

Part A: Introduction				
Program: Certificate Course		Class: B.Sc. I Year	Year: 2022	Session: 2022-2023
1	Course Code	ZOOL- 2T		
2	Course Title	Cell Biology, Histology and Comparative Anatomy & Physiology of Chordates		
3	Course Type	Theory		
4	Pre-requisite (if any)	To study this course, a student must have/had the subject Biology in class 12 th .		
5	Course Learning Outcomes (CLO)	<p>At the end of this course, the students will be able :</p> <ul style="list-style-type: none"> Understand the basic structure, functioning of the cell and cell organelles and understand the intricate cellular mechanisms involved. Understand the tissues, how tissues are produced from cells in a normal course and about any malfunctioning which may lead to benign or malignant tumor. Develop an understanding of the evolution of vertebrates thus integrating structure, function and development. Understand the morphological, anatomical and physiological adaptation in diverse habitats. 5. Develop an understanding of the evolution of vertebrates thus integrating structure, function and development. 		
6	Credit Value	Theory : 4		
7	Total Marks	Max. Marks: 50	Min Passing Marks : 17	

Part B: Content of the Course

Total Lecturer: 60

Unit	Topics	No. of Lectures
I	<p>Prokaryotic and Eukaryotic cells : General structure of prokaryotes, bacteria, archaea and eukaryotes. Ultra structure and function of endoplasmic reticulum, ribosomes, Golgi apparatus, lysosome, Mitochondria, nuclear apparatus.</p> <p>Cell membrane and transport mechanism : Structure, composition, models and function. Fluid mosaic model Junctional complexes, membrane receptor modifications : microvilli, desmosomes and plasmodesmata.</p>	12
II	<p>Cell cycle, cell signaling and cell culturing : Cell cycle, cell division – mitosis and meiosis. Cell division check points and their regulation. Role of growth factors. Programmed cell death (Apoptosis).</p> <p>Cell regulation and cell signaling : Signaling molecules and their receptors. Functions of cell surface receptors. Regulation of signaling pathways.</p> <p>Cell culture : Types of cell culture – monolayer and suspension culture. Types of culture media. Basic characteristics of tissue culture media. Tissue culture and engineering.</p>	12
III	<p>Structure and functional significance of animal tissues : Introduction to tissues. Epithelial tissue: types, structure and characteristics. Exocrine and endocrine glands: type and structure. Structure and function of loose, dense and adipose tissue. Muscular tissue: Ultra structure of smooth, skeletal and cardiac muscles. Muscle contraction. Membrane of the brain and spinal cord.</p>	11
IV	<p>Structure and function of integument, skeletal, digestive, circulatory system :</p> <p>Integument : Structure of integument from fish to mammals. Function of integument. Epidermal and dermal derivatives of integument and their functional significance.</p> <p>Skeletal system : Comparative account of pelvic and pectoral girdles from fishes (cartilaginous and bony) to mammals.</p> <p>Digestive system : Dentition in mammals. Comparative study of alimentary canal and digestive glands from fish to mammal. Physiology of digestion in mammal.</p>	13

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31-5-2022

	Circulatory system: Evolution of aortic arches and their significance. Structure and evolution of heart in vertebrates. Cardiac cycle. Blood : Composition and function.	
V	<p>Structure and function of circulatory, respiratory, excretory, reproductive and endocrine system :</p> <p>Respiratory system : Aquatic and terrestrial respiration. Comparative anatomy of lungs in amphibian, reptile, bird and mammals.</p> <p>Excretory system : Physiology of excretion, urine formation.</p> <p>Reproductive system : Comparative details of testes and ovaries from fishes to mammals. Estrous and menstrual cycle.</p> <p>Endocrine system : Types and functional significance of endocrine glands and hormones.</p>	12
<p>Keywords: Tissue, Endocrine glands, Girdles, Cell signaling, Cell culture, Excretion, Circulatory system, Aortic arches, Heart, Reproductive cycle.</p>		

Part C - Learning Resource

Text Books, Reference Books, Other Resources -

1. Books of M. P. Hindi Granth Academy
2. Rastogi V. B. : Introduction to Cytology
3. Cell Biology and Molecular Biology : N. Arumugam
4. Cell Biology : N. Arumugam
5. Molecular Cell Biology : N. Arumugam
6. Cell Biology, Genetics, Molecular Biology and Evolution : Verma P. S., Agrawal V. K.
7. Sheelar and Binachi : Cell and Molecular Biology
8. Karp : Cell and Molecular Biology
9. De Robertis : Cell and Molecular Bology
10. Powar C. B. : Cell Biology
11. A Textbook of Animal Histology : A. K. Berry, Emkey Publication, Delhi
12. A Textbook of Histology and Practical guide: J. P. Gunasegram
13. Animal Cell Culture : R. Freshney
14. Animal Cell and Tissue Culture : Shivangi Mathur
15. Chordate Zoology : R. L. Kotpal & P. S. Verma
16. Modern Text Book of Zoology – Vertebrate : R. L. Kotpal
17. A Text Book of Chordates : A. Thangamani, N. Arumugam, Saras Puplication
18. Biology of Animals, Volume – II, Sinha, Adhikari, Ganguly
19. Comparative Anatomy of vertebrates, 2nd edition : R. K. Saxena, Sunita Saxena
20. Comparative Anatomy and Developmental Biology : Kotpal, Shastry and Shukla
21. Chordata and Comparative Anatomy : R. L. Kotpal
22. Chordate Zoology : Jordan E. L. and Verma P. S.
23. Anatomy of Chordates, 4th edition : Weichert C. K.
24. Comparative vertebrate Anatomy : L. H. Hyman

E-Resources –

1. SWAYAM- <https://swayam.gov.in/explorer?searchText=>
2. <https://academic.oup.com>
3. <https://medineplus.gov>
4. <https://ncin.nlm.nih.gov>
5. <https://zoologylearningpoint.wordpress.com>
6. <https://zoologyresources.com>
7. National digital library – <https://ndl.iitkgp.ac.in>
7. e-PG Pathshala (MHRD) Portal, <https://egpg.inflibnet.ac.in>
8. Science Direct Open Access Content – <https://www.sciencedirect.com/book/9781843342038/> open – Access
9. <https://egyankosh.ac.in>

*Arunkumar
3/5/2022*

Part D: Assessment and Evaluation

University Exam(UE): Maximum Marks: 50 Marks

DECLARATION

This is to certify that the syllabus is framed by the central board of study (Zoology) as the guidelines of the department of higher education, Chhattisgarh.

1. Dr. K. R. Sahu	-	Chairman	
Assistant Professor, Govt. Pandit Madhav Rao Sapre College, Pendra Road			
2. Dr. Ajit Hundet	-	Member	
Professor, Govt. D. B. Girls College, Raipur			
3. Dr. Prem Praksah Singh	-	Member	
Professor, Govt. College, Kusmi			
4. Dr. Shubhada Rahalkar	-	Member	
Professor, Govt. Bilasa Girls P. G. College, Bilaspur			
5. Dr. Anil Kumar Shrivastava	-	Member	
Professor, Govt. V. Y. T. P. G. Autonomous College, Durg			
6. Dr. R. K. Tamboli	-	Member	
Assistant Professor, Kirodimal Govt. Arts & Science College, Raigarh			
7. Dr. Parmita Dubey	-	Member	
Assistant Professor, Govt. J. Y. Chhattisgarh College, Raipur			
8. Dr. Shashi Gupta	-	Member	
Assistant Professor, Govt. Nagarjuna P. G. College of Science, Raipur			
9. Dr. L. P. Miri	-	Member	
Assistant Professor, Govt. J.P. Verma P. G. Arts & Commerce College, Bilaspur			
10. Dr. Rajesh Kumar Rai	-	Member	
Assistant Professor, Govt. Mahamaya College, Ratanpur, Bilaspur			
11. Dr. Kavita Krishnamoorti	-	Member	
Assistant Professor, Govt. Lahiri P. G. College, Chirimiri, Koriya			

Date : 31.05.2022

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Shashi
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Rajesh
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K. Kavita
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