



AMITY UNIVERSITY

UTTAR PRADESH

FORMAT FOR COURSE CURRICULUM

Course Title: Introduction to Marine Invertebrates

Credit Units:

| L | T | P/S | SW/FW | No. of PSDA | TOTAL CREDIT UNITS |
|---|---|-----|-------|-------------|--------------------|
| 4 | - | 2 | 2 | 3 | 6 |

Course Level: UG

Course Code:

Course Objectives: Objective of the course to teach form and function, physiology, reproduction and nutrition of the different groups of marine invertebrates. Course will focus on marine invertebrate organisms in different phylum. Course also aimed for the identification of the various marine invertebrates by the students,

Pre-requisites: Nil

Course Contents/Syllabus:

| | Weightage (%) |
|--|---------------|
| Module I : Protista and Porifera Descriptors/Topics Systematic position up to the class. Concept of Protista, Body Structure, Growth and reproduction, Food and Feeding, Defense system, Contractile vacuoles and Osmoregulation, Economic/ecological importance. Example: Amoeba, Euglena, Paramecium and Plasmodium. | 15% |
| Module II: Cnidaria Descriptors/Topics Classification, General Characters, distribution, morphology and anatomy, Growth and reproduction, Food and Feeding, Defense system, Economic/ecological importance, General account of coral reefs, Sea anemone, Sea pen, Sea whip | 15% |

| | |
|---|-------------|
| Module III : Annelids | 15% |
| Descriptors/Topics Classification, distribution, morphology and anatomy, Growth and reproduction, Food and Feeding, Defense system, Economic/ecological importance. General account of Polychaeta, Oligochaeta, Hirudinia, Archiannelida. Metamerism and adaptive radiation of hirudina | |
| Module IV : Echinoderms and prochordats | 15% |
| Descriptors/Topics Classification, distribution, water vascular system, Growth and reproduction- larvae, their comparative morphology- Star fish, Sea Cucumber, Sea Urchins Prochordata - classification and comparative morphology, reproduction and early development, larval metamorphosis- Herdmania , Branchiostomata and Amphioxus | |
| Module V : Mollusc | 20% |
| Descriptors/Topics Mollusca classification, general characters with reference to bivalves, gastropods and cephalopods. reproduction and early development, Special features and torsion in gastropoda., Economic importance of mollusc | |
| Module VI : Arthropods | 20 % |
| Descriptors/Topics Classification of Arthropoda. Crustacea- comparative morphology, crustacean appendages, larval forms, Respiration, evolution and paleontology with reference to prawn and crab. Economic importance of Crustaceans | |

Course Learning Outcomes:

After completing the course, student will be able to

- **find** biology of protist and organism from phylum porifera
- **explain** the biology of the organisms of the phylum cnidaria
- **develop** knowledge of the biology and economic importance of Annelids
- **discover** morphology and physiology of Echinoderms and prochordates
- **evaluate** mollusk classification on the basis of general characters.
- **discuss** various crustaceans based on morphology, appendages and larval forms

Pedagogy for Course Delivery:

Course will be delivered in the form of lectures, power point presentations and practicals in the lab. E-content with 4 Quadrant approach will be available to the students for self-learning. Students will spend minimum 2hrs per week for selfwork on certain topics. Value addition by the guest lectures is integral part of learning for the course. Course will be delivered in Face to face/ remote learning or in hybrid mode as per the requirement.

List of Professional Skill Development Activities (PSDA):

- i. Field Visit Report (Home assignment)
- ii. Group discussion by presentation
- iii. Lab safety skills- Poster Making

Lab/ Practicals details, if applicable:**List of Experiments:**

1. Collection, preservation and identification of invertebrates
2. Study of external morphological features of marine invertebrates
3. study of external and internal anatomy of higher marine invertebrates
4. Museum study of marine invertebrates-corals, sea urchin, sea anemones, crustaceans, mollusks, Polychaeta etc

Assessment/ Examination Scheme:

| Theory L/T (%) | Lab/Practical/Studio (%) |
|----------------|--------------------------|
| 75 | 25 |

Theory Assessment (L&T):

| Continuous Assessment/Internal Assessment (50%) | | | | | End Term Examination (50%) |
|--|------------|--|--------------------|------------|----------------------------|
| Components (Drop down) | Class Test | Presentation | Home assignment | Attendance | |
| Linkage of PSDA with Internal Assessment Component, if any | | <ul style="list-style-type: none"> • Group discussion by presentation | Field Visit Report | | |

| | | | | | |
|----------------------|----|--|----|---|----|
| | | (10 Marks) • Lab safety skills- Poster Making (5 Marks) | | | |
| Weightage (%) | 10 | 15 | 20 | 5 | 50 |

Lab/ Practical/ Studio Assessment:

| | Continuous Assessment/Internal Assessment (50 %) | | | End Term Examination (50 %) | | | |
|------------------------|---|---------------|------------|--------------------------------|---------------------------|------|--------|
| Components (Drop down) | Class test (Practical Based) | Mid term Viva | Attendance | Major Experiment | Minor experiment/spotting | Viva | Record |
| Weightage (%) | 30 | 15 | 5 | 20 | 10 | 10 | 10 |

Mapping Continuous Evaluation components/PSDA with CLOs

| Bloom's Level > | Remembering | Understanding | Applying | Analyzing | Evaluating | Creating |
|--|---|--|---|---|--|---|
| Course Learning Outcomes Assessment type/PSDA | CLO 1: The student will be able to find biology of protist and organism from phylum porifera | CLO2: The student will be able to explain the biology of the organisms of the phylum cnidaria | CLO3: The student will be able to develop knowledge of the biology and economic importance of Annelids | CLO4: The student will be able to discover morphology and physiology of Echinoderms and prochordates | CLO5: The student will be able to evaluate mollusk classification on the basis of general characters. | CLO6: The student will be able to discuss various crustaceans based on morphology, appendages and larval forms |

| | | | | | | |
|---|---|---|---|---|---|---|
| Class Test | √ | √ | √ | √ | √ | |
| Presentation (Group discussion by presentation) | √ | √ | √ | √ | | |
| Presentation (Lab safety skills- Poster Making) | | | √ | √ | √ | √ |
| Home Assignment | | | | √ | √ | √ |

Text Reading:

- E-content on Amity LMS (Available on student Amizone id)
- Biology of the Invertebrates 7 ed. by Pechenik J. A. 2019. McGraw Hill publication.
- An introduction to Zoology by Joseph Springer and Dennis Holley, 2013, Jones & Bartlett Learning publication house
- Laboratory and field investigations in Marine Life by Dudley, sumich and Dedley, 2012, Jones & Bartlett Learning publication house