St. Aloysius College (Autonomous), Jabalpur
Department of Higher Education, Govt. of M.P.
Under Graduate Syllabus for B.Sc.(Bio)
As recommended by Central board of Studies in Zoology
Class - B.Sc. II Semester
(Session 2022-23)

Theory Syllabus			
Part A Introduction			
Programme-Certificate Course	**Class: B.Sc**	**Sem -II Semester**	**Session: 2022-2023**
Subject: Zoology			
1.	Course Code	S1-ZOOL2T	
	Course Title	**Cell Biology,Reproductive biology and developmental biology**	
	Course Type (Core Course/Elective/Generic Elective/Vocational)	Core Course– Minor (Zoology)	
	Pre-requisite (if any)	To study this course a student must have had the subject Biology in 12th Class	
	Course Learning outcomes (CLO)	Upon completion of the course students should be able to 1. Develop deeper understanding of what life is and howit functions at cellular level 2. Understand the nature and basic concepts of Cellbiology, Reproductive and Developmental biology. 3. Understand structure and functions of cell membraneand cellular organelles 4. Understand the importance of latest reproductive trends, reproductive techniques to be applied for human welfare. 5. Understand the general patterns and sequential developmental stages during embryogenesis; and understand how the developmental processes lead to establishment of body plan of multi-cellularorganisms. 6. Understand about the evolutionary development ofvarious animals. .	
6	Credit Value	4	
7	Total Marks	MM 40+60	Min Passing Marks 35

Part B Content of the course		
Total No. of Lectures – Tutorials- Practical (in hours per week): 2hours per week L-T-P:		
Unit I	**Topics**	**No. of Lectures**
I	Cell Biology 1.1 Concept of Prokaryotic and Eukaryotic Cells, difference between Prokaryotic and Eukaryotic Cells 1.2 Structure and functions of Plasma membrane 1.3 Structure and functions of Golgi body, Mitochondria, Endoplasmic reticulum, Ribosome and Lysosome 1.4 Structure and functions of Nucleus 1.5Structure and functions of Chromosome and special type of chromosomes-Lampbrush and Polytene chromosome 1.6Cell cycle, Mitotic and Meiotic cell division and their significance Keywords/Tags: Prokaryote, Eukaryote, Cell organalles, Chromosomes, Cell Cycle	13
II	**Reproductive Biology** 1.1Structure of Male reproductive system of Lepus 1.2Structure of Female reproductive system of Lepus 1.3Histology of Testis, and Ovary of Lepus 1.4 Gametogenesis - Spermatogenesis and oogenesis, difference between spermatogenesis and oogenesis 1.5Types of Eggs-based on amount and distribution of yolk with examples Keywords/Tags: Reproductive system, Gametogenesis, Sperms, Eggs	13
III	**Recent Assisted Reproductive Techniques (ART)** 1.1tem cell-Types and their uses 1.2Gene bank, Sperm bank, Superovulation, Cryopreservation 1.3 In Vitro Fertilization (IVF) and Embryo Transfer (ET)), Zygote Intra Fallopian Transfer (ZIFT), Intracytoplasmic Sperm Injection (ICSI), MOET(multiple ovulation Embryo transfer) 1.4Placentation -Types, examples and functions 1.5 Placenta Banking-Placenta preservation benefits Keywords/Tags: Gene bank, Sperm bank, Superovulation, IVF, ET,ZIFT, ICSI, Placenta banking	12

IV	**Developmental Biology** 1.1Fertilization; Process of fertilization 1.2Embryonic development of frog up to the formation of three germinal layers 1.3Fate map construction in frog. 1.4Metamorphosis of Tadpole Larva 1.5Parthenogenesis Keywords/Tags: Fertilization, Frog embryology. Tadpole metamorphosis, Parthenogenesis	11
V	**Embryonic Development of Chick** 1.1Structure of hen's egg. 1.2 Embryonic Development of chick embryo upto the formation of primitive streaks 1.3 Fate map construction in chick 1.4Extra embryonic membranes of Chick: Formation and functions. Keywords/Tags: Hen's egg, Chick embryology, Fate map, Chick Embryo membranes	11

Part C-Learning Resources

Text Books, Reference Books, Other resources

Suggested readings

1. Suggested readings:

1. Armugam, "A Text Book of Embryology", Saras Publication, 2005.
2. Balinsky, BI, "An Introduction to Embryology", Cengage Learning, 2012.
3. De Robertis, EDP, De Robertis, EMF, "Cell and Molecular Biology", Eighthedition, Lippincott, Williams & Wilkins, Philadelphia, 2006.

4. Gupta, PK, "Cell Biology, Genetics and Evolution", Rastogi
5. Haffner, L, "Human reproduction at a glance", BWL Publication, "Human Embryology",Publications, 2013.
ChurchillLivingstone, 2001. 7. Powar, CB, "Cell Biology", Himalaya Publishing House, 2010.
6. Larsen, 8. Rastogi, VB, "Introduction to Cytology", KNRN Publication, 1988.
9. Rastogi, VB,"Animal Distribution and Developmental Biology", KNE2001.Publication, 2020.

10. Sastry,KV,Publications, 2018."Endocrinology andReproductiveBiology",

11. Verma and Agarwal, "A Text Book of Cytology", S. Chand & Co., 1999.

12. Verma, PS, Agarwal, V, K. "Chordate Embryology", S. Chand & Co., 2000 13. Pardesi,K and Dubey, A., 'Cell and Developmental Biology", Akhandpubli

Suggested equivalent online courses:

1. house,New Delhi, I edition,2020. 14. https://academic.oup.com

15. https://medineplus.gov

16. https://ncni.nlm.nih.gov

17. https://zoologylearningpoint.wordpress.com zoologyresources.com

sted equivalent online courses:

Swayam Online Courses https://storage.googleapis.com/uniquecourses/online.html

National Digital Library https://ndl.iitkgp.ac.in/

Theory Syllabus			
Part A Introduction			
Programme-CertificateCourse	**Class: B.Sc**	**Sem -II Semester**	**Session: 2022-2023**
Subject: Zoology			
1.	Course Code	S1-ZOOL2T	
	Course Title	**Cytology ,Reproductive biology and Embryology**	
	Course Type (Core Course/Elective/Generic Elective/Vocational)	Core Course– Minor (Zoology)	
	Pre-requisite (if any)	To study this course a student must have had the subject Biology in 12th Class	
	Course Learning outcomes (CLO)	Upon completion of the course students should be able to 1.The different stages of my topic and mitotic cell division and special types of chromosomes. 2.Different stages of embryology 3.Through squash preparation understand the stages of cell division and structure of polythene chromosome 4.Enhance collaborative learning and communicating skill through the practical session team work, group discussion assignment and project . .	
6	Credit Value	2	
7	Total Marks	MM 40+60	Min Passing Marks 35

Part B- Content of the Course		
Total No. of Lectures - Tutorials-Practical (in hours per week): 02 hours per week **L-T-P:**		
Unit	**Topics**	**No. of lectures**
1.	Spotting related to the cytology Prokaryote and Eukaryote Cell b. Stages of Mitotic cell division c. Stages of Meiotic cell division. d. Lamp brush Chromosome f. Study of Polytene chromosome under Phase Contrast Microscope.	13
2.	Spotting related to Reproductive biology and Embryolo a. T.S. Testis of Mammal b. T.S. Ovary of Mammal c. Developmental stages of Frog embryology d. Developmental stages of Chick embryology e. Malaria Antibody Test using ELISA Reader g.Calculation of phase percentage of stages of meiotic cell division under Phase Contrast Microscope h. Sperm Morphology	13
3.	Squash preparation of onion root tip to understand the stages ofMitosis	08
4.	Squash preparation of Grasshopper testis to understand the stages of Meiosis	9
5.	Trypan Blue exclusion test of cell viability	8
6.	Squash preparation of salivary gland chromosome fromChironomus larva / Drosophila	9
Keywords/Tags: Stages of cell division, Stages of Embryonic development, Squash Preparation		

Part C-Learning Resources

Text Books, Reference Books, Other resources

Suggested Readings:

1. Arumuam, N. Nair, NC, Leelavathy, S. Pandian, NS, Murugan, T, Jayasurya, "Practical Zoology - Invertebrata", Volume-I. Saras Publication, 2013.

2. Lal, SS. "A Text book of Practical Zoology - Invertebrates", Rastogi Publication, 2016

3. Prakash, M, and Arora, CK. "Laboratory Animals". Anmol Publications, New Delhi, 1998

4. Verma, PS, "A Manual of Practical Zoology - Invertebrates". S. Chand & Co., 2013.

5. Virtual Labs (https://www.vlab.co.in)

Part D- Assessment and Evaluation			
Suggested continuous Evaluation Methods:			
Internal Assessment	Marks	External Assessment	Marks
Class Interaction/Quiz	20	Viva Voce on Practical	05
Attendance	10	Practical Record File	05
Assignments (Charts/Model/ Seminar/Rural Service/Technology Dissemination/ Report of Excursion/lab Visits/Survey/Industrial visit)	10	Table work/Experiments Spotting of cytology Spotting of Reproductive Biology & Embryology Squash Preparation of onion root tip Squash Preparation of Grass hopper testis Cell Viability test Salivary gland chromosomepreparation	50 08 10 08 08 08 08
TOTAL	40		60
Any Remarks/Suggestion:			