

**Shiksha Mandal's
Bajaj College of Science, Wardha
(An Autonomous College)
Department of Zoology
Syllabus for B.Sc. Zoology (Semester Pattern)
Credit Based System
Academic Session 2019-20**

B.Sc. Semester V

Paper V:- Developmental biology

UG-ZOO(07)-S5-T

UNIT I :- (12 Periods)

Gametes to fertilization in Frog

- 1.1 Spermatogenesis.
- 1.2 Oogenesis.
- 1.3 Sperm egg recognition and fusion
- 1.4 Post fertilization events (prevention of polyspermy, rearrangement of egg cytoplasm)

UNIT II :- (12 Periods)

Early embryonic development in frog:

- 2.1 Cleavage properties and types.
- 2.2 Blastula of frog.
- 2.3 Gastrulation of frog.
- 2.4 Germ layer formation.

UNIT III :- (12 Periods)

Axis specification in embryo:

- 3.1 Embryonic organizer in frog.
- 3.2 Nieuwkoop Center.
- 3.3 Concept of morphogen gradient.
- 3.4 Basics of axis specification in *Drosophila*.

UNIT IV :- (12 Periods)

Gene and development:

- 4.1 Sex determination in bird and human, drosophila (Genic balance theory)
- 4.2 Dosage compensation.
- 4.3 Cloning by nuclear transfer in mammals.
- 4.4 Teratogens.

UNIT V :- (12 Periods)

Techniques in developmental biology:

- 5.1 Multiple ovulation.
- 5.2 IVF , ICSI.
- 5.3 In situ hybridization.
- 5.4 Cryopreservation of gametes & embryos.

UNIT VI :-**(12 Periods)****Developmental biology in human welfare:**

- 6.1 Model organisms with examples *Drosophila* & *C. elegans*
- 6.2 Transgenic animals with examples
- 6.3 Sources & Basics of stem cells culturing with examples of application.
- 6.4 Induced Pluripotency Basics and genes involved.

Practical based on Developmental Biology –

UG-ZOO(07)-S5-P

1. Study of permanent slides of Frog embryology: T.S. Blastula, T.S. Gastrula, T.S. Neurula, T.S. tadpole passing through internal and external gill stage.
2. Study of permanent slides of chick embryology W.M.: 18 hrs, 24 hrs, 36 Hrs, 72hrs. 96 hrs.
3. Semen analysis: Motility and Sperm count (Source of semen: Government artificial insemination centre).
4. Sperm vitality study using suitable stains (Source of semen: Government artificial Insemination centre).
5. Hypo-osmotic swelling (HOS) for the assessment of normal semen.
6. Study of Egg Structure (Avian Egg)
7. Histology of male and female reproductive organs (Testis, Ovary, Uterus, Fallopian tube and accessory reproductive glands) With the help of already available permanent slides/ ICT tools/ charts/ photographs etc.
8. Demonstration of Barr body
9. Submission of Field report / Diary on Congenital disorders / Birth defects / Life Cycles of Animals in your surroundings

Distribution of Marks –**Total Marks 30**

1.	Identification and Comment on spots (2 Slides on Frog embryology, 2 Slides on chick Embryology, 1 Slides on Reproductive Histology)	10
2.	Experiment on Sperm Count / Hypo-osmotic test for Fertility	04
3.	Experiment on Sperm Vitality /Preparation of Slides of Barr Body	04
4.	Submission of Field diary	04
5.	Submission of certified practical record	04
6.	Viva voce	04

References Books :-

1. Leon W. Browwer - Developmental Biology. 2nd Edition. Saunders College publishing.
2. R. A. Pedersen and G. P. Schatten - Current Topics in Developmental Biology eds.
3. S. C. Goel - Principles of animal developmental biology, Himalaya Publishing House.
4. S.F. Gilbert - Developmental Biology, 4th Edn. Sinauer Associates Inc. Publishers.
5. D. A. Ede - An Introduction to Developmental Biology.
6. Paul Weiss - Principles of developmental: edited by Hafner publishing company New York.
7. John Philip Trinkaus. Tom Aloisi - Cells into organs. 2nd Edition. The forces that shape the Embryo.
8. Lewis Wolpert et al. - Principles of development, Oxford University Press.
9. B. M. Patten & B. M. Carlson - Foundations of Embryology.. Tata McGraw Hill Publishing Company Ltd., New Delhi.
10. Balinsky (1981) 5th Ed - An Introduction to Embryology, (CBS College Publishing).
11. Austin and Short - Embryonic and foetal development. Cambridge University Press by, 1982, 1994 2nd Ed.
12. Marshall's Physiology of Reproduction Longmont, Green and Co. London Vol. 1 & 2. Lamming 1984, 2000.