

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF ZOOLOGY**  
**Course Curriculum**

<b>PART- A: Introduction</b>			
<b>Program: Bachelor in Life Science</b> (Certificate / Diploma / Degree/ Honors)		<b>Semester - I</b>	<b>Session: 2024-2025</b>
1	<b>Course Code</b>	<b>ZOGE - 01T</b>	
2	<b>Course Title</b>	<b>Life on Earth and Unique Attributes of Animal Kingdom</b>	
3	<b>Course Type</b>	<b>General Elective</b>	
4	<b>Pre-requisite (if, any)</b>	<i>As per program</i>	
5	<b>Course Learning Outcomes (CLO)</b>	<p><b>After successfully completing this course, the students will be able to-</b></p> <ul style="list-style-type: none"> <li>➤ Develop an understanding of concepts, mechanisms, evolutionary significance and relevance of Origin of life.</li> <li>➤ Understand General Idea about Invertebrate and Vertebrate animals with special reference and their specific qualities.</li> <li>➤ Understand and appreciate diversity of life forms.</li> <li>➤ Apply the knowledge about animals Sciences in daily life.</li> </ul>	
6	<b>Credit Value</b>	<b>3 Credits</b>	<b>Credit = 15 Hours - learning &amp; Observation</b>
7	<b>Total Marks</b>	<b>Max. Marks: 100</b>	<b>Min Passing Marks: 40</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)</b>			
<b>Unit</b>	<b>Topics (Course contents)</b>		<b>No. of Period</b>
<b>I</b>	<p><b>Origin of life: Theories of Origin of life:</b>  <b>Ancient Theory</b> Theory of Special Creation (Mythological approach), Theory of Panspermia or Cosmozoic Theory, Theory of Directed Panspermia, Theory of Catastrophism, Theory of Spontaneous Generation (Abiogenesis or Autogenesis), Theory of Biogenesis: Redi's Experiment and Pasture's Experiment. <b>Modern Theory: Origin of Universe:</b> Big Bang Hypothesis in Brief, <b>Origin of Solar System and The Earth:</b> Nebular hypothesis, <b>Atmosphere and Energy Sources on Primitive Earth,</b> <b>Biochemical Origin of Life:</b> Oparin and Haldane Theory, <b>Chemogeny:</b> Formation of simple and complex organic compounds (Stanely Miller and Ure's Experiment), Formation of Coacervates, Nucleic Acids. <b>Biogeny:</b> Origin of primitive prokaryotic cell. <b>Evolution of modes of Nutrition:</b> Chemoheterotrophs, Anaerobic and Aerobic Photoautotrophs. Evolution of Eukaryotes.</p>		<b>12</b>
<b>II</b>	<p><b>Systematics &amp; Unique attributes of Invertebrate and Vertebrate animals with special reference to Coelentrata, Mollusca and Pisces:</b>            Definition and difference between Invertebrate and Vertebrate. <b>Nomenclature:</b> Binomial and Trinomial Nomenclature and International code of Nomenclature <b>Corals:</b> Meaning of Coral, Structure of Coral polyp, Coral Skeleton, Types of corals: Hydrozoan Coral, Example- Millipora, Octocorallian Coral, Example- Alcyonium, Hexacorallian Corals, Example- Gorgonia. <b>Torsion in Mollusca:</b> Definition, Mechanism of Torsion, Effects of Torsion, Significance of Torsion. <b>Pisces: Migration in fishes:</b> Catadromous: Eel fish and Anadromous: Salmon fish and <b>Parental care in fishes:</b> By nest formation, Coiling round eggs, Attachment to body, Integumentary cups, Shelter in mouth, Brood pouch, Mermaids purses, Viviparity.</p>		<b>11</b>
<b>III</b>	<p><b>Unique attributes of Vertebrate animals with special reference to Amphibia &amp; Reptilia:</b>  <b>Parental care in Amphibia:</b> by Nest, by Nursery or Shelter and by Parents <b>Neoteny in Amphibia:</b> Definition, Partial and Total Neotony, Factors Affecting Neotony, Examples- Axolotal larva, Necturus and Siren. <b>Reptilia: Venomous &amp; Non-venomous Snakes:</b> Identification, Poison apparatus: Poison Glands, Poison ducts and Fangs, Biting Mechanism.</p>		<b>11</b>
<b>IV</b>	<p><b>Unique attributes of Vertebrate animals with special reference to Aves and Mammals:</b>  <b>Birds:</b> Flight Adaptation, Migration and Perching Mechanism, Flightless Birds (Morphology and Special Characters of Emu, Ostrich and Penguins), Discuss-Birds are glorified reptiles: Archaeopteryx. <b>Monotremes or Egg laying mammals:</b> Morphology and Special Characters of Echidna and Duck bill platypus. <b>Aquatic Mammals:</b> Morphology and Special Characters of Whale and Dolphin. <b>Mammals: Flying Mammals:</b> Morphology and Special Characters of Bat.</p>		<b>11</b>
<b>Keywords</b>	Origin of life, Invertebrate, Vertebrate, Corals, Torsion, parental care, Neotony, Fangs, Aves, Mammals		
<b>Signature of Convener &amp; Members (CBoS) :</b>			

## PART-C: Learning Resources

### Text Books Recommended

- E. J. W. Barrington , Invertebrate structure and function, English Language Book Society UK
- Robert Barnes, Invertebrate Zoology, Robert Barnes IVth edition Holt Saunders International Edition Japan
- Park Haswell, Marshall and Williams, A textbook on Zoology Invertebrate, AITBS Publishing and Distributers, Delhi
- Park Haswell, Marshall and Williams, A textbook on Zoology Vertebrate, AITBS Publishing and Distributers, Delhi

### Reference Books Recommended

- Prof R. L. Kotpal, Protozoa to Echinodermata, Rastogi Publication Meerut
- E.L. Jordan, Dr. P. S. Verma, Invertebrate Zoology , S. Chand Publications, New Delhi
- N. Arumugam, N. C. Nair S. - Invertebrate Zoology, Saras Publication.
- N. Arumugam, N. C. Nair S. - vertebrate Zoology, Saras Publication.
- Barrington E. J. W., Invertebrate Structure and Function, Nelson London
- Barnes, R. D., Invertebrate Zoology –Saunders Philadelphia
- R. L. Kotpal, Invertebrate, Rastogi Publications
- R. L. Kotpal, Vertebrate, Rastogi Publications
- H. S. Bhampah, KavitaJuneja, Recent trends in vertebrates vol 1 – 9, Anmol Publication
- S. N. Prasad, Life of invertebrates, Vikash Publication House Pvt Ltd New Delhi
- G. S. Sandhu, HarshwardhanBhagskar – Advanced invertebrate zoology –Campus books international

### Online Resources–

- <https://www.coursera.org/lecture/emergence-of-life/4-5-invertebrates-successes-of-life-without-a-backbone-WQHqS>
- <https://www.shiksha.com/online-courses/introduction-to-biology-biodiversity-course-cour15385>
- <https://www.youtube.com/watch?v=k121Qv6loBA>
- [https://www.youtube.com/watch?v=uK-Xx\\_OCYcI](https://www.youtube.com/watch?v=uK-Xx_OCYcI)
- <https://www.youtube.com/watch?v=vybbBil5Elk>
- <https://www.youtube.com/watch?v=WxMSckEeio4>

## PART -D: Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

<b>Continuous Internal Assessment (CIA):</b> (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10 Total Marks - 30	
<b>End Semester Exam (ESE):</b>	<b>Two section – A &amp; B</b> Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

Signature of Convener & Members (CBoS):

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
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**COURSE CURRICULUM**

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2	<b>Course Title</b>	<b>Life on Earth and Unique Attributes of Animal Kingdom</b>	
3	<b>Course Type</b>	<b>General Elective</b>	
4	<b>Pre-requisite (if, any)</b>	<i>As per Program</i>	
5	<b>Course Learning Outcomes (CLO)</b>	<p><b>After successfully completing this course, the students will be able to-</b></p> <ul style="list-style-type: none"> <li>➤ <i>To demonstrate comprehensive understanding of the current theories and hypotheses regarding the origin of life on Earth,</i></li> <li>➤ <i>Understand diversity of life forms</i></li> <li>➤ <i>Identify some distinctive invertebrate and vertebrate animals</i></li> <li>➤ <i>Apply this Understanding to broader context of life</i></li> </ul>	
6	<b>Credit Value</b>	<b>1 Credits</b>	<b>Credit =30 Hours Laboratory or Field learning/Training</b>
7	<b>Total Marks</b>	<b>Max. Marks: 50</b>	<b>Min Passing Marks: 20</b>
<b>PART -B: Content of the Course</b>			
<b>Total No. of learning-Training / performance Periods: 30 Periods (30 Hours)</b>			
<b>Module</b>	<b>Topics (Course Contents)</b>		<b>No. of Period</b>
<b>Lab./Field Training/ Experiment Contents of Course</b>	<ul style="list-style-type: none"> <li>➤ Study of origin of life through chart and models</li> <li>➤ Study of different Invertebrates and Vertebrates animals through models and museum specimens in the laboratory with details of biogeography and diagnostic features: Millipora, Alcyonium, Gorgonia, Hippocampus, Ichthyophis (Female), Alytes (Male), Axolotal larva, Necturus, Siren, Cobra, Viper (pit &amp; Pitless), Sea Snake, Rattle Snake, Archaeopteryx, Emu, Ostrich and Penguins, Echidna and Duck bill platypus, Whale, Dolphin, Bat.</li> <li>➤ Preparation and Demonstration of Key for Identification of Venomous and Non-venomous snakes.</li> <li>➤ Study of Coral Reefs through Models, Photographs</li> <li>➤ Study of Fossils through chart/ Models</li> <li>➤ An “<b>Animal album or Practical Record</b>” containing sketches, photographs, cut outs, with appropriate write up about the above mentioned taxa.</li> <li>➤ Study of some videos to develop understanding and acquired knowledge on the animals salient features as mentioned above.</li> <li>➤ Group discussion/Viva or Seminar presentation on related topics mentioned in Theory paper.</li> </ul>		<b>30</b>
<b>Keywords</b>	<i>Museum specimens, Invertebrates, Vertebrates, Venomous and Non-venomous, Seminar</i>		
<b>Name and Signature of Convener &amp; Members of CBoS:</b>			

## **PART-C: Learning Resources**

### **Text Books, Reference Books and Others**

#### **Text Books Recommended –**

- S.S. Lal, Practical Zoology, Invertebrate. 12<sup>th</sup> Edition Rastogi Publications, Meerut,  
o New Delhi.
- A manual of practical Zoology. Dr. P.S Verma, S. Chand Publication, New Delhi

#### **Reference Books Recommended –**

- Park Haswell, Marshall and Williams, A textbook on Zoology Invertebrate, AITBS Publishing and Distributers, Delhi
- Park Haswell, Marshall and Williams, A textbook on Zoology Vertebrate, AITBS Publishing and Distributers, Delhi

#### **Online Resources–**

- [http://ndl.iitkgp.ac.in/he\\_document/swayamprabha/swayam\\_prabha/gc5ua6m873i?e=3|\\*||](http://ndl.iitkgp.ac.in/he_document/swayamprabha/swayam_prabha/gc5ua6m873i?e=3|*||)
- <https://www.youtube.com/watch?v=JUdp3U6A1EA>

## **PART -D: Assessment and Evaluation**

### **Suggested Continuous Evaluation Methods:**

**Maximum Marks: 50 Marks**

**Continuous Internal Assessment (CIA): 15 Marks**

**End Semester Exam (ESE): 35 Marks**

<b>Continuous Internal Assessment (CIA): (By Course Teacher)</b>	Internal Test / Quiz-(2): <b>10 &amp; 10</b>	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against <b>15 Marks</b>
	Assignment/Seminar +Attendance - <b>05</b> Total Marks - <b>15</b>	
<b>End Semester Exam (ESE):</b>	<b>Laboratory / Field Skill Performance: On spot Assessment</b>	<b>Managed by Course teacher as per lab. status</b>
	<b>A. Performed the Task based on lab. work - 20 Marks</b> <b>B. Spotting based on tools &amp; technology (written) – 10 Marks</b> <b>C. Viva-voce (based on principle/technology) - 05 Marks</b>	

*Name and Signature of Convener & Members of CBoS:*

