INDIRA GANDHI (P.G.) MAHILA MAHAVIDYALAYA ,KAITHAL

Affiliated to Kurukshetra University, Kurukshetra

Department Of Science

Lesson Plan (Session 2025-2026)

Class: B.Sc. Life Science
Semester: I
Name of the Course: Animal Diversity of Non-Chordates
Course Code : B23-ZOO-101
Dates: 22 July, 2025 – 24 Nov., 2025

SYLLABUS

Maximum Marks: 100
Time: 3 hours
End Term Exam Marks: 50(T)+20(P)=70 Marks
Assessment: 20(T)+10(P)=30 Marks

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of short type question covering the entire syllabus in addition to that eight more questions will be set, two question from each unit. Students will be required to attempt in all. In addition to the compulsory question, student will have to attempt four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
Unit: I	Phylum Protozoa: General characters and classification up to class level Type study of Plasmodium Phylum Porifera: General characters and classification up to class level, Type study of Sycon.	12
Unit: II	Phylum – Coelentrata: General characters and classification up to class level Type Study of Obelia Phylum – Platyhelminthes and Aschelminthes: General characters and classification up to class level, Type study of Liver Fluke, Fasciola hepatica.	11
Unit: III	Phylum – Annelida: General characters and classification up to class level, Type study of Earthworm, Pheretima posthuma (Habitat, habits, metamerism, digestive System, circulatory system, nervous system, reproductive system) Phylum – Arthropoda: General characters and classification up to class level, Type study of Cockroach, Periplaneta americana (Habitat, habits, external morphology, digestive system, respiratory system, excretory system, reproductive system)	11
Unit: IV	Phylum - Mollusca: General characters and classification up to class level, Type study of Pila Phylum – Echinodermata: General characters and classification up to class level, Type study of Asterias (Sea Star) (Habitat, habits, external morphology, water vascular system, Circulatory System) Phylum Hemichordata: General characters of Hemichordates with examples.	11
V	Classification up to orders with ecological note and economic importance of the following animals: 1. Protozoa: Lamination of cultures of Amoeba, Euglena and Paramecium; permanent prepared slides: Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria, Paramecium (binary fission and conjugation), Opalina, Vorticella, Balantidium, Nyctotherus, radiolarian and formaniferan ooze. 2. Parazoa (Porifera): Sycon, Grantia, Euplectella, Hyalonema, Spongilla, Euspongia 3. Coelenterata: Porpita, Valella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia, and Astrea. Permanent prepared slides: Hydra (W.M.), Hydra with buds, Obelia (colony and medusa), Sertularia, Plumularia, Tubularia, Bougainvillea, Aurelia (sense organs and stages of life history). 4. Playhelminthes: Dugesia, Fasciola, Taenia, Echinocoecus. Permanent prepared slides: Miracidium, Sporocyst, Redia, Cercaria, Scolex and Proglotttids of Taenia (mature and gravid). 5. Aschelminthes: Ascaris (male and female), Trichinella, Ancylostoma, Meloidogyne 6. Annelida: Pheretima, Heteronereis, Polynoe, Aphrodite, Chaetopterus, Arenicola, Tubifex and Pontobdella 7. Arthropoda: Peripatus, Palaemon (Prawn), Lobster, Cancer (crab), Sacculina, Eupagurus (hermit crab), Lepas, Balanus,Cyclops, Daphnia, Lepisma, Periplaneta (cockroach), Schistocerca (locust), Poecilocerus (akhopper), Gryllus (cricket), Mantis (praying mantis), Cicada, Forticula (earwig), Dragon fly, termite queen, bug, moth, beetle, Polistes (wasp), Apis (honey bee), Bombyx (silk moth), Cimex (beg bug), Pediculus (body louse), Millipede, Scolopendra (centipede), Palamnaeus (scorpion), Aranea (spider), Limulus (king crab) 8. Mollusca: Mytilus, Ostrea, Cardium, Pholas, Solen (razor/Fish), Pecten, Holiotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Octopus, Nautilus (complete and T.S.), Chiton and Dentalium 9. Echinodermata: Asterias, Echinus, Cucumaia, Ophiothrix,	30

	Antedon and Asterophyton 10. Hemichordata: Balanoglossus 11. Study of slides of Non-Chordates phyla; Staining of Obelia and Sertularia	

Text Books :

1. Ashok Sabharwal, Modern's Zoology

Course Learning Outcomes (CLO)

1. Student will be able to describe unique characters and recognize life forms of phylum Protozoa and Porifera

2. Student will be able to describe unique characters and recognize life forms of phylum Coelenterata and Helminthes

3. Student will be able to describe unique characters and recognize life forms of phylum Annelida and Arthropoda

4. Student will be able to describe unique characters and recognize life forms of phylum Mollusca, Echinodermata and Hemichordates

5. Students will be capable of identifying the characters and classification of Non-Chordates

Lesson Plan

SR. No	Date	Course Content	
		Theory (2)	**Practical (2)**
1	22 July -25July 2025	Phylum Protozoa: General characters and classification up to class level	Protozoa: Lamination of cultures of Amoeba, Euglena and Paramecium; permanent prepared slides: Amoeba, Euglena, Trypanosoma, Noctiluca, Eimeria.
2	28 July - 2 August	Type study of Plasmodium	-----
3	4 August -8 August	Phylum Porifera: General characters and classification up to class level, Type study of Sycon	Parazoa (Porifera): Sycon, Grantia, Euplectella, Hyalonema, Spongilla, Euspongia
4	11 August - 14 August	Phylum – Coelentrata: General characters and classification up to class level. Type Study of Obelia	Coelenterata: Porpita, Valella, Physalia, Aurelia, Rhizostoma, Metridium, Millipora, Alcyonium, Tubipora, Zoanthus, Madrepora, Favia, Fungia, and Astrea.
5	18 August - 23August	Phylum – Platyhelminthes and Aschelminthes: General characters and classification up to class level.	Permanent prepared slides: Hydra (W.M.), Hydra with buds, Obelia (colony and medusa), Sertularia, Plumularia, Tubularia, Bougainvillea, Aurelia (sense organs and stages of life history).
6	25 August -30 August	Type study of Liver Fluke, Fasciola hepatica.	------
7	1 Sept. - 6 Sept.	Phylum – Arthropoda: General characters and classification up to class level,	Playhelminthes: Dugesia, Fasciola, Taenia, Echinocoecus. Permanent prepared slides: Miracidium, Sporocyst, Redia, Cercaria, Scolex and Proglotttids of Taenia (mature and gravid).
8	8 Sept. - 13 Sept.	Type study of Cockroach, Periplaneta americana (Habitat, habits, external morphology, digestive system, respiratory system, excretory system, reproductive system)	Annelida: Pheretima, Heteronereis, Polynoe, Aphrodite, Chaetopterus, Arenicola, Tubifex and Pontobdella
9	15 Sept. - 20 Sept.	Phylum - Mollusca: General characters and classification up to class level,	--------
10	22 Sept. - 27 Sept.	Type study of Pila.	Arthropoda: Peripatus, Palaemon (Prawn), Lobster, Cancer (crab), Sacculina, Eupagurus (hermit crab), Lepas, Balanus,Cyclops, Daphnia, Lepisma, Periplaneta (cockroach), Schistocerca (locust)
11	29 Sept.- 4 Oct.	Phylum – Echinodermata: General characters and classification up to class level.	Mollusca: Mytilus, Ostrea, Cardium, Pholas, Solen (razor/Fish), Pecten, Holiotis, Patella, Aplysia, Doris, Limax, Loligo, Sepia, Octopus, Nautilus (complete and T.S.), Chiton and Dentalium
12	6 Oct.- 11 Oct.	Type study of Asterias (Sea Star) (Habitat, habits, external morphology, water vascular system, Circulatory System);	----------
13	13 Oct.- 18 Oct.	Phylum Hemichordata: General characters of Hemichordates with examples	Echinodermata: Asterias, Echinus, Cucumaia, Ophiothrix, Antedon and Asterophyton
14	27 Oct. - 1 Nov.	Revision of Unit I	Hemichordata: Balanoglossus
15	3 Nov. - 8Nov	Revision of Unit II	------
16	10 Nov-15 Nov	Revision of Unit III	Morphological Characters Revision
17	17 Nov -22 Nov	Revision of Unit IV	Study of slides of Non-Chordates phyla; Staining of Obelia and Sertularia
18	24 Nov.	Revision	Morphological Characters Revision

Signature of Teacher **Head of Department**

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Department Of Science

Lesson Plan (Session 2025-2026)

Class: B.Sc. Life Science
Semester: III
Name of the Course: Cell Biology and Animal Genetics
Course Code : B23-ZOO-301
Dates: 22 July, 2025 – 24 Nov., 2025

SYLLABUS

Maximum Marks: 100
Time: 3 hours
End Term Exam Marks: 50(T)+20(P)=70 Marks
Assessment: 20(T)+10(P)=30 Marks

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of short type question covering the entire syllabus in addition to that eight more questions will be set, two question from each unit. Students will be required to attempt in all. In addition to the compulsory question, student will have to attempt four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
Unit: I	General structure of animal cell. Plasma Membrane: Fluid mosaic model, various modes of transport across the membrane, mechanism of active and passive transport, endocytosis and exocytosis. Endoplasmic reticulum (ER): types and functions. Golgi complex: Structure, associated enzymes and role of golgi-complex in animal cell.	12
Unit: II	Ribosomes: Types, biogenesis and role in protein synthesis. Lysosomes: Structure, enzymes and their role; polymorphism Mitochondria: Structure, Mitochondria as semiautonomous body, biogenesis, functions of mitochondria. Cilia and Flagella: Structure and Functions Ultrastructure and functions of Nucleus: Nuclear membrane, nuclear lamina, nucleolus, fine structure of chromosomes, nucleosome concept and role of histones, euchromatin and heterochromatin.	11
Unit: III	Introduction and Mendel's Laws of Inheritance, Linkage and recombination: Cell Cycle, crossing-over and chiasma formation; gene mapping. Sex determination and its mechanism: male and female heterozygous systems, genetic balance system; role of Y-chromosome, male haploidy, cytoplasmic and environmental factors, role of hormones in sex determination. Sex linked inheritance: Haemophilia and colour blindness in man, eye colour in Drosophila, Non-disjunction of sex-chromosome in Drosophila, Sex-linked and sex-influenced inheritance Extra chromocomal and cytoplasmic inheritance: Kappa particles in Paramecium, Shell coiling in snails, Milk factor in mice.	11
Unit: IV	Multiple allelism: Eye colour in Drosophila; A, B, O blood group in man. Human genetics: Human karyotype, Chromosomal abnormalities involving autosomes and sex chromosomes, monozygotic and dizygotic twins. Inborn errors of metabolism (Alcaptonuria, Phenylketonuria, Albinism, sickle-cell anaemia). Applied genetics: Genetic counseling, pre-natal diagnosis, DNA-finger printing, transgenic animals.	11
V	1. Cell division: Prepared slides of stages of mitosis and meiosis. 2. Salivary gland and polytene chromosomes of Drosophila/ Chironomus. 3. Temporary squash preparations of onion root tip/grasshopper testis for the study of mitosis 4. Blood antigens and antibodies: Blood group testing 5. Preparation of Human Karyotype and Idiogram 6. Barr Body and Drum stick slide Preparations	30

Text Books :

1. Cell Biology and Genetics by Veer Bala Rastogi.
2. Cell and Molecular Biology by S.C. Rastogi

Course Learning Outcomes (CLO)

1Course Learning Outcomes (CLO)

1. Students will understand the nature and basic concept of cell biology and genetics.

2. Students will be able to apply the knowledge of internal structure of cell and their role in many metabolic function of organism

3. Students will have acquaintance with the basic causes associated with inborn errors and other genetic disorder and will be able to give counseling to general people

4. Students will be able to explain the concept of gene interactions, Sex linked inheritance and their role in medical sciences.

5. Students will be able to conduct the morphomatric analysis of chromosomes and demonstrate cell division 5. Students will be capable of identifying the characters and classification of Non-Chordates

Lesson Plan

SR. No	Date	Course Content	
		Theory (2)	**Practical (2)**
1	22 July -25July 2025	General structure of animal cell.	----
2	28 July - 2 August	Plasma Membrane: Fluid mosaic model,various modes of transport across the membrane	-----
3	4 August -8 August	mechanism of active and passive transport, endocytosis and exocytosis.	Cell division: Prepared slides of stages of mitosis and meiosis.
4	11 August - 14 August	Endoplasmic reticulum (ER): types and functions.	-----
5	18 August - 23August	Golgi complex: Structure, associated enzymes and role of golgi-complex in animal cell.	Salivary gland and polytene chromosomes of Drosophila/Chironomus.
6	25 August -30 August	Ribosomes: Types, biogenesis and role in protein synthesis.	------
7	1 Sept. - 6 Sept.	Lysosomes: Structure, enzymes and their role; polymorphism	------
8	8 Sept. - 13 Sept.	Mitochondria: Structure, Mitochondria as semiautonomous body, biogenesis, functions of mitochondria.	Temporary squash preparations of onion root tipgrasshopper.
9	15 Sept. - 20 Sept.	Cilia and Flagella: Structure and Functions	--------
10	22 Sept. - 27 Sept.	ultrastructure and functions of Nucleus: Nuclear membrane, nuclear lamina, nucleolus,	Temporary squash preparations oftestis for the study of mitosis
11	29 Sept.- 4 Oct.	fine structure of chromosomes, nucleosome concept and role of histones, euchromatin and heterochromatin	-----
12	6 Oct.- 11 Oct.	Introduction and Mendel's Laws of Inheritance, Linkage and recombination: Cell Cycle, crossing-over and chiasma formation; gene mapping. Sex determination and its mechanism: male and female heterozygous systems, genetic balance system;	Blood antigens and antibodies: Blood group testing
13	13 Oct.- 18 Oct.	Role of Y-chromosome, male haploidy, cytoplasmic and environmental factors, role of hormones in sex determination. Sex linked inheritance: Haemophilia and colour blindness in man, eye colour in Drosophila, Non-disjunction of sex-chromosome in Drosophila, Sex-linked and sex-influenced inheritance.	------
14	27 Oct. - 1 Nov.	Extra chromocomal and cytoplasmic inheritance: Kappa particles in Paramecium, Shell coiling in snails, Milk factor in mice.	-------
15	3 Nov. - 8Nov	Multiple allelism: Eye colour in Drosophila; A, B, O blood group in man. Human genetics: Human karyotype, Chromosomal abnormalities involving autosomes and sex chromosomes, monozygotic and dizygotic twins.	Preparation of Human Karyotype and Idiogram.
16	10 Nov-15 Nov	Inborn errors of metabolism (Alcaptonuria, Phenylketonuria, Albinism, sickle-cell anaemia). Applied genetics: Genetic counseling, pre-natal diagnosis, DNA-finger printing, transgenic animals.	Barr Body and Drum stick slide Preparations
17	17 Nov -22 Nov	Revision	Revision
18	24 Nov.	Revision	Revision

Signature of Teacher **Head of Department**

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Lesson Plan (Session 2025-2026)

Class: B.Sc. Life Science
Semester: V
Name of the Course: Ecology and Environment
Course Code : B23-ZOO-501
Dates: 22 July, 2025 – 24 Nov., 2025

SYLLABUS

Maximum Marks: 100
Time: 3 hours
End Term Exam Marks: 50(T)+20(P)=70 Marks
Assessment: 20(T)+10(P)=30 Marks

Note: Examiner will be required to set nine questions in all. First question will be compulsory, consisting of short type question covering the entire syllabus in addition to that eight more questions will be set, two question from each unit. Students will be required to attempt in all. In addition to the compulsory question, student will have to attempt four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
Unit: I	Basic concepts of ecology: Definition, significance. Concepts of habitat and ecological Niche. Ecosystem: Concept, components, properties and functions; Ecological energetics and energy flow models, food chain, food web, trophic structure; ecological pyramids, concept of productivity	12
Unit: II	Factors affecting environment: Abiotic factors (light-intensity, quality and duration), temperature, humidity, wind, Rainfall, topography; edaphic factors; Biotic factors. Introduction to major ecosystems of the world. Biogeochemical cycles: Concept, reservoir pool, gaseous cycles and sedimentary cycles. CommunityEcology: Characteristics, Composition, structure, origin and development of a community Ecological Succession.	11
Unit: III	Population: Growth and regulation. Population interactions: Competition, predation, parasitism, commensalisms and mutualism. Concept of biodiversity and conservation of natural resources..	11
Unit: IV	Climate change: Global warming, Greenhouse Effect, Ozone Depletion, Sustainable Development. Natural Recourses: Types, Uses and conservation. Environmental Pollution: Air, water, soil and management strategies. Environmental Impact Assessment..	11
V	1. Chemical analysis of pond water (pH, Salinity, free CO2, alkanity, hardness) 2. Chemical analysis of soil for pH, moisture, nitrates, and phosphates. 3. Estimation of DO, BOD for given Sample of water. 30 ZOO-7 4. A study of pond ecosystem. 5. Basic Zooplankton & Phytoplankton study of any water body.	30

Text Books :

1. Odum, E.P., (2008). Fundamentals of Ecology. Indian Edition. Brooks/Cole

Course Learning Outcomes (CLO)

1. Students will be able to describe interactions and relation between abiotic and biotic factors.

2. Students will able to describe about ecosystem and Biogeochemical cycles.

3. Students will be able to describe about population characteristics & biodiversity.

4. Students will be able to understand the causes of different types of pollution.

5. Students will be able to practical approaches of natural resources and their conservation

Lesson Plan

SR. No	Date	Course Content	
		Theory (2)	**Practical (2)**
1	22 July -25July 2025	Students doing their Internship	----
2	28 July - 2 August	Students doing their Internship	-----
3	4 August -8 August	Basic concepts of ecology: Definition, significance. Concepts of habitat and ecological Niche.	Chemical analysis of pond water (pH, Salinity, free CO2, alkalinity, hardness)
4	11 August - 14 August	Ecosystem: Concept, components, properties and functions; Ecological energetics and energy flow models	-----
5	18 August - 23August	food chain, food web, trophic structure; ecological pyramids, concept of productivity.	Chemical analysis of soil for pH, moisture, nitrates, and phosphates.
6	25 August -30 August	Factors affecting environment: Abiotic factors (light-intensity, quality and duration), temperature, humidity, wind, Rainfall, topography; edaphic factors .	------
7	1 Sept. - 6 Sept.	Biotic factors. Introduction to major ecosystems of the world.	------
8	8 Sept. - 13 Sept.	Biogeochemical cycles: Concept, reservoir pool, gaseous cycles and sedimentary cycles.	Estimation of DO, BOD for given Sample of water.
9	15 Sept. - 20 Sept.	Community Ecology: Characteristics, Composition, structure, origin and development of a community	--------
10	22 Sept. - 27 Sept.	Ecological Succession.	A study of pond ecosystem.
11	29 Sept.- 4 Oct.	Population: Growth and regulation.	-----
12	6 Oct.- 11 Oct.	Population interactions: Competition, predation, parasitism, commensalisms and mutualism.	Basic Zooplankton & Phytoplankton study of any water body.
13	13 Oct.- 18 Oct.	Concept of biodiversity and conservation of natural resources	------
14	27 Oct. - 1 Nov.	Climate change: Global warming, Greenhouse Effect.	-------
15	3 Nov. - 8Nov	Ozone Depletion, Sustainable Development .	------
16	10 Nov-15 Nov	Natural Recourses: Types, Uses and conservation.	
17	17 Nov -22 Nov	Environmental Pollution: Air, water, soil and management strategies. Environmental Impact Assessment.	Revision
18	24 Nov.	Revision	Revision

Signature of Teacher **Head of Department**