

4. Arrange field trips to microbiology research facilities, such as government labs, industrial settings, or healthcare institutions

III SEMESTER

COURSE 5: - EUKARYOTIC MICROORGANISMS

credits -_3

I. Course Outcomes:

On successful completion of the course, the students will be able to

1. Understand the characteristics, classification, and reproductive mechanisms of fungi, algae, and protozoa.
2. Recognize the importance of fungi in biotechnology, including their roles in food production, medicine, and agriculture.
3. Comprehend the significance of algae in various industries, the environment, and as a source of food.
4. Identify pathogenic protozoa and understand their impact on human health and the environment.

Unit 1: Fungi

No. of Hours:9

1. Habitat, distribution, nutritional requirements, fungal cell ultra-structure, fungal wall, Outline classification of Fungi
2. Reproduction in different fungal groups- Phycomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes
3. Heterokaryosis, heterothallism and parasexual mechanism.
4. Fungal dimorphism (Candida albicans)

Unit 2: Importance of Fungi

No. of Hours:9

1. Role of fungi in biotechnology: food, medicine and pharmaceutical industry (baking, brewing, antibiotics, alcohols, enzymes, organic acids, and pharmaceuticals)
2. Beneficial Role of fungi in Agriculture: Biofertilizers, Myco toxins; Biological control (Myco fungicides, Myco herbicides, Myco insecticides).
3. Mushrooms and its cultivation. (White button, Milky and Oyster)
4. Fungi as plant and animal pathogens (Cercospora, Puccinia, Candida, Aspergillus)

Unit 3: Algae

No. of Hours:9

1. Algae- occurrence, thallus organization, algae cell ultra-structure, pigments, flagella, eyespot food reserves, outline classification
2. Vegetative, asexual and sexual reproduction in Algae
3. Photosynthetic apparatus, and outline of Photosynthesis in Algae

Unit 4: Importance and cultivation of Algae**No. of Hours:9**

1. Importance of algae in agriculture, industry, environment and food with examples.
2. Algal culture techniques- Indoor, Outdoor, Closed, Open, Batch, continuous, Fed batch
3. Culture media and growth parameters for algal cultivation (Spirulina)

Unit 5: Protozoa**No. of Hours:9**

1. General characteristics with special reference to Amoeba, Paramecium
2. Pathogenic Protozoa- Plasmodium, Leishmania and Giardia
3. Importance of protozoa (in waste management, soil fertility, industry and scientific study)
4. Culturing protozoans from natural sources-Hay water, pond water, Chalkley's solution
5. Haplobiontic (Nemalion), Haplontic (Chlamydomonas), Diplontic (Cladophora), Diplobiontic (Polysiphonia) and Diplohaplontic (Cladophora) life cycles. deleted

II. Skill Outcomes:

On successful completion of the course, the students will be able to

1. Develop practical skills in the isolation, identification, and cultivation of fungi and algae.
2. Acquire knowledge about the preparation of growth media and study host-pathogen interactions.
3. Gain the ability to examine the vegetative and reproductive structures of selected genera through microscopy.
4. Demonstrate proficiency in purifying and preserving pure cultures of common algae and fungi.

III SEMESTER**COURSE 5: - EUKARYOTIC MICROORGANISMS**credits -_1

- a.Preparation of Potato Dextrose Medium.
- b. Isolation and identification of pathogenic and non-pathogenic fungi.
- c.Study of host-pathogen interaction.

- d. Study of the vegetative and reproductive structures of following genera through temporary and permanent slides: *Mucor*, *Saccharomyces*, *Penicillium*, *Agaricus* and *Alternaria*
- e. Purification and preservation of pure cultures of common algae and fungi.

References

1. Alexopoulos, C.J., Mims, C.W. and Blackwell, M, Introductory Mycology. John Wiley, New York.
2. Mehrotra, R.S. and K.R. Aneja An Introduction to Mycology. New Age International press, New Delhi
3. Webster, J. Introduction to fungi. Cambridge University Press. Cambridge, U.K. (1985).
4. Bessey E.A. Morphology and Taxonomy of fungi. Vikas Publishing House Pvt. Ltd., New Delhi.
5. Jhon Webster and R W S Weber. Introduction to Fungi. Cambridge University Press 2007.
6. A. V. S. S. .Sambamurty. A Textbook of Algae. I.K. International Publishing House Pvt. Limited, 2010
7. H.D. Kumar and H.N. Singh. A Textbook on Algae (Macmillan international college edition)

III. Co- Curricular Activities

1. Conduct hands-on microscopy workshops using to observe eukaryotic microorganisms
2. Organize field trips to natural habitats, such as forests, ponds, or marine environments, where eukaryotic microorganisms thrive.
3. Arrange culturing workshops where students can learn how to isolate and culture eukaryotic microorganisms in the laboratory.
4. Eukaryotic Microorganism Photography Contest