GOVERNMENT DEGREE COLLEGE RAMACHANDRAPURAM

DEPARTMENT OF BOTANY

COURSE OUTCOMES

Course: 1 INTRODUCTION TO CLASSICAL BIOLOGY Hours/Week: 5 Credits: 4 Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Learning Outcomes

1. Learn the principles of classification and preservation of biodiversity

2. Understand the plant anatomical, physiological and reproductive processes. 3. Knowledge on animal classification, physiology, embryonic development and their economic importance.

4. Outline the cell components, cell processes like cell division, heredity and molecular processes.

5. Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

I -Semester

Course: 2 INTRODUCTION TO APPLIED BIOLOGY

Hours/Week: 5 Credits: 4 Learning objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Learning Outcomes

1. Learn the history, ultrastructure, diversity and importance of microorganisms. 2. Understand the structure and functions of macromolecules.

3. Knowledge on biotechnology principles and its applications in food and medicine. 4. Outline the techniques, tools and their uses in diagnosis and therapy.

5. Demonstrate the bioinformatics and statistical tools in comprehending the complex biological data.

II Semester

Course 3: Non-Vascular Plants (Algae, Fungi, Lichens and Bryophytes) Credits -3

I. Learning Objectives: By the end of this course the learner has:

1. To realize the characteristics and diversity of non-vascular plants.

2. To recognize the ecological and economic value of algae, fungi, lichens and bryophytes. 3. To inquire the habit, habitat, morphological features and life cycles of selected genera of non-vascular plants.

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II. Learning Outcomes: On completion of this course students will be able to: 1. Compile the general characteristics of algae and their significance in nature. 2. Compare and contrast the characteristics of different groups of algae.
3. Summarise the important features of fungi and their economic value.
4. Distinguish the characteristics of different groups of fungi.
5. Elaborate the features and significance of amphibians of plant kingdom exam/ evaluating the chart or drawings or concise data on similarities and differences.
Unit-5: Collection, characterization, identification and classification of any four bryophytes from their native locality or college campus.
Evaluation method: Assessment of observations and documentation accuracy/presentation or report summarizing findings based on a rubric.
II Semester
Course 3: Non-vascular Plants (Algae, Fungi, Lichens, and Bryophytes)
Credits -1
I. Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Identify some algal and fungal species based on the structure of thalli and reproductive organs.
2. Decipher the lichens and Bryophytes based on morphological, anatomical and reproductive
features.
II Semester
Course 4: Origin of Life and Diversity of Microbes
Credits -3
I. Learning Objectives: By the end of this course the learner has:
1. To get awareness on origin and evolution of life.
2. To understand the diversity of microbial organisms.
3. To get awareness on importance of microbes in nature and agriculture.
II. Learning Outcomes: On completion of this course students will be able to: 1. Illustrate diversity of viruses, multiplication and economic value.
2. Discuss the general characteristics, classification and economic importance of special groups of bacteria.
3. Explain the structure, nutrition, reproduction and significance of eubacteria. 4. Evaluate the interactions among soil microbes.
III Semester
Course 5 : Vascular Plants

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COURSE OUTCOMES

(Pteridophytes, Gymnosperms and Taxonomy of Angiosperms)
Credits -3
I. Learning Objectives: By the end of this course the learner has:
1. To recognize the morphology, anatomy and reproduction in two groups of archegoniates. 2. To acquire knowledge of the taxonomic aids and classification systems. 3. To read the vegetative and floral characteristics of some forms of angiospermic families along with their economic value.
4. To study the significance of other branches of botany in relation to plant taxonomy. II. Learning Outcomes: On completion of this course students will be able to: 1. Infer the evolution of vasculature, heterospory and seed habit in Pteridophytes. 2. Illustrate the general characteristics of Gymnosperms along with their uses 3. Discuss about some Taxonomic aids and their applications in plant systematics. 4. Compare and contrast the vegetative and floral characteristics of some angiospermic families 5. Evaluate the economic value of plant species from the families under the study. 6. Defend the utility of evidences from different branches of botany in solving the taxonomic lineages of some species.

Botany Major: III Semester
Course 5 : Vascular Plants (Pteridophytes, Gymnosperms and Angiosperm Taxonomy) Practical 02 hours /Week Credits -1
I. Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Distinguish the Pteridophytes and Gymnosperms based on their morphological, anatomical and reproductive structures.
2. Make systematic classification of plant species using vegetative and floral characters. 3. Identify angiosperm plant species and make herbarium specimens.
II Semester
Course 6: Plant Pathology and Plant Diseases
Credits -3
I. Learning Objectives: By the end of this course the learner has:
1. To study various plant pathogens, their survival and dispersal mechanisms. 2. To understand the processes involved in infection and pathogenesis in plants. 3. To study the common diseases of some important field and horticultural crops. II. Learning Outcomes:
1. Identify major groups of plant pathogens and classify plant diseases.

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COURSE OUTCOMES

2. Explain various stages in infection, plant pathogenesis and responsible factors. 3. Elaborate the preventive and control measures for plant diseases.
4. Discuss about some diseases of field crops and their management.
5. Discuss about some diseases of horticultural crops and their management. III Semester
Course 6: Plant Pathology and Plant Diseases
Credits -1
I. Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Handle equipment and instruments in plant pathology laboratory.
2. Isolate plant pathogenic microbes.
2. Identify the plant diseases based of histopathological observations.

III Semester
Course 7: Plant Breeding
Credits -3
I. Learning Objectives: By the end of this course the learner has:
1. To learn the objectives and scope of plant breeding along with reproductive methods in plants.
2. To understand the breeding methods in plant for production of new varieties. 3. To have a comprehensive knowledge on tools and techniques in plant breeding. II. Learning Outcomes:
1. Compare and contrast the methods of reproduction and also pollination mechanisms. 2. Design appropriate pollination method for a given crop plant.
3. Recommend the best possible breeding method for a crop species.
4. Propose the steps for production of hybrid varieties of crop plants.
5. Apply molecular techniques to develop a tailored plant variety.
III Semester
Course 7: Plant Breeding
Credits -1
I. Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Distinguish self and cross-pollinated plant species based on floral biology. 2. Perform skills related to self and cross pollination in plants.
3. Make hybridization to produce new varieties.
III Semester
Course 8: Plant Biotechnology

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COURSE OUTCOMES

Credits -3

I. Learning Objectives: By the end of this course the learner has:

1. To acquire knowledge of sterilization techniques used in plant tissue culture. 2. To learn about various types of plant tissue culture practices. 3. To know the applications of plant biotechnology in production of novel plants. II. Learning Outcomes: Students at the successful completion of the course will be able to: 1. Explain the scientific techniques and tools used in plant tissue culture laboratories. 2. Appraise the applications of plant tissue culture in agriculture and horticulture sectors. 3. Acquire skills related to various aspects in plant tissue culture.

4. Evaluate the role of transgenic plants in solving certain plant related beneficiary issues. 5.Justify the role of plant biotechnology in bioenergy and phytoremediation. 6. Judge the biosafety and bioethics related to plant biotechnology.

III Semester

Course 8: Plant Biotechnology

Credits -1

I. Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Operate all the equipment and instruments in a plant tissue culture laboratory. 2. Establish callus and organ culture. 3. Obtain quality plants using micro-propagation techniques.

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IV Semester

Course 9: Anatomy and Embryology of Angiosperms

Credits -3

I. Learning Objectives: By the end of this course the learner has:

1. To know about various types of tissues in plants and their organization. 2. To obtain awareness on anomalous secondary growth in plants and economic value of woods.

3. To acquire knowledge on development of male and female gametophytes in plants. 4. To probe into embryogenesis in angiosperms.

II. Learning Outcomes: to: 1. Categorize various tissues and evaluate their role in plants.

2. Explain anomalous secondary growth in some plants and justify the value of timber plants. 3. Summarize the events in micro-sporogenesis and development of male gametophyte. 4. Discuss the events in mega-sporogenesis and development of female gametophyte. 5. Propose the

incidents in embryogenesis of an angiospermic plant species. 6. Compile the aspects of developmental and reproductive biology in plants.

IV Semester
Course 9: Anatomy and Embryology of Angiosperms
Credits -1
Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Conduct dissections of various plant organs and study the internal structures by staining. 2. Look into the embryological characteristics from sex organs to seeds in angiosperms.
IV Semester
Course 10: Plant Ecology, Biodiversity and Phytogeography
Credits -3
I. Learning Objectives: By the end of this course the learner has:
1. To figure-out the components of ecosystem and energy flow among different trophic levels. 2. To apprise the characteristics of autecology and synecology.
3. To understand the climatic change and associated impacts on biotic components. 4. To discern the value of biodiversity, threats and conservation strategies. 5. To know the distribution of various plant groups in different geographical areas.
II. Learning Outcomes: On completion of this course students will be able to: 1. Explain the interactions among the biotic and abiotic components in an ecosystem. 2. Summarize the characteristics of a population and a community.
3. Anticipate the environmental problems arising due to climate change.
4. Assess the value IV Semester
Course 10: Plant Ecology, Biodiversity and Phytogeography
Credits -1
I. Course Outcomes: On successful completion of this practical course, student shall be able to: 1. Handle instruments used in ecological studies.
2. Perform experiments and collect data on autecology and synecology.
3. Identify various plant groups based on their morphological and anatomical adaptations. 4. Collect data on biodiversity and phytogeography.
microclimatic variables;

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IV Semester

Course 11: Plant Resources and Utilization Credits -3 I.

Learning Objectives: By the end of this course the learner has: 1. To know different plants domesticated by humans and utility of their products

. 2. To gain knowledge on commercial and timber products obtained from plants.

3. To know the facts on economic value of plants products in relation to human welfare.

II. Learning Outcomes: Students at the successful completion of the course will be able to:

1. Explain the significance of plants in human nutrition.

2. List out different plant products used by human beings.

3. Evaluate the commercial plant products and their utilization

4. Discuss the uses of medicinal and aromatic plants for human heal.