/Internal Assessment							End Term Examination
Components (Drop down)	Class Test 1	Class Test 2	Home Assignment	Presentation/Seminar	Attendance		
Weightage (%)	5	10	10	-	5	70	

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment				End Term Examination			
Components (Drop down)	Performance	Lab record	viva	Attendance	Lab record	Performance	Viva	Total
Weightage (%)	10	10	5	5	10	40	20	100

Text & References:

- Langman's Medical Embryology 12th edition T.W Sadler Wolter Klewer/Lippincott.Williams& Wilkinsion (2013). ISBN 0-7506-2030-7
- Text Book of Human Embryology , Rani Kumar, IK International publisher, New Delhi, (2008). ISBN-81-85975-08-06
- Gilbert's Development Biology (6th edition) by Scott.F.Gilbert. (2000).ISBN-10: 0-87893-243-7
- Williams Text Book of Endocrinology, 12th Edition, By Shlomo Melmed, Kenneth S. Polonsky, MD, P. Reed MD Larsen and Henry M. Kronenberg (2012). ISBN 9781437703245