SEMESTER-III  Course: S.BOT.3.01  PLANT DIVERSITY- II

LEARNING OBJECTIVES
The students will be able to-

- Understand the importance of bacteria and methods of their cultivation.
- Learn about the causal organisms of plant diseases.
- Learn the life cycles of the individuals belonging to Algae, Fungi and Lichens.

Unit I: MICROBIOLOGY : Basics principles of staining; culture media preparation; pure culture methods: Classification of bacteria based on mode of nutrition; Biofertilizers and methods of application; Bacteria in sulphur cycle; Bacteria in Phosphate solubilization.


Unit III: FUNGI AND PLANT PATHOLOGY : Fungi- Structure life cycle and systematic position of *Erysiphe*, *Fusarium*. Plant pathology- diseases, symptoms, causative organism, disease cycle and control measures of rust of wheat and late blight of potato.

Practicals- Course: S.BOT PR.3.01

1. Sterilization techniques, preparation of nutrient agar.
2. Preparation of slants and plates, Study of streak plate method.
3. Effect of plant extract (Turmeric / Garlic) on microbial growth by agar diffusion method.
5. Structure of crustose, foliose and fruticose lichens and their reproductive structures.
6. Study of stages in the life cycle of *Erysiphe* and *Fusarium*.
7. Study of diseases, (a) rust of wheat (*Puccinia*) (b) late blight of potato.

CIA- multiple choice questions / assignments / presentation / field report / test.

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SEMESTER-III Course: S.BOT.3.02 PLANT PHYSIOLOGY AND BIOCHEMISTRY- II

LEARNING OBJECTIVES
The students will be able to understand-

- The importance of minerals to plants,
- The catabolic process and synthesis of chemical energy in plants, the anabolic process in plants.
- And differentiate between light and dark reactions of photosynthesis.
- The respiratory process in presence of light and differentiate between C3, C4 and CAM plants


Unit II: PHOTOSYNTHESIS: Efficiency of plants in converting radiant energy and matter, Light phase of photosynthesis, The chloroplast as the unit of photosynthesis, Reaction scheme for ATP and NADPH formation, Role of ATP and NADPH in CO₂ fixation, The path of carbon in photosynthesis – C3, C4 and CAM, Factors influencing photosynthesis.


Practicals- Course: S.BOT PR.3.02

1. Estimation of Ca²⁺ and Mg²⁺ in plant sample.
2. Estimation of phosphorous in plants.
3. Colorimetric estimation of total chlorophyll content.
4. Estimation of carotenoids from plant samples.
5. Separation of photosynthetic pigments by paper chromatography.
6. Isolation of chloroautos and study of Hill Reaction (Demonstration only).
7. To study the Kranz anatomy.

CIA- multiple choice questions / test / assignment.

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SEMESTER-III  Course: S.BOT.3.03  ANATOMY, EMBRYOLOGY & PALYNOLOGY

LEARNING OBJECTIVES:
The students will be able to-

- Differentiate between the normal and anomalous secondary growth.
- Learn about the different meristems their locations and functions.
- Learn the developmental stages of micro and megasporangium.
- Understand the pollen morphology and the applications of palynology.


Unit II: EMBRYOLOGY: Structure of Microsporangium, microsporogenesis and development of male gametophyte, Structure of Megasporangium, megasporogenesis, and development of female gametophyte, Double fertilization and its significance, Development of embryo – Dicotyledonous– Capsella type.

Unit III: PALYNOLOGY: Pollen and spore morphology- size and shape, polarity, apertures, exine stratification, construction of palynogram, Application of palynology in honey industry, coal and oil exploration, forensic sciences, pollen allergy.

Practicals- Course: S.BOT PR.3.03

2. Study of anomalous secondary growth in the stems of Bignonia, Salvadora, Achyranthus, and Dracaena by double staining technique and preparation of permanent slide using one of the above materials.
5. Study of various stages of microsporogenesis, megasporogenesis and embryo development with the help of permanent slides / photomicrographs
7. Pollen analysis from honey sample: Unifloral and Multifloral honey.

CIA- assignments / presentation / moodle / test.

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