



# ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC(CGPA:3.68/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

## Faculty of Science

Bachelor of Science (B.Sc.)

**SUBJECT: ZOOLOGY**

B.Sc. I Semester

Paper-Major

**ANIMAL DIVERSITY: NON-CHORDATA**

### Course Outcomes

| S. No. | Course Outcomes   |       |
|--------|---|-------|
|        | <b>On completion of this course students will able to:-</b>   |       |
| 01     | Learn about the importance of systemic, taxonomy and phylogeny to get a concrete idea of evolution of non-chordate phyla. | U     |
| 02     | Understand the various morphological, anatomical structures and functions of animals of different phyla                   | U     |
| 03     | Get the knowledge about economic, ecological and medical significance of various animals in human welfare.                | Apply |
| 04     | Understand the important parasites and their control measures   | U     |

### Credit and Marking Scheme

|              | Credits  | Marks    |            | Total Marks |
|--------------|----------|----------|------------|-------------|
|              |          | Internal | External   |             |
| Theory       | 4        | 40       | 60         | 100         |
| Practical    | 2        | 40       | 60         | 100         |
| <b>Total</b> | <b>6</b> |          | <b>200</b> |             |

### Evaluation Scheme

|                  | Marks  |  |
|------------------|--|--|
|                  | Internal   | External                                     |
| <b>Theory</b>    | 3 Internal Exams each of 20 Marks<br>(During the Semester)<br>(Best 2 will be taken) | 1 External Exams<br>(At the End of Semester) |
| <b>Practical</b> | 3 Internal Exams<br>(During the Semester)<br>(Best 2 will be taken)                  | 1 External Exams<br>(At the End of Semester) |



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## Content of the Course

### Theory

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

| Units | Topics   | No. of Lectures |
|-------|--|-----------------|
| I     | <b>Taxonomy, Phylogeny and Protozoa</b><br><b>1. Taxonomy</b><br>1.1 Elementary Knowledge of Zoological Nomenclature and International Code<br>1.2 Outline Classification of Animal Kingdom upto Phylum of acoelomate and coelomate non-chordates according to Parker and Haswell 7 <sup>th</sup> edition<br><b>2. Phylogeny</b><br>2.1 Definition and Examples<br><b>3. Protozoa</b><br>3.1 Phylum Protozoa: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples<br>3.2 Structure, life history and pathogenicity of malarial Parasite ( <i>Plasmodium vivax</i> )<br>3.3 Protozoa and disease - Amoebiasis, Trypanosomiasis, Leishmaniasis & Trichomoniasis<br><b>Keywords/Tags:</b> ICZN, Classification, Protozoa, Plasmodium, | 11              |
| II    | <b>Porifera, Coelenterata</b><br><b>1. Porifera</b><br>1.1 Phylum Porifera: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples<br>1.2 Type study of <i>Sycon</i> Morphology, Reproduction & Development<br>1.3 Canal system of Sponges<br><b>2. Coelenterata</b><br>2.1 Phylum Coelenterata: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples.<br>2.2 Type Study of <i>Obelia</i> -Morphology, Life cycle<br>2.3 Corals and Coral reef formation<br><b>Keywords/Tags:</b> Classification, Porifera, <i>Sycon</i> , Coelenterata, <i>Obelia</i> , Coral reefs   | 11              |





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|     |   |    |
|-----|---|----|
| III | <p><b>Platyhelminthes, Nematelminthes, Annelida</b></p> <p><b>1. Platyhelminthes</b></p> <p>1.1 Phylum Platyhelminthes: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples</p> <p>1.2 External morphology, larval forms and life history <i>Fasciola hepatica</i> (Liver fluke)</p> <p><b>2. Nematelminthes</b></p> <p>2.1 Phylum Nematelminthes: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples</p> <p>2.2 Pathogenic symptoms of Nematodes and diseases –<br/> <i>Ascariasis, Trichuriasis, Enterobiasis, Filariasis &amp; Trichinosis</i> (Trichinellosis)</p> <p><b>3. Annelida</b></p> <p>3.1 Phylum Annelida: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples</p> <p>3.2 Type study of Earthworm (<i>Pheretima</i>)</p> <p>3.3 Structure and significance of Trochophore larva</p> <p><b>Keywords/Tags:</b> Classification, Platyhelminthes, Liver fluke, Nematode disease,</p> | 14 |
| IV  | <p><b>Arthropoda, Mollusca</b></p> <p><b>1. Arthropoda</b></p> <p>1.1 Phylum Arthropoda: General Characters of the phylum and outline classification up to classes with distinctive characters and suitable examples</p> <p>1.2 Type study of Prawn</p> <p>1.3 Larval forms of crustacea - Nauplius, Zoea, Megalopa &amp; Mysis larva.</p> <p>1.4 Insects as a vector of human disease - <i>Culex, Aedes, Tsetse fly &amp; Housefly.</i></p> <p><b>2. Mollusca</b></p> <p>2.1 Phylum Mollusca: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples</p> <p>2.2 Type study of <i>Pila</i></p> <p>2.3 Structure &amp; Significance of Glochidium larva</p> <p><b>Keywords/Tags:</b> Classification, Arthropoda, Prawn, Crustacea larva, Insects, Mollusca, <i>Pila</i>, Glochidium</p>   | 15 |

*[Handwritten signatures]*



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## V Echinodermata, Hemichordata

### 1. Echinodermata

- 1.1 Phylum Echinodermata: General characters of the phylum and outline classification up to classes with distinctive characters and suitable examples
- 1.2 External features and water vascular system of Starfish (*Asterias*)
- 1.3 Larval forms of Echinodermata

### 2. Hemichordata

- 2.1 Phylum Hemichordata: General characters of the phylum Hemichordata and relationship with non-chordates and chordates
- 2.2. *Balanoglossus* - External morphology
- 2.3 Structure and significance of tornaria larva

**Keywords/Tags:** Classification, Echinodermata, *Asterias*, Echinodermata larvae, Hemichordata, *Balanoglossus*, Tornaria



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## References

### Text Books, Reference Books and Other Resources:-

#### Suggested readings

1. Parker, J, Haswell, WA, "A Text Book of Zoology". VII edition, Vol. 1 & II, Low Price Publications, Delhi, 1990.
2. Barnes, RD, "Invertebrate Zoology", VII Edition, Cengage Learning, India, 2006.
3. Pechenik, JA, "Biology of the Invertebrates" McGraw-Hill Educations, VII Edition, 2015.
4. Sedgwick, A, "A Students Text Book of Zoology", Vol.I. II & Vol. III., Low Price Publications, Delhi, 1990.
5. Dhama and Dhama, "Invertebrate Zoology" R., Chand & Co., India, 2009.
6. Jordan and Verma, "Invertebrate Zoology," S. Chand & Company. New Delhi, 2013.
7. Agarwal, VK, "Zoology for Degree Students: Non-Chordata", S Chand & Company, 2017.
8. Kotpal, R, "Modern Text Book of Invertebrates", Rastogi Publications, Meerut, 2017
9. Kotpal, R. "Protozoa to Echinodermata (Phylum Series)", Rastogi Publications, Meerut, 2017.
10. <https://zoologylearningpoint.wordpress.com>
11. <https://zoologyresources.com>





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## List of Practical

| Part B- Content of the Course   |   |                 |
|---|---|-----------------|
| Total No. of Lectures – Tutorials – Practical (2 hour per week): L-T-P: 30                              |   |                 |
| Unit  | Topic   | No. of Lectures |
| I   | Study of museum specimens and slides relevant to the invertebrates.   | 25              |
| II  | Dissection (Demonstration Only -Through You Tube Video or Models or Charts)<br>a. Earthworm- Digestive system. Nervous system, Reproductive system<br>b. Prawn-Nervous system and appendages<br>c. Pila-Nervous System<br>d. Cockroach-Digestive System, Nervous System<br>(Easily available animal in residential areas which can be used for dissection and mounting) | 12              |
| III   | Mounting<br>a. Locally available small non-chordates, their larvae<br>b. Mouth Parts of Insects –<br>Cockroach/Mosquitoes   | 8               |
| V   | Economic Importance of any two invertebrates/<br>two Insects  | 5               |
| VI  | Parasitic Adaptation of any one parasite – Fasciola hepatica/Taenia solium  | 5               |
| Keywords/Tags: Museum specimens, Slides, Dissection, Mounting, Benefited insects, parasitic adaptation. |   |                 |