

As Per NEP 2020

University of Mumbai



Syllabus for Minor (Scheme III) Vertical 2

Faculty of Science & Technology

Board of Studies in Zoology

Third Year Programme in Minor B.Sc. (Zoology)

Semester

V

Title of Paper

S3MN3 Animal Classification

Credits

2

From the Academic Year

2026-27

Semester V

Syllabus
B.Sc. (Zoology)
Semester V
Title of Paper: S3MN3 Animal Classification

Sr. No.	Heading	Particulars
1	Description of the course: Including but Not limited to:	This course provides a comprehensive understanding of animal classification, taxonomy, and systematics, covering both invertebrates and vertebrates. It introduces the historical development, principles, and importance of classification, including artificial, natural, and phylogenetic systems. The course explains the basis of classification such as levels of organization, symmetry, germ layers, body cavity, and segmentation. Detailed study of major invertebrate and vertebrate phyla is included with representative examples. The syllabi also includes modern approaches like molecular systematics, DNA barcoding and their relevance to biodiversity conservation.
2	Vertical:	Minor
3	Type:	Theory
4	Credit:	2 credits (1 credit = 15 Hours for Theory in a semester)
5	Hours Allotted:	30 Hours
6	Marks Allotted:	50 Marks
7	Course objectives: The course is designed to acquaint the learners to, • The principles, history, and need for animal classification and taxonomy. • The diagnostic characters and classification of major invertebrate and vertebrate animal. • Modern and applied aspects of systematics and their role in biodiversity studies.	
8	Course outcome: On completion of the course the learner will be able to: • Classify animals based on structural, developmental, and evolutionary features. • Identify and compare major invertebrate and vertebrate phyla with suitable examples. • Understand modern taxonomic tools and their applications in evolutionary biology and conservation,	

9	Module 1: Animal Classification I	15hrs
	1.1 Introduction and History of Animal Classification 1.1.1 Definition, scope, and importance of animal classification 1.1.2 Contributions of Aristotle, Linnaeus, Lamarck, Cuvier, R.H. Whittaker, Carl Woese 1.1.3 Concept of species, binomial nomenclature, and taxonomic hierarchy	03hrs
	1.2 Basis of animal Classification 1.2.1 Levels of organization: cellular, tissue, organ, and organ-system level 1.2.2 Body symmetry: asymmetry, radial symmetry, and bilateral symmetry 1.2.3 Germ layers: diploblastic and triploblastic organization 1.2.4 Body cavity: acoelomate, pseudocoelomate, and coelomate condition 1.2.5 Segmentation and cephalization	04hrs
	1.3 Classification of Invertebrata – Acoelomates and pseudocoelomates 1.3.1 Kingdom Protista (Protozoa – Animal-like protists) – General characters and classification with examples • Phylum Amoebozoa: <i>Amoeba proteus</i> • Phylum Ciliophora: <i>Paramecium caudatum</i>	04hrs

	- Phylum Euglenozoa or Zoomastigophora: <i>Euglena</i> - Phylum Apicomplexa or Sporozoa: <i>Plasmodium</i> 1.3.2 Phylum Porifera – General characters; examples: <i>Sycon</i>, <i>Spongilla</i> 1.3.3 Phylum Cnidaria – General characters; examples: <i>Hydra</i>, <i>Aurelia</i> 1.3.4 Phylum Platyhelminthes – General characters; examples: <i>Taenia solium</i>, <i>Fasciola hepatica</i> 1.3.5 Phylum Nematoda – General characters; examples: <i>Ascaris lumbricoides</i>, <i>Wuchereria bancrofti</i>	
	1.4 Classification of Invertebrata – Coelomates 1.4.1 Phylum Annelida – General characters; examples: <i>Pheretima</i>, <i>Nereis</i> 1.4.2 Phylum Arthropoda – General characters; examples: <i>Periplaneta americana</i>, <i>Penaeus sp.</i> 1.4.3 Phylum Mollusca – General characters; examples: <i>Pila globosa</i>, <i>Sepia</i>. 1.4.4 Phylum Echinodermata – General characters; examples: <i>Asterias</i>, <i>Echinus</i> 1.4.5 Comparison of main characters of Invertebrate phyla.	04hrs
	Module 2: Animal Classification II	15hrs
	2.1 Concepts of Taxonomy, Phylogeny and Systematics.	01hr
	2.2 Classification of Chordates 2.2.1 Characteristic features of Phylum Chordates 2.2.2 Classification of Protochordates – Subphylum Cephalochordata (<i>Branchiostoma</i>) and Subphylum Urochordata (<i>Herdmania</i>)	03hrs
	2.3 Classification of Subphylum Vertebrata 2.3.1 General features of subphylum vertebrata, 2.3.2 Infraphylum Cyclostomata (jawless fishes): examples <i>Petromyzon marinus</i>, <i>Eptatretus spp</i> 2.3.3 Infraphylum Gnathostomata (jawed fishes): examples: <i>Scoliodon laticaudus</i>, <i>Labeo rohita</i> 2.3.4 Class Amphibia: examples: <i>Hoplobatrachus tigerinus</i>, <i>Ichthyophis bombayensis</i> 2.3.5 Class Reptilia: examples: <i>Calotes versicolor</i>, <i>Geochelone elegans</i> 2.3.6 Class Aves: examples: <i>Ardea alba</i>, <i>Passer domesticus</i> 2.3.7 Class Mammalia: examples: <i>Pteropus giganteus</i>, <i>Delphinus delphis</i>	07hrs
	2.4 Modern & Applied Systematics 2.4.1 DNA Barcoding & Phylocode: Recent developments in molecular identification and nomenclature 2.4.2 Zoogeography: Animal distribution, biogeographic realms, factors affecting distribution, endemic species 2.4.3 Relevance: Biodiversity conservation, understanding evolutionary patterns (speciation, macroevolution)	04hrs

10	References: - Zakryś, B; Milanowski, R; Karnkowska, Anna (2017). "Evolutionary Origin of <i>Euglena</i>". <i>Euglena: Biochemistry, Cell and Molecular Biology. Advances in Experimental Medicine and Biology</i>. Vol. 979. pp. 3–17. doi:10.1007/978-3-319-54910-1_1. ISBN 978-3-319-54908-8. PMID 28429314. - Cavalier-Smith T (1981). "Eukaryote kingdoms: seven or nine?". <i>Bio Systems</i>. 14 (3–4): 461–481. doi:10.1016/0303-2647(81)90050-2. PMID 7337818. - Euglenozoa". <i>Encyclopedia of Life</i>. National Museum of Natural History - Smithsonian Institution. Retrieved 16 January 2020. - Hodda et al. (2022) Phylum Nematoda: a classification, catalogue and index of the species, <i>Zootaxa</i>. 5114 (1): 1–289. - Francis Polkinghorne Pascoe (2023). <i>Zoological Classification; a Handy Book of Reference with Tables of the Subkingdoms, Classes, Orders, etc., of the Animal Kingdom, Their Characters and Lists of the Families and Principal Genera</i>, ISBN 978-1020027147.
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	6. Evelyn Wells (2025). Fundamentals of Animal Classification: A Beginner's Guide, ISBN-979 .8313953526 7. Louis Agassiz (2023). On the Principles of Classification in the Animal Kingdom, ISBN-978 1021394712. 8. Rahul Jain (2023). Kingdom Animalia Animal Classification: Quick Revision Book, ISBN-978 .9358470635	
12	Internal Continuous Assessment: 40%	External, Semester End Examination 60% Individual Passing in Internal and External Examination
13	Continuous Evaluation through: Quizzes / Class Tests / Presentation / Project / Role play / Creative writing / Assignment, etc. (at least 3)	

QUESTION PAPER PATTERN (External and Internal)

T. Y. B. Sc. Zoology evaluation pattern and question paper pattern for semester end theory examination of Minor course

Internal Continuous Assessment: 40% (20 Marks)	Semester End Examination: 60% (30 Marks)	Duration for End Semester Examination
Continuous Evaluation through: Quizzes, Class Tests, Presentation, Project, Role play, Creative writing, Assignment, etc. (at least 3)	As per paper pattern	01:00 hour

Format of Theory Question Paper: Semester End Examination

TYBSc NEP Question Paper Pattern

External Theory (Major, Minor, Electives) Credits-2

Time 1 hr

Max. Marks 30

NB: 1. All Questions are compulsory. 2. Draw neat and labelled diagram wherever necessary.			
Q. No.	Type	Marks	Module
Q 1.	Multiple choice question / Fill in the blanks (Any 5 out of 10) (5 from each module)	5	1 & 2
Q 2.	Answer in 1-2 sentences (Any 5 out of 10) (5 from each module)	5	1 & 2
Q 3.	Answer any 2 of the following (Any 2 out of 4)	10	1
Q 4.	Answer any 2 of the following (Any 2 out of 4)	10	2

Sd/-

**Sign of the BOS
Prof. Vaishali U. Somani
Chairman/Co-ordinator
BOS in Zoology**

Sd/-

**Sign of the
Offg. Associate Dean
Dr. Madhav R. Rajwade
Faculty of Science &
Technology**

Sd/-

**Sign of the Offg. Dean
Prof. Shivram S. Garje
Faculty of Science &
Technology**