



GOVT. COLLEGE FOR WOMEN, PARADE GROUND JAMMU
(AN AUTONOMOUS COLLEGE)

Syllabus and Course of Study in Zoology – M Sc Semester-IV

For Examinations to be held in 2024-25, 2025-26 & 2026-27

Course No: PSZOTC-410

Credit: 4

Course Title: Human Reproductive & Developmental Biology

M.M: 100

Minor Test I: 20

Minor Test II: 20

Major Test: 60

LEARNING OBJECTIVES

- The course in developmental and reproductive Biology has been framed in such a way to enable the students to understand fundamental concepts in Reproductive Biology and Development.
- The learners will be familiarized with the mechanism and control of various developmental processes.

LEARNING OUTCOMES

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

1. Understand the anatomy and histomorphology of human gonads.
2. Comprehend the mechanism of action and synthesis of sex steroids.
3. Understand the origin of primordial germ cells, concept of spermatogenesis and Oogenesis.
4. Understand mechanism and events in the process of fertilization
5. Comprehend the concept of human embryonic development.

UNIT-I: Gonadal Anatomy and Development

(12 hrs)

- 1.1 Anatomy of Gonads and their ducts
- 1.2 Embryonic Development of Gonads & their ducts
- 1.3 Genetic regulation of Gonadal development
- 1.4 Gonadotropins, types, mechanism of action and functions
- 1.5 Reproductive Disorders: Disorders of chromosomal sex and disorders of Gonadal development – male & female



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Unit-II: Regulative mechanism and process (12 hrs)

- 2.1 Origin of Primordial Germ Cells and their migration
- 2.2 Spermatogenesis and its regulation & structure of sperm
- 2.3 Folliculogenesis – process and regulation
 - 2.3.1 Vitellogenesis – process and importance
- 2.4 Oogenesis – Process and Regulation
 - 2.4.1 Oogenic meiosis – its regulation
 - 2.4.2 Follicular atresia, significance
 - 2.4.3 Corpora Lutea

Unit-III: Fertilization, Breeding behaviour (12 hrs)

- 3.1 Puberty: precocious and delayed
- 3.2 Fertilization – major events; - molecular mechanisms
 - 3.3.1 Capacitation
 - 3.3.2 Acrosomal exocytosis – (Acrosomal Reaction)
 - 3.3.3 Cortical reaction
 - 3.3.4 Sperm penetration into egg
 - 3.3.5 Amphimixis
- 3.3 Menstrual cycle

Unit-IV: Human Embryonic Development (12 hrs)

- 4.1 Pre-Embryonic Development
- 4.2 Implantation in the Uterus
- 4.3 Embryonic Development (third to eighth week)
- 4.4 Foetal Development (ninth week till birth)



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4.5 Extra embryonic membranes & Placenta

Unit-V: Assisted Reproductive Techniques & Recent Advances (12 hrs)

5.1 Semen analysis

5.2 Ovulation induction; Oocyte retrieval; In vitro maturation

5.3 In vitro fertilization, Intra cytoplasmic sperm injection (ICSI); Gamete intra-fallopian tube transfer (GIFT); Zygote intra-fallopian tube transfer (ZIFT) etc.

5.4 Surrogacy

5.5 Cryopreservation of gametes & embryos.

Note for Paper Setting:

Theory Examination	Syllabus to be covered	Time allotted for Exam	Marks
Minor Test I (From Ist Unit)	Upto 20%	1 hr	20
Minor Test II (From IInd Unit)	21% to 40%	1 hr	20
Major Test	41% to 100%	2.5 hrs	60

1. Major Test will have two Sections (A & B)
2. Section A shall comprise of (5) multiple choice questions of 1 mark each covering the entire syllabus and 5 short answer questions of 2 mark each from the entire syllabus (Sec A = 15 marks)
3. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).



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Books Recommended:

- Austin, C.R. and Short, R.V. Reproduction in Mammals. Cambridge University Press.
- Degroot, L.J. and Jameson, J.L. (eds). Endocrinology. W.B. Saunders and Company.
- Begley, D.J, Firth, J.A & Hoult, J.R.S. Human Reproduction and Developmental Biology. Macmillon Press, London.
- Meena Yadav, Brototi Roy, Human Reproductive Biology and Health – Pearson
- Rajni Arora & Anita Grover, Developmental Biology. R Chand & Company

Committee members (External)

1	Prof. (Dr.) Seema Langer Head, Department of Zoology & Dean, Life Sciences, University of Jammu	
2	Dr. N. K. Tripathi, Professor (Retd.) Department of Zoology, University of Jammu	
3	Dr. Surya Partap Singh, Assistant Prof. & Head, Department of Zoology, GDC Basholi	
4	Dr. Shvetambri Jasrotia, Assistant Prof., Department of Zoology, Central University of Jammu	
5	Mr. Munish Sharma ,Assistant Director Fisheries, Jammu.	
6	Col. (Retd.) Sunil Sambyal ,Biofloc Expert & Entrepreneur	



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Lab Course –I

Course No- PSZOPS-415

Credits -02

Syllabus for Practicals of Human Reproductive & Developmental Biology

- 1 .Permanent slide study of T.S of Testis &T.S. of Ovary
- 2.Chromosomal Sex determination Exercises through karyotypic technique to determine chromosomal sex.
- 3.Observation of human embryo developmental changes through microphotographs.

Ist Trimester Embryonic Changes

2nd Trimester Embryonic Changes

3rd Trimester Embryonic Changes

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