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## RAICHUR UNIVERSITY, RAICHUR

## **BACHELOR OF SCIENCE IN ZOOLOGY**

## **PROPOSED SYLLABUS FOR III AND IV SEMESTERS**

2024-2025 Onwards

John

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23. May

## **Zoology**

**B.Sc., Semester – IV (SEP) w.e.f 2025-26**

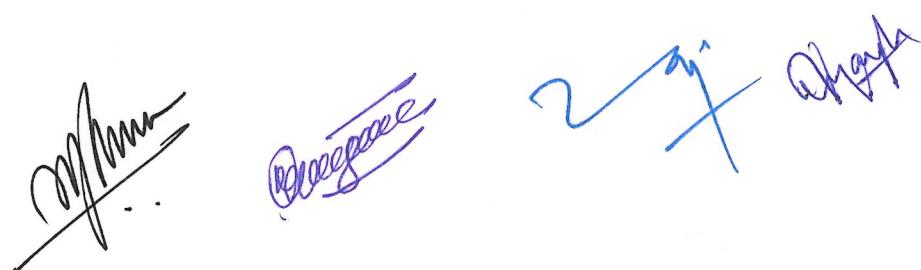
### **Theory Syllabus**

|   |                          |
|---|--------------------------|
| Course Title: <b>Cell Biology, Genetics, Evolution and Ethology</b> | Course Code:             |
| Total Contact Hours: 64   | No. of Credits: T=4      |
| L:P   | 4:0                      |
| Internal Assessment Marks: 20                                       | Duration of SEE: 3 Hours |
| Semester End Exam Marks: 80   |                          |

#### **Course Outcomes (COs):**

At the end of the course, students will be able to:

1. Understand the structure and functions of a basic unit of life.
2. Gain knowledge about the techniques and experiments in understanding molecular mechanisms.
3. Solve the genetic problems and establish phylogeny.
4. Establish the evolutionary relationship among different organisms.
5. Appreciate and scientifically assess the habit and habitat of different species.
6. Develop the skills to identify various animal behavior patterns.
7. Distinguish uniqueness of a particular animal and appreciate its biological importance in the perspective of conservation point of view.
8. Will be able to understand the evolutionary trends of organisms.
9. Appreciate the importance of every species in the biosphere.
10. Understand the role of human in the ecosystem.



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| Units | Description   | Hours |
|-------|---|-------|
| 1     | Cellular organization, Structure and function of Cell organelles, Cell theory. Transport across cell membranes, cell junctions. Central dogma of molecular cell biology. Evidences for DNA as a genetic material Structure of dsDNA. Replication models, Transcription and post-transcriptional modification. Translation and post-translational editing of polypeptide. DNA sequencing.  | 16    |
| 2     | Elements of heredity, Mendelian principles, Monohybrid and dihybrid cross experiments, Extensions to Mendelian principles; Interaction of genes; complementary genes, supplementary genes and epistasis. Sex linkage; Inheritance of X-linked characters, Sex-limited characters, sex-influenced characters. Multiple allelism, Inheritance of blood groups and Rh incompatibility.   | 16    |
| 3     | Biopoiesis and theories of origin of life. Organic Evolution: Lamarckism and neo-Lamarckism, Darwinism, Darwin-Wallce theory of natural selection, modern synthetic theory of evolution. Adaptive radiations: Patterns of evolution (Divergence, Convergence, Parallel, Co-evolution). Fossilization and dating of fossils. Origin and evolution of human. Geological Time Scale.<br><br>Evidences of evolution: Relationship among organisms, Morphological, Anatomical, Embryological, Paleontological, Bio-geographical, Biochemical, Cytological evidences and current evidences<br><br>Forces of evolution: mutation, selection, genetic drift.<br><br>Species Concept: Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric), Mass extinction.<br><br>Population Genetics: Microevolution and Macroevolution: allele frequencies, genotype frequencies, Hardy-Weinberg equilibrium and conditions for its maintenance. | 16    |
| 4     | Definition and types of animal behaviour, innate behaviour, taxes, reflexes, instincts and motivation. Learned behaviour- habituation, imprinting and conditioned reflexes.<br><br>Social organization in termites and honey bees.  | 16    |

|  |   |  |
|--|---|--|
|  | <p>Migration in fishes and birds.</p> <p>Courtship behavior in amphibians and birds; Nesting behavior in weaver and bayabird.</p> <p>Coloration and mimicry: Aggressive, protective and warning; Batesian and Mullerian mimicry.</p> <p>Ecological aspects of behavior: Habitat selection, food selection, optimal foraging theory, anti-predator defenses. Territoriality, Communication, conflict behavior, courtship behavior and maternal instinct.</p> |  |
|--|---|--|

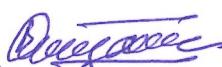
#### **Suggested references.**

1. Alberts, Bray Dennis, Lewis et al., (1994): Molecular Biology of the cell, Garland Publishing Inc. New York.
2. Young: The Life of Vertebrates (3rded 2006, ELBS/Oxford).
3. Parker T. S. and Haswell W. A. (1978). TextBook of Zoology, Vol. II, ELBS.
4. R.L Kotpal, Rastogi Publication.

*M. M. Deogance* *W. A. Haswell* *R. L. Kotpal*

5. Nagabhushan C M (2019). Advanced Practical Zoology, Edurite publications, Delhi.
6. Brown TA (1998): Genetics a molecular approach, 3<sup>rd</sup> ed, Chapman and Hall Publishers, London.
7. Gardner E J et al., (1991): Principles of Genetics, 8<sup>th</sup> ed. John Wiley and Sons Inc.
8. Gerald Karp (2013): Cell and molecular biology, Concepts and experiments, 7<sup>th</sup> Ed.
9. V K Agarwal (2010): Animal Behaviour, S. Chand Publications.
10. Veer Bala Rastogi (2020): Organic evolution (evolutionary biology), 15<sup>th</sup> Ed., MT Science Press.

| <b>Internal Assessment for Theory</b>                        |       |
|--|-------|
| Assessment type  | Marks |
| First Test / Presentation / Project / Seminars / Assignment  | 10    |
| Second Test / Presentation / Project / Seminars / Assignment | 10    |
| Total  | 20    |


**Zoology**  
**B.Sc., Semester – IV (SEP)**  
**Practical Syllabus**

|  |                        |
|--|------------------------|
| Course Title: <b>Cell Biology, Genetics, Evolution and Ethology.</b> | Course Code:           |
| Total Contact Hours: 64  | No. of Credits: P = 2  |
| Contact hours per week: 4  | L:P (0:4)              |
| Internal Assessment Marks: 10  | Duration of SEE: 3 Hrs |
| Semester End Exam Marks: 40  |                        |

**Course Outcomes (COs):**

At the end of the course, students will be able to:

1. Understand and appreciate the composition of cell.
2. Learn the structure and function of cell organelles.
3. Develop the skills to draw the chromosomes and cell structure.
4. Gain the skills micro-preparation techniques.
5. Enhance basic laboratory skills, observation and drawing.
6. Demonstrate the genetic solutions for the problems.
7. Explain the osteological characters.
8. Understand evolutionary relationship among vertebrates.
9. Take up research in biological sciences.
10. Observe the ethological behavior among species.

| List of Experiments  |
|--|
| <ol style="list-style-type: none"> <li>1. Micro-preparation of onion-root tips for mitosis and testes of grass hopper/flower buds for meiosis.</li> <li>2. Study of permanent slides of mitosis and meiosis stages.</li> <li>3. Study of giant chromosomes using <i>Chironomus</i> larva/permanent slides.</li> <li>4. Genetics problems (monohybrid, dihybrid, blood groups, X-linkage, epistasis)</li> <li>5. Genetic pedigree analysis chart preparation.</li> <li>6. Study of genetic characteristics using animal samples.</li> <li>7. Determination of human blood groups.</li> <li>8. Study of Darwin's finches.</li> <li>9. Study of HMS Beagle track history.</li> <li>10. Types of fossils.</li> <li>11. Study of homologous and analogous organs.</li> <li>12. Mimicry.</li> <li>13. Classical conditioning experiment.</li> <li>14. Trial and error theory of learning.</li> <li>15. Colonies and castes of Honey bee and Termites.</li> <li>16. Social organization in honey bees.</li> </ol> |

**\*Note:** i) Students should draw the diagrams rather than just pasting the pictures in the records.  
ii) Practicals are subject to the availability of resources and may be modified accordingly on consent with BoS members. At least 12 practical experiments covering the course title is advisable.

## Internal Assessment for Practical

| Internal Assessment for Practical    |           |
|--------------------------------------|-----------|
| Assessment type                      | Marks     |
| Test/Presentation/Project/ Seminars  | 5         |
| Laboratory Performance/Participation | 5         |
| <b>Total</b>                         | <b>10</b> |

## Semester End Practical Question Paper Pattern for UG Semester-IV (Major)

| Q.No. | Duration: 04 Hours               | Max Marks: 40 |
|-------|----------------------------------|---------------|
| 1     | Major Experiment                 | 12            |
| 2     | Minor experiment                 | 08            |
| 3     | Spotting/Identification          | 10            |
| 4     | Record Book / Journal Submission | 05            |
| 5     | Viva                             | 05            |

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**Zoology**  
**B.Sc., Semester – IV (SEP)**  
**DISSERTATION (PROJECT)**

|  |                          |
|--|--------------------------|
| Course Title: <b>Dissertation (Project work)</b> | Course Code:             |
| Total Contact Hours: 2                           | No. of Credits: P = 2    |
| Contact hours per week: 2                        | L:P (1:2)                |
| Internal Assessment Marks: 10                    | Duration of SEE: 04 Hrs. |
| Semester End Exam Marks: 40                      |                          |

**Course Outcomes (CO's):**

**At the end of the course, students will be able to:**

1. Understand the research and develop scientific temper.
2. Learn to state research problems / hypothesis.
3. Develop the detailed in-sights into observation, analysis, interpretation of data.
4. Inculcate the knowledge of problem solving using scientific temperament.
5. Develop scientific attitude.
6. Carryout independent research at local, national and international standard.

**Aim:** (a) Application of knowledge to real life situation (b) to introduce research methodology.

The topic of dissertation may be laboratory-oriented / field-oriented or combined or computational project work across the branches of zoology is to be undertaken by every student to gain research insights in the relevant areas of interest with an emphasis on originality of approach. The course involves framing a problem statement (define hypothesis / alternate hypothesis), design a research program and investigate to find out the possible solution for it. It may be started early and shall be completed by the end of the 4<sup>th</sup> semester. The Dissertation to be submitted should include (a) background information in the form of introduction (b) objectives of the study (c) materials and methods employed for the study (d) results and discussion thereon (e) summary and conclusions and (f) bibliography. Apart from these sections, importance of the results, originality and general presentation also may be taken into consideration for evaluation. At the end of the course, each student should submit the findings of his/her research in a printed and bound form of book.



| Internal Assessment for Dissertation |       |    |
|--------------------------------------|-------|----|
| Assessment type                      | Marks |    |
| Test/Presentation/Project/ Seminars  |       | 5  |
| Laboratory Performance/Participation |       | 5  |
| Total                                |       | 10 |

| <b>Semester End Examination for UG Semester-IV (Major)</b> |  |                       |
|--|--|-----------------------|
| <i>Q. No.</i>  | <i>Duration: 04 Hours</i>  | <i>Max. Marks: 40</i> |
| 1  | Submission of dissertation and oral (includes MS Office Power Point) presentation. | 30                    |
| 2  | Viva-Voce  | 10                    |
|  | <b>Total</b>   | <b>40</b>             |

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W. M. ...

Christopher

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