

Teaching Plan

Department : Botany
Class : I M.Sc. Botany
Title of the Course : Core I: PLANT DIVERSITY – I: ALGAE, FUNGI, LICHENS AND BRYOPHYTES
Semester : I
Course Code : PB231CC1

| Course Code | L | T | P | Credits | Inst. Hours | Total Hours | Marks | | |
|-------------|---|---|---|---------|-------------|-------------|-------|----------|-------|
| | | | | | | | CIA | External | Total |
| BP231CC1 | 5 | 2 | - | 5 | 7 | 105 | 25 | 75 | 100 |

Objectives

- To learn about the classification, distinguishing traits, geographic distribution, and reproductive cycle of algae, fungi, lichens, and bryophytes.
- To gain knowledge about the ecological and economic importance of algae, fungi, lichens and bryophytes.

Course outcomes

| Course outcomes | On completion of this course, the students will be able to: CO | PSO addressed | Cognitive level |
|-----------------|---|---------------|-----------------|
| CO 1 | Relate to the structural organizations of algae, fungi, lichens and Bryophytes. | PSO -1 | K1(R) |
| CO2 | Demonstrate both the theoretical and practical knowledge in understanding the diversity of basic life forms and their importance. | PSO -1 | K2(U) |
| CO3 | Explain life cycle patterns in algae, fungi, lichens and Bryophytes. | PSO -2 | K3(Ap) |
| CO4 | Compare and contrast the mode of reproduction in diverse groups of basic plant forms. | PSO -2 | K4(An) |
| CO5 | Discuss and develop skills for effective conservation and utilization of lower plant forms. | PSO-4 | K5 & K6(Ev&Cr) |

Teaching plan

Total Contact hours: 90 (Including lectures, assignments and tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/ Evaluation |
|-----------|----------|--|----------------|-----------------|---|---------------------------------------|
| I | | | | | | |
| | 1 | General account of algology, Contributions of Indian Phycologist (T.V.Desikachary, V.Krishnamurthy and V.S. Sundaralingam), Classification of algae by F.E. Fritsch (1935-45) & Silva (1982). | 4 | K2(U) | Lecture using Chalk and talk ,Introductory session, Mind mapping, | Short essays, MCQ, Quiz |
| | 2 | Salient features of major classes: Cyanophyceae, Chlorophyceae, Xanthophyceae, Chrysophyceae, Cryptophyceae, Dinophyceae, Chloromonadineae, Euglenophyceae, Charophyceae, Bacillariophyceae, Phaeophyceae and Rhodophyceae.. | 4 | K2(U) | PPT, Lecture | Short summary |
| | 3 | Range of thallus organization, algae of diverse habitats, reproduction (vegetative, asexual and sexual) and life cycles | 4 | K1(R) | Review, Lecture | MCQ, Quiz, Short Essay, True or false |
| | 4 | Phylogeny and inter-relationships of algae, origin and evolution of sex in algae. | 4 | K3(Ap) | Demonstration, PPT, Review | Discussion, Debating or Presentations |
| | 5 | Structure, reproduction and life histories of the following genera: <i>Oscillatoria</i> , <i>Scytonema</i> , <i>Ulva</i> , <i>Codium</i> , <i>Diatoms</i> , <i>Dictyota</i> and <i>Gelidium</i> . | 4 | K4(An) | Group discussion | Essay |
| II | 1 | FUNGI: General Characteristics, occurrence and distribution. Mode of | 4 | K1(U) | Lecture using videos, Group discussion | Definitions, MCQ, Assignment |

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|------------|----|--|---|--------|---|---|
| | | nutrition in fungi. Contributions of Indian Mycologists (C.V.Subramanian), | | | | |
| | 2 | Classification of Fungi by Alexopoulos and Mims (1979) & Recent trends in the classification of fungi - Phylogeny and inter-relationships of major groups of fungi. | 4 | K2(R) | Lecture using videos, | Essay, Discriminating the concepts |
| | 3 | General characters of major classes: Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina. | 4 | K3(An) | Lecture using Chalk and talk | Explain, |
| | 4 | Heterothallism in fungi, sexuality in fungi, Para sexuality, sex hormones in fungi. | 4 | K3(Ap) | Group discussion | Concept with examples, short essay, Seminar |
| | 5 | Structure, reproduction and life histories of the following genera: <i>Plasmodiophora</i> , <i>Phytophthora</i> , <i>Rhizopus</i> , <i>Taphrina</i> , <i>Polyporus</i> and <i>Colletotrichum</i> | 4 | K4(An) | Group discussion | Seminar, |
| III | 1 | LICHENS Introduction and Classification (Hale, 1969). | 4 | K1 (U) | Lecture using Chalk and talk ,Introductory session, | MCQ, Concepts, short essay |
| | 2. | Occurrence and inter-relationship of phycobionts and mycobionts, | 4 | K2(R) | Lecture using Chalk and talk Method | MCQ, Quiz |
| | 3. | Structure and reproduction in Ascolichens, Basiodi lichens and Deuterolichens.. | 4 | K4(An) | Group discussion | Diagrammatic representation, Essays |

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| | 4. | Structure and reproduction in Basiodi lichens | 4 | K4(An) | Lecture using Chalk and talk method | Differentiating the characters, short essays |
| | 5. | Structure and reproduction in Deuterolichens.. | 4 | K4(An) | Group discussion | Summarize, Essays, |
| IV | 1 | BRYOPHYTES: General characters and Classification of Bryophytes by Watson (1971). | 4 | K1(U) | Lecture using Chalk and talk ,Introductory session, | MCQ, Quiz,Group discussion, |
| | 2. | Distribution, Structural variations and evolution of gametophytes and sporophytes in Bryopsida, Anthocero psida and Mosses. | 4 | K4(An) | Lecture using Chalk and talk ,Introductory session, | MCQ, Quiz,Group discussion, |
| | 3. | General characters of major groups - Marchantiales, Jungermaniales, Anthocerotales, Sphagnales, Funariales and Polytrichales. | 5 | K2(R) | Group discussion | Differentiating the characters, short essays |
| | 4. | Reproduction - Vegetative and sexual, spore dispersal mechanisms in bryophytes, spore germination patterns in bryophytes. | 4 | K3(Ap) | Review | Summarize, Essays, diagrammatic representations |
| | 5. | Structure, reproduction and life histories of the following genera: <i>Targionia</i> , <i>Porella</i> and <i>Polytrichum</i> . | 5 | K4(An) | Lecture using PPT Videos | Essays, |
| V | 1 | ECONOMIC IMPORTANCE | 5 | K3(Ap) | Group Discussion, | Short essays, MCQ, Quiz, True or false, Assignments |

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| | | Algae - Economic importance in Food and feed - Single cell protein, | | | | |
| 2. | | Industrial products (Agar-Agar, Carrageenan, Alginic acid, Iodine, biofertilizers, Vitamins and biofuel), Medicinal value and Diatomaceous earth. | 5 | K4(Ap) | Group Discussion | Short essays, MCQ, quiz |
| 3. | | Fungi – Economic importance in food, industries and medicine. Culturing and cultivation of mushrooms <i>Pleurotus</i> . | 5 | K4(Ap) | Group Discussion | Short essays, MCQ, quiz |
| 4. | | Lichen –economic importance and as indicator pollution. | 4 | K5(Ev) | Group Discussion, | Summarize, Slip test |
| 5. | | Bryophytes – Ecological and economic importance – industry, horticulture and medicine. | 4 | K5(Ev) | Group Discussion, | Summarize, Slip test |

Course Focussing on Employability/ Entrepreneurship/ Skill Development : **Skill Development**

Activities (Em/ En/SD): **Algae visit**

Course Focussing on Cross Cutting Issues (Professional Ethics/ Human Values/Environment Sustainability/ Gender Equity): **Environment Sustainability**

Activities related to Cross Cutting Issues : -

Assignment : **Mode of nutrition in fungi./ online**

Seminar Topic: **Heterothallism in fungi.**

Sample questions

Part A

1. Who is the father of Algology?
2. Which of the following fungi division includes ‘Club fungi’?
 - a. Zygomycotina
 - b. Deuteromycotina
 - b. Basidiomycotina
 - d. Ascomycotina
3. What is dolipore septum?
4. What is the algal component of Lichen?
5. Cite the lichen used as food.

Part B

1. Write short note on the thallus organisation of Algae.
2. List out the general characters of Fungi .
3. Categorize lichen based on habitat.
4. Explain the morphological and anatomical structures of *Marchantia*.
5. Criticize the economic importance of Bryophytes

Part C

1. Classify Algae based on Fritsch.
2. Summarize Parasexuality in Fungi with neat labelled sketches.
3. Discuss the structure and reproduction in Lichen.
4. Explain the evolution of sporophytes in Bryophytes
5. Critique on the economic importance of Algae.

Head of the Department

Dr. A. Anami Augustus Arul

Course Instructor

Dr. J. Celin Pappa Rani

Teaching Plan

Department : Botany

Class : I M.Sc. Botany

**Title of the Course : PLANT DIVERSITY – II:
PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY**

Semester : I

CourseCode : BP231CC2

| CourseCode | L | T | P | Credits | Inst.Hours | Total Hours | Marks | | |
|------------|---|---|---|---------|------------|-------------|-------|----------|-------|
| | | | | | | | CIA | External | Total |
| BP231CC2 | 5 | 2 | - | 5 | 7 | 105 | 25 | 75 | 100 |

Objectives

1. To investigate the classification, distinctive traits, distribution and reproduction and life history of the various classes and major types of Pteridophytes and Gymnosperms.
2. To identify and characterize diversity of lower vascular plants in order to comprehend the dynamics of diversity to realize the importance of diversity.

Course Outcomes

| CO | Upon completion of this course, the students will be able to: | PSO Addressed | Cognitive level |
|-------|--|---------------|-----------------|
| CO- 1 | Recall on classification, recent trends in phylogenetic relationship, General characters of Pteridophytes and Gymnosperms. | PSO-1 | K1 & K3 |

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| CO- 2 | Learn the morphological/anatomical organization, life history of major types of Pteridophytes and Gymnosperms. | PSO-2 | K3 & K4 |
| CO- 3 | Comprehend the economic importance of Pteridophytes, Gymnosperms, and fossils. | PSO-3 | K3 & K5 |
| CO- 4 | Understanding the evolutionary relationship of Pteridophytes and Gymnosperms. | PSO-3 | K2 |
| CO- 5 | Awareness on fossil types, fossilization and fossil records of Pteridophytes and Gymnosperms. | PSO-3 | K1 & K3 |

Teaching plan

Total Contact Hours:90 (Including Lectures, Assignments and Tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/ Evaluation |
|------|--------|--|----------------|-----------------|--|--|
| I | | | | | | |
| | 1. | General characteristics and classification (Reimer, 1954).Stellar evolution. | 4 | K2(U) | Lecture using Chalkandtalk Demonstration | Evaluation through short test, MCQ, True/False, Short essays, Concept explanations, Shortsummary or overview |
| | 2. | Range of structure, reproduction and evolution of the gametophytes | 4 | K1(R) | Introductory session, Group Discussion, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Gametophyte types – sex organs. Apogamy and Apospory. Life cycles. | 4 | K3(Ap) | Mind mapping, | Suggest idea/concept with examples |
| | 4. | Heterospory and seed habit, Telome theory. | 4 | K4(An) | Lecture using videos | Finish a procedure in many steps, Differentiate betweenvarious ideas,Map knowledge |
| | 5. | Morphogenesis, Economic importance of Pteridophytes. | 4 | K5(E) | PPT | Longer essay/ Evaluation essay |

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| II | | | | | | |
| | 1. | Structure, anatomy, reproduction and life histories of <i>Isoetes</i> | 4 | K2(U) | Lecture using Chalk and talk Demonstration | Evaluation through short test, MCQ Shortsummary |
| | 2. | Structure, anatomy, reproduction and life histories of <i>Equisetum</i> | 4 | K1(R) | Introductory session, Group Discussion, | Simple definitions, MCQ, Concept definitions |
| | 3. | Structure, anatomy, reproduction and life histories of <i>Angiopteris</i> | 4 | K3(Ap) | Mind mapping, | Suggest idea/concept with examples |
| | 4. | Structure, anatomy, reproduction and life histories of <i>Osmunda</i> | 4 | K4(An) | Lecture using videos | Finish a procedure in many steps, Differentiate between various ideas, Map knowledge |
| | 5. | Structure, anatomy, reproduction and life histories of <i>Pteris</i> and <i>Azolla</i> . | 4 | K5(E) | PPT | Longer essay/ Evaluation essay |
| III | | | | | | |
| | 1. | General characters - A general account of distribution of Gymnosperms. | 4 | K2(U) | Lecture using Chalk and talk Demonstration | Evaluation through short test |
| | 2. | Morphology, anatomy of Gymnosperms. (K.R.Sporne, 1965). | 4 | K1(R) | Introductory session, Group Discussion, | Simple definitions, Concept definitions |
| | 3. | Reproduction, phylogeny of Gymnosperms. | 4 | K3(Ap) | Mind mapping, | Suggest idea/concept with examples |
| | 4. | Classification of Gymnosperms. (K.R.Sporne, 1965). | 4 | K4(An) | Lecture using videos | Differentiate between various ideas, Map knowledge |
| | 5. | Economic importance of Gymnosperms. | 4 | K5(E) | PPT | Longer essay/ Evaluation essay |
| IV | | | | | | |
| | 1. | Structure (Exomorphic and endomorphic), anatomy, reproduction and life histories of <i>Thuja</i> | 4 | K2(U) | Lecture using Chalk and talk Demonstration | Evaluation through short test, MCQ, True/False, Short essays, |

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| | | | | | | Concept explanations, Shortsummary or overview |
| | 2. | Structure (Exomorphic and endomorphic), anatomy, reproduction and life histories of <i>Cupressus</i> | 4 | K1(R) | Introductory session, Group Discussion, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Structure (Exomorphic and endomorphic), anatomy, reproduction and life histories of <i>Araucaria</i> | 4 | K3(Ap) | Mind mapping, | Suggest idea/concept with examples |
| | 4. | Structure (Exomorphic and endomorphic), anatomy, reproduction and life histories of <i>Podocarpus</i> | 4 | K4(An) | Lecture using videos | Finish a procedure in many steps, Differentiate between various ideas, Map knowledge |
| | 5. | Structure (Exomorphic and endomorphic), anatomy, reproduction and life histories of <i>Gnetum</i> | 4 | K5(E) | PPT | Longer essay/ Evaluation essay |
| | 6. | Structure (Exomorphic and endomorphic), anatomy, reproduction and life histories of the following genera: <i>Ephedra</i> . | 4 | K5(E) | PPT | Evaluation essay |
| V | | | | | | |
| | 1. | PALEOBOTANY: Geological Scale; Radiocarbon dating; Fossilization and fossil types. | 4 | K2(U) | Lecture using Chalk and talk Demonstration | Evaluation through short test, MCQ, True/False, Short essays, Concept explanations, Shortsummary or overview |
| | 2. | Contribution of Birbal Sahni to Paleobotany, Gondwana flora of India. | 3 | K1(R) | Introductory session, Group Discussion, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Study of fossils in understanding evolution, Economic importance of fossils. fossil fuels and industrial raw materials and uses | 5 | K3(Ap) | Lecture and Chalk method | Suggest idea/concept with examples |

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| 4. | Study of organ genera: <i>Rhynia, Lepidocarpon</i> | 3 | K4(An) | Lecture using videos | Differentiate between various ideas, Map knowledge |
| 5. | Study of organ genera: <i>Calamites, Cordaites</i> | 3 | K5(E) | Lecture and PPT | Longer essay/ Evaluation essay |
| 6. | Study of organ genera: <i>Lyginopteris</i> . | 3 | K5(E) | Lecture and PPT | Longer essay/ Evaluation essay |

Course Focussing on Employability/Entrepreneurship/Skill Development: Activities (Em/En/SD): **Skill Development**

Course Focussing on Cross Cutting Issues (Professional Ethics/Human Values/Environment Sustainability/Gender Equity): **Environment Sustainability**

Activities related to Cross Cutting Issues: **Field Visit**

Assignment: **Economic importance of Pteridophytes**

Seminar Topic: **Study of fossils in understanding evolution, Economic importance of fossils.**

Part-A

- Spores of Pteridophytes are
 - Haploid
 - Diploid
 - Triploid
 - Tetraploid
- In Pteridophytes, the dominant generation is
 - Gametophytic
 - haploid
 - diploid
 - triploid
- Reduction division in pteridophytes occurs in
 - Prothallus is formed
 - Gametes are formed
 - spores are formed
 - sex organs are formed
- In pteridophytes, the gametophyte is dominant, while sporophyte is a dependent generation-**State True or False.**
- The phloem of pteridophytes does not possess _____ cells.

Part-B

- Describe the structure and reproduction in Coniferales
- Write an essay on evolution of Gymnosperms
- Discuss the variation in the structure of female gametophyte in Gymnosperms
- Write short notes on Cordaitales
- Comment on Lyginopteris

Part-C

- Write a classification of Bryophytes in detail.
- Explain the life history of Riccia in detail.
- Write a detail account on "Telome theory".
- Explain the lifecycle of Isoetes.
- Give a detail account on lifecycle of Marsilea.

Head of the Department

Course Instructor

Dr. A. Anami Augustus Arul

Dr. w. Vincy

Teaching Plan

Department : Botany
Class : I M.Sc Botany
Title of the Course : Elective I MICROBIOLOGY, IMMUNOLOGY AND PLANT PATHOLOGY
I Semester : I
CourseCode : BP23GE1

| CourseCode | L | T | P | Credits | Inst.Hours | Total Hours | Marks | | |
|------------|---|---|---|---------|------------|-------------|-------|----------|-------|
| | | | | | | | CIA | External | Total |
| BP23GE1 | 4 | 1 | - | 3 | 5 | 75 | 25 | 75 | 100 |

Objectives

1. To provide comprehensive knowledge about microbes and its effect on man and environment.
2. To provide comparative analysis of major groups of microbes.
3. To study the principles of immune system, immunizing agents like antibodies and vaccines and gene therapy methods.

Course Outcomes

| CO | Upon completion of this course, the students will be able to: | PSO Addressed | Cognitive level |
|-------|--|---------------|-----------------|
| CO- 1 | Recognize the general characteristics of microbes, plant defense and immune cells. | PSO-1 | K1 (K) |
| CO- 2 | Explain about the stages in disease development and various defense mechanisms in plants and humans. | PSO-2 | K2 (U) |
| CO- 3 | Elucidate concepts of microbial interactions with plant and humans | PSO-3 | K3 (AP) |
| CO- 4 | Analyze the importance of harmful and beneficial microbes and immune system | PSO-3 | K4 (AN) |
| CO- 5 | Determine and interpret the detection of pathogens and appreciate their adaptive strategies. | PSO-3 | K5 & K6(C & E) |

Teaching plan

Total Contact Hours : 75 (Including Lectures, Assignments and Tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/ Evaluation |
|------|--------|---|----------------|-----------------|---|--|
| I | | | | | | |
| | 1. | Types of microorganisms. General characteristic of bacteria – Outline classification of Bergey’s manual of 9th edition. | 2 | K2(U) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False, |
| | 2. | Classification of bacteria based on Morphological, cultural, physiological and molecular characteristics. | 2 | K 3(Ap) | PPT | Simple definitions, Concept definitions |
| | 3. | Bacterial growth – batch culture and continuous culture. Growth Curve. Factors affecting growth | 2 | K1(K) | Introductory session, Group Discussion | Suggest idea/concept with examples, |
| | 4. | Determination of bacterial growth – Direct method: Haemocytometer, Viable plate count; Indirect method: Turbidity. Nutritional types. | 3 | K4(An) | Group Discussion, Mind mapping | Differentiate between various ideas, Map knowledge |
| | 5. | Reproduction - Fission and sporulation. Genetic recombination- Transformation, Transduction and Conjugation | 3 | K5(E) | Demonstration, PPT | Longer essay/ Evaluation essay |
| | 6. | Isolation and cultivation of bacteria. | 3 | K2(U) | Lecture using Chalk and talk | MCQ, True/False |

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| | | Maintenance of bacterial culture. | | | | |
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| II | | | | | | |
|-------------------|----|---|---|---------|---|--|
| | 1. | General characters, Classification, Structure, Multiplication of virus | 3 | K2(U) | Lecture using Chalk and talk ,Introductory session, | Concept explanations, Short summary or overview |
| | 2. | Overview of Phycoviruses and Mycoviruses. Viruses of Eukaryotes – Animal & Plant viruses. | 3 | K 3(Ap) | Mind mapping, Peer tutoring, PPT, Review | Evaluation through short test, MCQ, True/False, |
| | 3. | Cultivation of viruses – in embryonated egg and in plants. Control of viral infections. | 3 | K1(K) | Lecture using videos,Demonstration, | Suggest idea/concept with examples, |
| | 4. | Bacteriophages-classification, replication of DNA and RNA phages -Lytic and Lysogenic cycle. | 3 | K4(An) | Mind mapping, Peer tutoring, | Differentiate between various ideas, |
| | 5. | Viroids and prions. Mycoplasma: Structure and classification. | 3 | K5(E) | Lecture using Chalk and talk PPT, | Map knowledge |
| III | | | | | | |
| Food Microbiology | | | | | | |
| | 1. | Beneficial role of microbes – yoghurt, Olives, Cheese, Bread, Wine, Tempeh, Miso & Fermented green tea. | 3 | K 3(Ap) | Peer tutoring, Lecture using videos, Demonstration, | Evaluation through short test, MCQ, True/False, |
| | 2. | Spoilage of fruits, vegetables, meats, poultry, eggs, bakery products, dairy products and canned foods. | 3 | K1(K) | Lecture using Chalk and talk ,Introductory session, | Simple definitions, Concept definitions |
| | 3. | Microbial toxins - Exotoxin, Endotoxin & Mycotoxin. Action of Enterotoxin, Cytotoxin& Neurotoxin. Food Preservation – temperature, drying, radiation and chemicals. | 3 | K4(An) | Demonstration, PPT, Review | Suggest idea/concept with examples, |
| | 4. | Soil Microbiology: Importance of Microbial flora of soil and factors affecting the microbial community in soil. Interaction among soil microbes (positive and | 2 | K5(E) | Lecture using Chalk and talk ,Introductory session, | Differentiate between various ideas, Map knowledge |

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| | | negative interactions) & with higher plants (rhizosphere & phyllosphere). | | | | |
| | 5. | Environmental Microbiology: Microbiology of water and air. Water borne diseases - diphtheria, chicken pox. | 2 | K2(U) | Peer tutoring, Lecture using videos, Demonstration, | Longer essay/ Evaluation essay |
| | 6. | Air borne diseases - Swine flu and Measles . Microbial degradation of chemical pesticides and hydrocarbon. | 2 | K 3(Ap) | Demonstration, PPT, Review | Simple definitions, Concept definitions |
| IV | Immunology | | | | | |
| | 1. | Introduction; Immune System; Types of Immunity - Innate and Acquired. Immune Cells - Hematopoiesis, B and T lymphocytes - Maturation, NK cells | 3 | K4(An) | Lecture using Chalk and talk , Demonstration, | Concept explanations, Short summary or overview |
| | 2. | Introduction to inflammation, Adaptive immune system, Innate Immune system. Antigen: Definition, Properties and types. Antibody – Structure, types and function. | 3 | K5(E) | Demonstration, PPT, Review | Evaluation through short test, MCQ, True/False, |
| | 3. | Generation of antibody diversity. Antigen - Antibody interactions: definition, types- Precipitation, Agglutination, Complement fixation. | 3 | K2(U) | PPT, Review | Suggest idea/concept with examples, |
| | 4. | Immune Response – Humoral and Cell Mediated. Vaccines – history, types and recombinant vaccines | 2 | K 3(Ap) | Lecture using Chalk and talk , Introductory session, | Differentiate between various ideas, |
| | 5. | Immunodiagnosis – Blood Grouping, Widal test, Enzyme-Linked Immunosorbent Assay (ELISA). | 2 | K1(K) | Mind mapping, Peer tutoring, | Map knowledge |
| | 6. | Immunoelectrophoresis and Immunodiffusion. | 2 | K4(An) | Mind mapping, Peer tutoring, Lecture using videos. | Concept explanations, Short summary or overview |

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| V | Plant Pathology | | | | | |
| | 1. | History and significance of plant pathology. Classification of plant diseases, Symptomology (important symptoms of plant pathogens). | 2 | K2(U) | Mind mapping, Peer tutoring, PPT, Review | Evaluation through short test, MCQ, True/False, |
| | 2. | Causal agents of plant diseases - biotic causes (fungi, bacteria virus, mycoplasma, nematodes, parasitic algae | 2 | K 3(Ap) | Lecture using videos, Demonstration, | Evaluation through short test, MCQ, True/False, |
| | 3. | Angiospermic parasites - Abiotic causes (Physiological, deficiency of nutrients & minerals and pollution). Mechanism of penetration- Disease development of pathogen (colonization) and dissemination of pathogens. | 3 | K1(K) | Mind mapping, Peer tutoring, | Suggest idea/concept with examples, |
| | 4. | Role of enzymes and toxins in disease development. Important diseases of crop plants in India - Sheath blight of rice, Late blight of potato, Little leaf of Brinjal and Red rust of tea | 3 | K4(An) | PPT, Review | Differentiate between various ideas, |
| | 5. | Principles of disease management – Cultural practices, physical, chemical and biological methods, disease controlled by immunization | 3 | K4(An) | PPT, Review | Map knowledge |
| | 6. | Biocontrol - merits and demerits; Diagnostic technique to detect pest/pathogen infection - Immunofluorescence (IF). | 2 | K5(E) | Lecture using videos, Demonstration, | Evaluation through short test, MCQ, True/False, |

Course Focussing on Cross Cutting Issues (Professional Ethics/Human Values/Environment Sustainability/ Gender Equity): **Environment Sustainability**

Activities related to Cross Cutting Issues: Industrial Visit – **Milk Plant, Microbiology Lab**

Assignment: **Classification, Structure, Multiplication of virus - Online**

Genetic recombination- **Transformation, Transduction and Conjugation**

Seminar Topic: **Spoilage of fruits, vegetables, meats, poultry, eggs, bakery products, dairy products and canned foods.**

Sample questions

Part A

1. Which of the following immunity is obtained during a lifetime?
 - a. Acquired immunity
 - b. Active immunity
 - c. Passive immunity
 - d. None of the above.
2. Which of these bacterial components is least likely to contain useful antigens?
 - a. Cell wall
 - b. Flagella
 - c. Ribosomes
 - d. Capsule
3. Which of the following contains structures composed of N-acetylmuramic acid and N-acetylglucosamine?
 - a. Mycoplasmas
 - b. Amoeba
 - c. E. coli
 - d. Spheroplast
4. The association of endotoxin in gram-negative bacteria is due to the presence of
 - a. Steroids
 - b. Peptidoglycan
 - c. Lipopolysaccharides
 - d. Polypeptide
5. Which of the following is a gram-positive eubacterium?
 - a. *Actinomyces*
 - b. *Clostridium*
 - c. *Rhizobium*
 - d. *Clostridium, Actinomycetes*

Part B

1. Determine the bacterial count methods
2. Discuss virioids
3. Define the spoilage of microbes in fruits.
4. Differentiate Acquired Immunity & Innate Immunity.
5. Recall Citrus Canker.

Part C

1. Explain the Bacterial growth culture and its methods.
2. Formulate the nomenclature and classification of virus.
3. Criticize the beneficial role of microbes with a relevant example.
4. Analyze, how cytokines act as signalling molecules to mediate and regulate immunity?
5. Recall Late Blight of Potato with respect to its casual organism, disease cycle, symptoms and control measures.

Head of the Department

Dr. A. Anami Augustus Arul

Course Instructor

Dr. S. Kala Veda Kumari

Teaching Plan

Department : **Botany**
Class : **I M.Sc Botany**
Title of the Course : **Elective I ETHNOBOTANY, NATUROPATHY AND TRADITIONAL HEALTH CARE**
I Semester : **I**
CourseCode : **BP23GE12**

| CourseCode | L | T | P | Credits | Inst.Hours | Total Hours | Marks | | |
|------------|---|---|---|---------|------------|-------------|-------|----------|-------|
| | | | | | | | CIA | External | Total |
| BP23GE1 | 4 | 1 | - | 3 | 5 | 75 | 25 | 75 | 100 |

Objectives

1. Understand the concept of ethnobotany and the life style and traditional practices of plants by Indian tribals.
2. Emphasize the importance of non-timber forest products for Indian tribal people livelihoods.

Course Outcomes

| CO | Upon completion of this course, the students will be able to: | PSO Addressed | Cognitive level |
|-------|---|---------------|-----------------|
| CO- 1 | Recall or remember concept of ethnobotany. | PSO-1 | K1 |
| CO- 2 | Understand the life style and traditional practices of plants by Indian tribals. | PSO-2 | K2 & K6 |
| CO- 3 | Highlight the role of Non-Timber Forest products for livelihood of tribal people of India | PSO-3 | K3 |
| CO- 4 | Assess the methods to transform ethnobotanical knowledge into value added products. | PSO-3 | K4 |
| CO- 5 | Build idea to make digitization of ethnobotanical knowledge. | PSO-3 | K5 |

Teaching plan

Total Contact Hours : 75 (Including Lectures, Assignments and Tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/ Evaluation |
|------|--------|---|----------------|-----------------|------------------------------|---|
| I | | | | | | |
| | 1. | Concept, important landmarks in the development, scope, sub disciplines of ethno botany.: | 4 | K2(U) | Lecture using Chalk and talk | Evaluation through short test, MCQ, |
| | 2. | Interdisciplinary approaches. Knowledge of following sociological and anthropological terms | 4 | K1(R) | Lecture using videos | Simple definitions, MCQ, |
| | 3. | culture, values and norms, institutions, culture diffusion and ethnocentrism. | 4 | K3(Ap) | Demonstration, PPT, Review | short test |
| | 4. | History of ethnobotany: A brief history of ethno botanical studies in the world and in India. | 3 | K4(An) | Demonstration, PPT, Review | Differentiate betweenvarious ideas, Map knowledge |

| | | | | | | |
|-----|----|--|---|---------|---|--|
| II | | | | | | |
| | 1. | Distribution of tribes in India. | 3 | K2(U) | Mind mapping, Peer tutoring | Simple definitions, |
| | 2. | . Basic knowledge of following tribes of Tamil Nadu: Irulas, Kanis, | 4 | K 3(Ap) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False |
| | 3. | PaliyarsBadagas, Kurumbres, | 4 | K1(K) | PPT | Simple definitions, |
| | 4. | Thodas and Malayalis. Plants used by tribals of Tamil Nadu. | 4 | K4(An) | Introductory session, Group Discussion | Evaluation through short test, MCQ, True/False, |
| III | | | | | | |
| | 1. | Primary - archeological sources and inventories, Secondary - travelogues, folklore and literary sources. | 3 | K2(U) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False, |
| | 2. | Herbaria, medicinal texts and official records. Methods in ethnobotanical research | 3 | K 3(Ap) | PPT | Simple definitions, Concept definitions |
| | 3. | Prior Informed Consent, PRA techniques, interviews and questionnaire methods, choice of resource persons | 3 | K1(K) | Introductory session, Group Discussion | Suggest idea/concept with examples, |
| | 4. | Folk taxonomy – plants associated with culture and socio- religious activities | 3 | K4(An) | Group Discussion, Mind mapping | Differentiate between various ideas, Map knowledge |
| | 5. | Non – timber forest products (NTFP) and livelihood – Sustainable harvest and value addition. | 3 | K5(E) | Demonstration, PPT | Longer essay/ Evaluation essay |
| IV | | | | | | |
| | 1. | Role of plants in naturopathy- Importance and relevance of medicinal drugs in India. | 3 | K2(U) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False, |

| | | | | | | |
|---|----|--|---|---------|---|--|
| | 2. | Indian Systems of Medicine (Ayurveda, Siddha, Allopathy, Homeopathy, Unani, Tibetan, Yoga and Naturopathy) | 3 | K 3(Ap) | PPT | Simple definitions, Concept definitions |
| | 3. | Disease diagnosis, treatment, and cure using natural therapies including dietetics, botanical medicine, homeopathy, fasting, exercise, lifestyle counseling, detoxification, and chelation | 3 | K1(K) | Introductory session, Group Discussion | Suggest idea/concept with examples, |
| | 4. | clinical nutrition, hydrotherapy, naturopathic manipulation, spiritual healing, environmental assessment, | 2 | K2(U) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False, |
| | 5. | Health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies. | 2 | K 3(Ap) | PPT | Simple definitions, Concept definitions |
| | 6. | manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain | 2 | K1(K) | Introductory session, Group Discussion | Suggest idea/concept with examples, |
| V | | | | | | |
| | 1. | Bioprospecting of drug molecules derived from Indian traditional plants. | 3 | K2(U) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False, |
| | 2. | Methods for bioprospecting of natural resources | 4 | K 3(Ap) | PPT | Simple definitions, Concept definitions |
| | 3. | From folk Taxonomy to species confirmation - evidences based on phylogenetic and metabolomic analyses | 4 | K1(K) | Introductory session, Group Discussion | Suggest idea/concept with examples, |
| | 4. | Ethno botanical databases and Traditional knowledge Digital Library (TKDL). | 4 | K4(An) | Group Discussion, Mind mapping | Differentiate between various ideas, Map knowledge |

Course Focussing on Employability/Entrepreneurship/Skill Development:(Mention) Activities (Em/En/SD): **Entrepreneurship**

Course Focussing on Cross Cutting Issues(ProfessionalEthics/HumanValues/Environment Sustainability/Gender Equity): **Environment Sustainability**

Activities related to Cross Cutting Issues: **Collection of Medicinal herbs from Tribal Areas**

Assignment: **Herbaria, medicinal texts and official records. Methods in ethnobotanical research**

Seminar Topic: **Bioprospecting of drug molecules derived from Indian traditional plants**

Sample questions

Part A

1. The word "ethno" in ethnobotany refers to ?
a. region- locality- people b. culture c. civilization d. all of above
2. The concept and idea of greeks that walnut could be used to heal ailments of the human brain is known as?
a. doctrine of signatures b. doctrine of homeopathy c. doctrine of Allelopathy d. None of these
3. The cereals belong to the family?
a. Fabaceae b. Poaceae c. Solanaceae d. Rosaceae
4. The search for previously unknown compounds in organisms that have been never used in traditional medicines is
a. Molecular farming b. Bioremediation c. Biopiracy d. Bioprospecting
5. The Siddha science is a traditional treatment system generated from _____ culture.
a. Indian b. Tamil c. Kerala d. Maharastra

Part B

1. Write the botanical name, family, important plant part and traditional uses of 'Ashwagandha'.
2. Differentiate between Ethnobotany and Economic botany.
3. Explain the ethnomedicinal uses of *Janakia arayalpatra*.
4. Differentiate Ayurvedic pharmacopoeia from pharmacology.
5. Explain the importance of phyto-pharmacological screening in herbal drug development.

Part C

1. Analyze the history of ethnobotany.
2. Discuss about the tribes of Tamilnadu.
3. Evaluate the importance of folk taxonomy.
4. List out the traditional healthcare practices.
5. Summarize hydrotherapy.
6. Criticize bioprospecting techniques and its importance.

Head of the Department

Dr. A. Anami Augustus Arul

Course Instructor

Dr. S. Kala Veda Kumari

Teaching Plan

Department : **Botany**
Class : **II M.Sc., Botany**
Title of the Course : **Taxonomy of Angiosperms**
Semester : **III**
Course Code : **PB2031**

| CourseCode | L | T | P | Credits | Inst. Hours | Total Hours | Marks | | |
|------------|---|---|---|---------|-------------|-------------|-------|----------|-------|
| | | | | | | | CIA | External | Total |
| PB2031 | 4 | 2 | - | 5 | 6 | 60 | 25 | 75 | 100 |

Objectives

1. To be familiar in identifying the botanical name of plants.
2. To enable the students to get knowledge of modern trends in taxonomy of Angiosperms.

Course Outcomes

| CO | Upon completion of this course, the students will be able to: | PSOAddressed | Cognitive level |
|-------|---|--------------|-----------------|
| CO- 1 | differentiate between natural and artificial system of classification | PSO-1 | U |
| CO- 2 | apply sketches to identify the flora | PSO-2 | Ap |
| CO- 3 | collect and prepare herbaria for future use | PSO-3 | C |
| CO- 4 | record the rules and regulations framed by ICBN | PSO-3 | R |
| CO- 5 | interpreting biological knowledge in comparing and ranking plants | PSO-3 | An |
| CO -6 | evaluation of plants by using dichotomous keys | PSO -3 | E |

Teaching plan

Total Contact Hours:60 (Including Lectures, Assignments and Tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/ Evaluation |
|------|--------|---|----------------|-----------------|---------------------------------|---|
| I | | | | | | |
| | 1. | Aim and scope of plant taxonomy – Taxonomic Tools | 3 | K2(U) | Lecture using Chalk and talk | Evaluation through short test, MCQ, True/False, Short essays, Concept explanations, Short summary or overview |
| | 2. | Taxonomic literatures – floras, revisions, manuals, monographs and check lists | 3 | K1(R) | Introductory session, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Identification and preparation of intended keys and bracketed keys | 3 | K3(Ap) | Group Discussion, Mind mapping, | Suggest idea/concept with examples, Suggest formulae, Solve problems, Explain |
| | 4. | Herbarium techniques – Types and functions of herbarium; Digital Herbarium | 3 | K4(An) | Lecture using videos | Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge |
| | 5. | Systems of angiosperm classification; Linnaeus, Bentham and Hooker and Engler and Prantle | 3 | K5(E) | PPT | Longer essay/ Evaluation essay, Critique or justify with pros and cons |
| | 6. | APG Classification. Merits | 3 | K6(C) | PPT | Check knowledge in |

| | | | | | | |
|-----|----|---|---|---------|---------------------------------|--|
| | | and demerits of these classifications. | | | | |
| II | | | | | | |
| | 1. | Botanical nomenclature – ICN, Principles and Role of ICN, Rules – principle of priority | 4 | K2(U) | Lecture using Chalk and talk | Evaluation through short test, MCQ, True/False, Short essays |
| | 2. | Rejection of names, limitations in the principle of priority, typification, author citation, effective and valid publications | 3 | K1(R) | Introductory session, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Taxonomical Evidences - Numerical taxonomy, chemotaxonomy | 3 | K3 (Ap) | Group Discussion, Mind mapping, | Simple definitions |
| | 4. | Cytotaxonomy and phytotaxonomy | 4 | K4(An) | Lecture using videos | Differentiate between various ideas |
| | 5. | Molecular tools used in Taxonomy. | 3 | K5(E) | PPT | Longer essay/ Evaluation essay |
| III | | | | | | |
| | 1. | Systematic position, diagnostic features, distribution, description and economic importance of Capparidaceae | 4 | K2(U) | Lecture using Chalk and talk | Evaluation through short test, MCQ, True/False, Short essays |
| | 2. | Systematic position, diagnostic features, distribution, description and economic importance of Polygalaceae | 3 | K1(R) | Introductory session | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Systematic position, diagnostic features, distribution, description and economic importance of Caryophyllaceae | 3 | K3 (Ap) | Group Discussion, Mind mapping, | Simple definitions |

| | | | | | | |
|----|----|--|---|---------|---------------------------------|--|
| | 4. | Systematic position, diagnostic features, distribution, description and economic importance of Tiliaceae | 3 | K4(An) | Lecture using videos | Differentiate between various ideas |
| | 5. | Systematic position, diagnostic features, distribution, description and economic importance of Zygothryaceae. | 4 | K5(E) | PPT | Longer essay/ Evaluation essay |
| IV | | | | | | |
| | 1. | Systematic position, diagnostic features, distribution, description and economic importance of Rhamnaceae, Sapindaceae | 3 | K2(U) | Lecture using Chalk and talk | Evaluation through short test, MCQ, True/False, Short essays |
| | 2. | Systematic position, diagnostic features, distribution, description and economic importance of Passifloraceae | 3 | K1(R) | Introductory session, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Systematic position, diagnostic features, distribution, description and economic importance of Sapotaceae | 3 | K3 (Ap) | Group Discussion, Mind mapping, | Simple definitions |
| | 4. | Systematic position, diagnostic features, distribution, description and economic importance of Oleaceae, Boraginaceae | 3 | K4(An) | Lecture using videos | Differentiate between two families |
| | 5. | Systematic position, diagnostic features, distribution, description and economic importance of Scrophulariaceae | 3 | K5(E) | PPT | Longer essay/ Evaluation essay |

| | | | | | | |
|---|----|--|---|---------|---------------------------------|--|
| | 6. | Systematic position, diagnostic features, distribution, description and economic importance of Bignoniaceae. | 3 | (K5) | PPT | Essay Writing |
| V | | | | | | |
| | 1. | Systematic position, diagnostic features, distribution, description and economic importance of Verbenaceae, | 3 | K2(U) | Lecture using Chalk and talk | Evaluation through short test, MCQ, True/False, Short essays |
| | 2. | Systematic position, diagnostic features, distribution, description and economic importance of Nyctaginaceae | 3 | K1(R) | Introductory session, | Simple definitions, MCQ, Recall steps, Concept definitions |
| | 3. | Systematic position, diagnostic features, distribution, description and economic importance of Aristalochiaceae, Casuarinaceae | 3 | K3 (Ap) | Group Discussion, Mind mapping, | Simple definitions |
| | 4. | Systematic position, diagnostic features, distribution, description and economic importance of Orchidaceae, Commelinaceae | 3 | K4(An) | Lecture using videos | Differentiate between various ideas |
| | 5. | Systematic position, diagnostic features, distribution, description and economic importance of Araceae, Cyperaceae | 3 | K5(E) | PPT | Longer essay/ Evaluation essay |

Course Focussing on Employability/Entrepreneurship/Skill Development:Activities (Em/ En/SD):
Skill Development

CourseFocussingonCrossCuttingIssues(ProfessionalEthics/HumanValues/Environment
Sustainability/ Gender Equity): Environment Sustainability

ActivitiesrelatedtoCrossCuttingIssues: Herbarium Collection – Field Visit

Assignment: Identification and preparation of intended keys and bracketed keys

Seminar Topic: Molecular tools used in Taxonomy.

SAMPLE QUESTION

PartA

1. _____is the system which is responsible for giving name to an organism.
2. **This system of classification was used by Linnaeus**
 - a. Phylogenetic system
 - b.Natural system
 - c. Artificial system
 - d. Asexual system
3. **The substitute for the newly collected specimen when the original type material is missing in a herbarium is entitled as**
 - a. Holotype
 - b.Neotype
 - c. Lectotype
 - d. Isotype
4. Expand ICN
5. Fruit in family Polygalaceae is _____.

PartB

1. List out the merits and demerits of APG System of classification.
2. Interpret the short notes on botanical nomenclature.
3. Use and the economic importance of Capparidaceae.
4. Evaluate the salient features of Sapindaceae
5. How pollination occurs in Orchidaceae?

PartC

1. Enumerate the Bentham & Hooker System of Classification and mentions its merits and demerits.
2. Explain the rules of ICN with relation to Taxonomy.
3. Evaluate the floral characters of Caryophyllaceae and mention its economic usages.
4. Illustrate the systematic position, description and economic importance of Boraginaceae.
5. Describe the characteristic features and economic importance of Verbenaceae.

Head of theDepartment

Dr. A. Anami Augustus Arul

CourseInstructor

Dr. W. Vincy

Teaching Plan

Department : Botany
Class : II M.Sc Botany
Title of the Course : Core Genetics & Molecular Biology
I Semester : I
CourseCode :

| CourseCode | L | T | P | Credits | Inst.Hours | Total Hours | Marks | | |
|------------|---|---|---|---------|------------|-------------|-------|----------|-------|
| | | | | | | | CIA | External | Total |
| | 4 | 2 | - | 5 | 6 | 75 | 25 | 75 | 100 |

Objectives

1. To understand the organization and regulation of genes.
2. To acquire advanced training with opportunities to get employability in genetics and molecular biology laboratories

Course Outcomes

| CO | Upon completion of this course, the students will be able to: | PSO Addressed | Cognitive level |
|-------|---|---------------|-----------------|
| CO- 1 | understand the organization of cell organelles and genes | PSO-1 | K1 (K) |
| CO- 2 | Differentiate between mitochondrial DNA and chloroplast DNA | PSO-2 | K2 (U) |
| CO- 3 | evaluate the dissociation and re-association kinetics of DNA | PSO-3 | K3 (AP) |
| CO- 4 | construct different types of plasmids and operons | PSO-3 | K4 (AN) |
| CO- 5 | Analyze Transcription and Translation of Prokaryotes and Eukaryotes | PSO-3 | K5 & K6 (C & E) |

Teaching plan

Total Contact Hours : 90 (Including Lectures, Assignments and Tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/ Evaluation |
|------|-----------------|--|----------------|-----------------|---|--|
| I | Genetics | | | | | |
| | 1. | Contribution of Gregor Johann Mendel, T.H. Morgan, Karl Landsteiner; Mendel's law of heredity – Monohybrid and Dihybrid cross | 2 | K2(U) | Lecture using Chalk and talk Mind mapping, | Evaluation through short test, MCQ, True/False, |
| | 2. | Gene interaction – Dominant epistasis (12: 3:1), Recessive epistasis (9:3:4), Duplicate recessive genes (9:7), Duplicate dominant genes (15:1) | 2 | K 3(Ap) | PPT | Simple definitions, Concept definitions |
| | 3. | Sex determination in plants - theories of sex determination; Sex linked characters (Seminar) | 2 | K1(K) | Introductory session, Group Discussion | Suggest idea/concept with examples, |
| | 4. | Linkage and crossing over, construction of chromosome map, and three point cross | 3 | K4(An) | Group Discussion, Mind mapping | Differentiate between various ideas, Map knowledge |

| II | | DNA AND GENETIC DISEASES | | | | |
|-----|----|--|---|---------|---|---|
| | 1. | Mutation – Types of mutation, Molecular mechanism of mutation DNA-types (A, B, C & Z), Watson and Crick model of DNA, viral DNA, bacterial DNA | 3 | K2(U) | Lecture using Chalk and talk, Introductory session, | Concept explanations, Short summary or overview |
| | 2. | Mitochondrial (Seminar) and Chloroplast DNA | 3 | K 3(Ap) | Mind mapping, Peer tutoring, PPT, Review | Evaluation through short test, MCQ, True/False, |
| | 3. | Dissociation and re-association kinetics of DNA; cot value and its significance | 3 | K1(K) | Lecture using videos, Demonstration, | Suggest idea/concept with examples, |
| | 4. | DNA replication of prokaryotes and eukaryotes | 3 | K4(An) | Mind mapping, Peer tutoring, | Differentiate between various ideas, |
| | 5. | Genetic diseases – Sickle cell anemia, Cystic fibrosis, Duchennes muscular dystrophy | 3 | K5(E) | Lecture using Chalk and talk PPT, | Map knowledge |
| III | | GENETIC ENGINEERING | | | | |
| | 1. | Damage and DNA repair mechanism – photo reactivation – excision repair - mismatch repair | 3 | K 3(Ap) | Peer tutoring, Lecture using videos, Demonstration, | Evaluation through short test, MCQ, True/False, |
| | 2. | Genetic recombination - generalised and site specific; Lysogenic and lytic cycle; | 3 | K1(K) | Lecture using Chalk and talk, Introductory session, | Online Quiz, Short Test |

| | | | | | | |
|----|--------------------------|---|---|---------|---|--|
| | 3. | Bacterial Transformation, Transduction and Conjugation | 3 | K4(An) | Demonstration, PPT, Review | Suggest idea/concept with examples, |
| | 4. | Super vectors - BAC, YAC | 2 | K5(E) | Lecture using Chalk and talk, Introductory session, | Differentiate between various ideas, Map knowledge |
| IV | TOOLS IN GENETICS | | | | | |
| | 1. | RNA – types; Transcription - Initiation, elongation, termination, post transcriptional events | 3 | K4(An) | Lecture using Chalk and talk, Demonstration, | Concept explanations, Short summary or overview |
| | 2. | Genetic code, Wobble hypothesis; Translation – steps in translation | 3 | K5(E) | Demonstration, PPT, Review | Evaluation through short test, MCQ, True/False, |
| | 3. | Molecular tools for studying genes – northern blotting, southern blotting,, (Seminar) | 3 | K2(U) | PPT, Review | Demonstration Group Discussion |
| | 4. | Western blotting FISH | 2 | K 3(Ap) | Lecture using Chalk and talk, Introductory session, | Differentiate between various ideas, |
| V | GENOMICS | | | | | |
| | 1. | Fine structure of the gene; Transposons – Tn3, Tn5 | 2 | K2(U) | Mind mapping, Peer tutoring, PPT, Review | Evaluation through short test, MCQ, True/False, |
| | 2. | Gene regulations in Prokaryotes -Operon concept – lac operon, trp operon, | 2 | K 3(Ap) | Lecture using videos, Demonstration, | Evaluation through short test, MCQ, True/False, |

| | | | | | | |
|--|----|---|---|--------|------------------------------|--------------------------------------|
| | | | | | | |
| | 3. | GeneregulationinEukaryotes Steps in gene cloning; Pros and Cons in gene cloning | 3 | K1(K) | Mind mapping, Peer tutoring, | Quiz, Group discussions |
| | 4. | Construction of genomic library; Construction of cDNAlibrary | 3 | K4(An) | PPT, Review | Differentiate between various ideas, |
| | 5. | Gene silencing; Human Genome Project (Seminar) | 3 | K4(An) | PPT, Review | Map knowledge |

Course Focussing on Employability/Entrepreneurship/Skill Development: Activities (Em/ En/SD): Skill Development

Course Focussing on Cross Cutting Issues (ProfessionalEthics/HumanValues/Environment Sustainability/ Gender Equity): Environment Sustainability

Activities related to Cross Cutting Issues: Chart Preparation

Assignment: Genetic code, Wobblehypothesis

Seminar Topic: Mendel's law of heredity – Monohybrid andDihybrid cross

Sample questions

Part A

- Which of the following process is an exception of Mendel Law?
 - Mutation
 - Variation
 - Cloning
 - Linkage
- Pyrimidine dimers resulting from UV light damage to DNA are removed from sequences via the action of ----- enzymes.
- Endonucleases
 - Polymerases
 - Ligases
 - Helicases.
- Transformants are selected from non-transformants by the presence of a selectable marker – State True or False.
- Which single nucleotide makes up the 5' cap?
 - Guanine
 - Adenine
 - Cytosine
 - Thyamine

Part B

1. List out the contribution of Gregor Johann Mendel towards the science of Genetics.
2. Difference between A, B, C and Z forms of DNA.
3. Cosmids as cloning vectors – Justify.
4. Comment on tRNA with a neat diagram.
5. What are the ethical pros and cons of gene cloning.

Part C

1. Summarize the interaction of genes with respective examples.
2. Categorize the different steps involved in the DNA replication of Prokaryotes & Eukaryotes with neat sketch.
3. Construct a BAC vector and relate its role as a cloning vector.
4. Analyze, how the information in a strand of DNA is copied into a new molecule of messenger RNA?
5. Design a protocol to generate genomic library.

Head of the Department

Course Instructor

Dr. A. Anami Augustus Arul

Dr. S. Kala Veda Kumari

Department : Botany
Class : II M.Sc Botany
Title of the Course : Major Elective III b – Forestry

Semester : III

Course Code: PB2034

| Course Code | L | T | P | S | Credits | Inst. Hours | Total Hours | Marks | | |
|-------------|---|---|---|---|---------|-------------|-------------|-------|----------|-------|
| | | | | | | | | CIA | External | Total |
| PB2034 | 4 | 2 | - | - | 4 | 6 | 90 | 25 | 75 | 100 |

Objectives

- To enable the students to have broad knowledge about forest, its management and forest products.
- To prepare the students to involve in tree plantings and to provide and improve wildlife habitat.

Course Outcomes

| CO | Upon completion of this course the students will be able to: | PSO Addressed | Cognitive level |
|--------|--|---------------|-----------------|
| CO - 1 | Categorize the types of forests in Tamilnadu | PSO-3 | K4(An) |
| CO - 2 | Identify the reasons for degradation of forest | PSO-2 | K1(R) |
| CO - 3 | Summarize the methods in managing and conserving the forest | PSO-5 | K3(Ap) |
| CO - 4 | Understand the objectives, advantages and disadvantages of agroforestry | PSO-3 | K2(U) |
| CO - 5 | Determine the role of botanical gardens, zoos, national parks, and sanctuaries | PSO-6 | K2(U) |
| CO - 6 | Evaluate the utilization of forest | PSO-3 | K5(E) |

Teaching plan

Total Contact hours: 90 (Including lectures, assignments and tests)

| Unit | Module | Topic | Teaching Hours | Cognitive level | Pedagogy | Assessment/Evaluation |
|------|--------|-------|----------------|-----------------|----------|-----------------------|
|------|--------|-------|----------------|-----------------|----------|-----------------------|

| | | | | | | |
|------------|---|--|---|--------|--------------------------------|---|
| I | | | | | | |
| | 1 | Forest – definition, role of forest; forest as a balanced ecosystem; | 6 | K1(R) | Introductory session | Short test, Quiz, Group discussion |
| | 2 | Types and distribution of (Champion and Seth's classification). | 6 | K2(K) | Lecture using Chalk and talk | Assignment, Quiz. |
| | 3 | Forest types in Tamil Nadu – evergreen forest, deciduous and scrub jungle | 6 | K2(K) | Group Discussion, Mind mapping | MCQ, True/False, Short essays, Concept explanations |
| II | 1 | Forest management and conservation; regeneration; tending operations | 5 | K3(Ap) | Group Discussion | Explain, Finish a procedure in many steps, |
| | 2 | Sustainable utilization of forest resources – forest organizations | 5 | K3(Ap) | Lecture using videos, | Short summary or overview |
| | 3 | Forest mensuration and remote sensing – methods of measuring diameter, girth, height, and volume of trees, | 5 | K4(An) | Lecture using Chalk and talk | Simple definitions, MCQ, Class test |
| | 4 | Geographic information systems for management (GIS). | 3 | K4(An) | PPT Videos | Longer essay/, Evaluation essay |
| III | 1 | Forest utilization – harvesting, conservation, storage and disposal of wood in forest | 6 | K2(K) | Lecture using Chalk and talk | Quiz, MCQ, slip test |

| | | | | | | |
|-----------|---|---|---|--------|---|---|
| | 2 | Major and minor forest products | 6 | K3(Ap) | Lecture using videos | Assignment, Short essays, MCQ, Quiz |
| | 3 | Forest based industries – paper and pulp industry, resin tapping and turpentine manufacture. | 6 | K4(Ev) | Lecture using videos | Evaluation through short test, Seminar |
| | | Forest education in India | | K3(Ap) | Review | Longer essay/ Evaluation essay |
| IV | 1 | Forest degradation – damage caused by fire, climatic factors and injuries by insects, plants, animals, and diseases | 6 | K2(K) | Introductory session, Lecture using Chalk and talk, | MCQ, True/False, Short essays, Concept explanations |
| | 2 | Activities of man including encroachment and shifting cultivation | 6 | K3(Ap) | Lecture using Chalk and talk, Group discussion | MCAQ, True or false, Slip test, Assignment |
| | 3 | Measures to protect the forest damage caused by various factors | 6 | K4(Ev) | Lecture using videos | Differentiate between various ideas |
| V | 1 | Agroforestry – objectives, advantages and disadvantages, | 6 | K1(U) | Introductory session, Lecture using videos | Simple definitions, MCQ |
| | 2 | energy plantations; recreational forestry | 5 | K3(Ap) | Demonstration , PPT | Explain, Short essay, Explanatory |

| | | | | | | |
|--|---|---|---|--------|------------|---|
| | | | | | | essay, Seminar |
| | 4 | Role of botanical gardens, zoos, national parks and sanctuaries in recreation/conservation of wild life. Social forestry. | 7 | K3(Ap) | PPT Videos | Explanatory essay, Slip test, Group discussion, seminar |

Course Focussing on Employability/ Entrepreneurship/ Skill Development : Employability

Activities (Em/ En/SD) : Nature Walk

Course Focussing on Cross Cutting Issues (Professional Ethics/ Human Values/Environment Sustainability/ Gender Equity): Environment Sustainability

Activities related to Cross Cutting Issues: Nature Walk

Assignment: Shifting cultivation - Online

Seminar Topic: Social forestry.

Sample questions

Part A

1. Forest cover is maximum in_____.
(a). Rajasthan and Gujarat. (b). Gujarat and Maharashtra
(c). Chhattisgarh and Madhya Pradesh. (d). Kerala and Goa.
2. Define Ecosystem
3. Abbreviate GIS
4. Shifting cultivation is also known as_____.
5. Agroforestry is a type of_____.
(a). Mixed cropping (b). Multiple cropping.
(c). Double cropping (d). Mono cropping.

Part B

1. What is the importance of forest?
2. List out the tending operations.
3. Mention the various raw materials used for preparation of pulp?
4. What are some advantages and disadvantages of shifting cultivation?

5. What is the purpose of botanical gardens

Part C

1. Summarize forest types of Tamilnadu
2. Explain Geographic information systems for management(GIS).
3. Describe the manufacturing process of paper?
4. Explain the measures to protect forest from damage.
5. Recreational forestry- explain.

Head of the Department

Course Instructor

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