GOVT. COLLEGE FOR WOMEN, PARADE GROUND JAMMU

(AN AUTONOMOUS COLLEGE)

Syllabus and Course of Study in Zoology – B.Sc Semester-VI

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

Course Code: UZOMJT-602

Credit: 4

Course Title: Reproductive & Developmental Biology

M.M: 100

Learning outcomes: Upon completing the course successfully, students will be able to:

1. Understand the Basic and fundamental concepts of reproductive and developmental biology.

2. Comprehend the mechanism of action and synthesis of sex steroids.

3. Understand concepts of spermatogenesis and Oogenesis, fertilization and cleavage.

4. Understand mechanism and the types of morphogenetic movements involved in the embryonic development of Amphibians & Birds.

5. Comprehend the post embryonic developmental changes in amphibians and birds.

Unit 1: Fundamental Developmental concepts (12 hrs)

1.1Introduction & Basic Concepts of the following:

1.1.1 Potency, Commitment, Specification, Induction & Competence.

1.1.2 Developmental Phases: Embryogenesis, Organogenesis & Blastogenesis

1.1.3 Developmental Period: Embryonic & Post embryonic Period

Unit 2: Early Embryonic Development (12 hrs)

2.1 Gametes:

2.1.1Structure of sperm & its types

2.1.2 Structure of egg & its types

2.2 Gametogenesis

2.2.1 Spermatogenesis

2.2.2 Oogenesis

2.3 Fertilization

2.3.1 External & Internal

2.3.2 Significance

2.4 Patterns of Cleavage

2.5 Types of Blastula (with special reference to amphibians & birds)

Unit 3: Embryonic Development in Amphibians (Frog) (12 hrs)

3.1 Fate map

3.2 Gastrulation:

3.2.1 Initiation of Gastrulation

3.2.2 Morphogenetic movements

3.2.3 Neurulation

Unit 4: Embryonic Development in Chick (12 hrs)

4.1 Fate map

4.2 Gastrulation:

4.2.1 Formation of Primitive Streak

4.2.2 Morphogenetic movements

4.2.3 Neurulation

Unit 5: Post Embryonic Development (12 hrs)

5.1Metamorphosis

5.1.1 Types of Metamorphosis

5.1.2 Metamorphosis & its hormonal control in Amphibians

5.2 Regeneration & its types

5.2.1 Epimorphosis

5.2.2 Morphallaxis & Compensatory Regeneration

Note for Paper Setting:

1. External Theory Exam will have three Sections (A, B & C).
2. Section A shall comprise of (5) questions of 3 marks each covering the entire syllabus. All questions shall be compulsory.
3. Section B shall comprise of (5) questions of 7 marks each covering the entire syllabus. All questions shall be compulsory.
4. Section C shall comprise of (5) questions (atleast one from each unit) of 15 marks each & student shall attempt any 2.

Reference Books:

1.Gilbert, S. F. (2010). Developmental Biology, IX Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.

2.Balinsky B.I. and Fabian B. C. (1981). An Introduction to Embryology, V Edition, International Thompson Computer Press.

3.Kalthoff (2008). Analysis of Biological Development, II Edition, McGraw-Hill Publishers.

4.Lewis Wolpert (2002). Principles of Development. II Edition, Oxford University Press.

5. Berill: Development Biology Tata McGraw Hill.

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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Syllabus and Course of Study in Zoology – B.Sc Semester-VI

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

Programme:-UndergraduateProgrammeinZoology(FYUGP)			
Semester:-VI	**Course type:-MAJOR-**Practical Course	**Course title:-**Reproductive and developmental biology	**Course code:-UZOMJP-605**
Total marks:-50	**Total credits:-**2		
Syllabus and Course of the study in Reproductive and developmental biology (UG-Sem.VI) for examination to be held during 2024-25, 2025-26 and 2026-27			

Objectives:-The practicals based on the course "Reproductive and developmental biology", aims to develop deeper understanding of reproductive and developmental biology. During the practical classes, the students will understand the general pattern and sequential developmental stages during embryogenesis and understand how developmental process lead to establishment of body plan of multicellular organism.

Learning outcomes:-Upon completion of this course,the students will be able to:

- Understand basic concept of reproductive and developmental biology.
- Learn about different stages of embryogenesis.
- Importance of different devevlopmental stages in the life of an organism.

Total marks:-50 **Total Credits:** 2

Practical Exercises:-

I. Study of histology slides of -

a) T.S of testes (Mammals)
b) T.S of ovary (Mammals)
c) Structure of Sperm
d) Structure of Ova

II. Study of whole mounts and sections of developmental stages of frog through permanent slides-

a) Clevage stages
b) Blastula
c) Gastula
d) Neurula
e) Tail bud stage, Tadpole (External and internal gill stages)

III. Study of whole mounts and sections of developmental stages of chick embryo through permanent slides-

a) Primtive streak (13 to 18 hours)
b) 21, 24, 28, 33, 36, 48, 72, 96 hour of incubation

IV. Project report on chick embryo development/ frog embryo development

Examination pattern:-

A) Internal assessment

Weightage of Internal assessment:- 50% ie. 25 marks out of 50.

Components of internal assessment:-

a. 5 marks for attendance. Marks shall be awarded as per the rules already followed by the College

b.6 marks earmarked for the daily performance of the students in the practical exercises. The evaluation of daily performance shall be undertaken as per the standard a ß y scheme being followed in the College.

c. 6 marks are earmarked for minor project assigned to each student. Students shall have to submit the project report according to a prescribed format on the day of internal assessment test

d. 8 marks earmarked for internal assessment test in practical. The nature of the test shall be similar as is already followed by the College

B) **External examination**:-

Weightage of external examination:-50%i.e.25 marks out of 50. The examination pattern shall be same as followed by the College.

Committee members (External)

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