# GONDWANA UNIVERSITY GADCHIROLI

**SEMESTER SYSTEM SYLLABUS**

**FOR**

B.Sc. Part II

**Subject- Zoology**

**Semester IV – Paper II**

**Animal Behavior and Evolution**

(Paper -I)

<table>
<thead>
<tr>
<th>Unit- I</th>
<th>Definition, Types and Adaptive nature of Behavior</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Innate Behavior-Reflexes, taxes and instinctive behavior</td>
<td>05</td>
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<tr>
<td></td>
<td>Hypothalamus and behavior</td>
<td>02</td>
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</tbody>
</table>

**Unit-II**

- imprinting, Pavlovian and trial and error conditioning | 03 |
- Social behavior: Aggregation, Migration and navigation, | 03 |
- Courtship (Appeasement, intentional & display movement) | 03 |
- Reproductive fighting, Dominance hierarchy | 03 |

**Unit-III**

- Oparin’s concept of Miller’s experiments | 01 |
- Biochemical origin of life | 02 |
- Adaptive radiation in mammals | 02 |
- Parallel, Convergent and Divergent evolution | 02 |
- Recapitulation theory | 02 |
- Natural selection- Stabilizing, Directional and Disrupting | 03 |

**Unit-IV**

- Populations, gene pool, gene frequency, genotype frequency | 02 |
- Hardy-Weinberg law, migration and random genetic drift | 03 |
- Mechanism of isolation | 04 |
- Mechanism and pattern of speciation | 03 |
<table>
<thead>
<tr>
<th>Unit</th>
<th>Topics</th>
<th>Periods</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>Structure of DNA and RNA. Types of RNA Concept of gene as cistron, muton and recon.</td>
<td>3</td>
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<tr>
<td></td>
<td>Gene regulation in Prokaryotes (Lac operon in E. coli)</td>
<td>2</td>
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<td>Salient feature of genetic code.</td>
<td>2</td>
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<td>Protein synthesis- Transcription and Translation.</td>
<td>3</td>
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<td>II</td>
<td>Genic balance mechanism of sex determination in Drosophila.</td>
<td>3</td>
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<td>Cytoplasmic inheritance: Kappa particles in <em>Paramecium</em>, Milk factor in Mice.</td>
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<td>Gene mutation and Mutagenic agents – (physical and chemical).</td>
<td>4</td>
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<tr>
<td>III</td>
<td>Definition and Types of Eugenics. Eutelogenesis.</td>
<td>1</td>
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<td>Basic concept in recombinant DNA technology</td>
<td>1</td>
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<td>Isolation of gene- DNA manipulation enzyme: Nucleases, ligase, Polymerases, Alkaline phosphatase and topoisomerases</td>
<td>3</td>
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<td>Gene isolation methods- shotgun Method, hybridization and reverse transcription.</td>
<td>3</td>
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<td>Cloning vectors: Plasmid, Bacteriophage, Lamda, Cosmids YAC’s (Yeast artificial chromosome)</td>
<td>2</td>
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<tr>
<td>IV</td>
<td>Splicing technique - Insertion of DNA and ligation using blunt ends, Cohesive ends.</td>
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<td>Introduction of recombinant DNA in to host cell by Genetic transformation, Transfection, Transduction and Transgenesis.</td>
<td>4</td>
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<tr>
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<td>Application of genetic engineering- Production of insulin, Vitamins and monoclonal Antibodies.</td>
<td>4</td>
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</tbody>
</table>
PRACTICALS
B.Sc.II (Zoology), Semester-IV

1. Study of chemotaxis and phototaxis in animals.
2. Identification of wild and mutant type Drosophila.
3. Demonstration of monohybrid by beads.
4. Demonstration of Dihybrid by beads.
5. Study of sickle cell anemia.
6. Study of Thalassemia.
7. Study of ABO and Rh blood groups in human society.
9. Study of Barr body in vaginal smear or buccal epithelium.
10. Study of human genetic trait by using Hardy-Weinberg equations- Rolling of tongue, baldness, widow peak, length of index and ring finger, attached and free ear lobe.
11. Study of pictures of human chromosome abnormalities.
13. Study of pictures of Parallel, Convergent and Divergent evolution.
14. Study of picture of Stabilizing, Directional and Disruptional evolution.
15. Preparation of models on genetics.

Distribution of marks for Practical at the end of Semester-IV

1. Study of monohybrid/dihybrid cross by beads. 05
2. Identification of pictures (2 marks each). 08
3. Study of any human trait by using H-W equation. 06
4. Study any one of experiment (From 6 to 10). 04
5. Submission of any genetic model. 02
6. Viva-voce 02
7. Class Record 03

Total ......................................................... 30
Books Recommended –

Paper –I : Chordate and Developmental biology

1. T. B. of Zoology vol II – Parker & Haswell
2. T. B. of Vertebrate zoology _ S. N. Orasad
3. Vertebrate zoology – E. L. Jorden
4. Vertebrate zoology – Vishwanath
5. Zoology of chordates – Nigam H.C.
6. Phylum Chordata –n Newman H.H.
7. Biology of vertebrates – Walter & Sayles
8. The vertebrate body – Romer A. S.
9. Comparative anatomy of the vertebrates – Kingslay J. D.
10. The Biology of Amphibia – Noble G. K.
11. Snakes of India – Gharpura K. G.
12. Life of Mammals – Young J.Z.
13. Vertebrates – Kotpal R. L.
15. Vertebrate Zoology – Dhami & Dhami
16. T. B. Vertebrate Zoology – Agrawal
17. Protochordates – Chatterjee & Pandey
18. Protochordates – Bhatia
19. T. B. of Chordates – Bhamrah and Juneja
20. Chordate anatomy – Arora M.P.
22. T. B. of animal embryoology – Puranik
23. T. B. of Chordate embryoology – Dalella & Verma
24. T. B. of embryoology – Sandhu
25. S.Y B. Sc Zoology Sem-III- Dhamani, Bakare, Harney & Bhute
(Paper-III) Animal Behavior and Evolution