

Advanced mycology

Course syllabus

Course target: MSc. And PhD in Plant Pathology

Autumn 2020

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Course Introduction:

This course will give a comprehensive introduction to fungi in terms of their biology, physiology, genetics, biotechnological potential and pathogenicity. This course will deal with an in-depth description of the biology, structure and physiology of fungi in which the structure, metabolism and growth of fungi will be introduced. Moreover, the genetics and life cycles of a number of representative fungi are described and the use of fungi for genetic analysis is outlined. During this course we will describe how technologies have increased our knowledge of fungi and made available new opportunities for exploiting fungi for the good of humanity. This course will introduce information about the fungal population's diversity and speciation. This course will give an overview of how fungi are acting in the field of plant pathology in particular and how they utilized for producing antibiotics, enzymes and a range of chemical products. Introducing different fungal interactions with other organisms will be introduced. Description of plant pathogenic fungi and the human diseases caused by fungi will be studied. Plants and the impact of such pathogens on the global supply of food will be discussed.

Expected outcomes

1. To understand the definition, characterization and classification of fungi.
2. To study the features and growth of hyphae and mycelia formation.
3. To know the fungi cell wall composition, structure and formation.
4. To understand the fungal physiology in respect to nutrition, cellular biosynthesis, metabolism, growth and reproduction and understanding the fungal adaptations.
5. To understand the fungal genetics and populations.
6. To know the antibiotics, enzymes and chemical commodities production from fungi.

7. To understand biotechnological exploitation in fungi.
8. To understand the interactions of fungi with other organisms as symbiotic partners, plant pathogens and causing human diseases.
9. Possess significant knowledge of the principles and methods of fungal systematics
10. Recognize the most important fungal groups and their phylogenetic relationships
11. Understand how to use fungal scientific names correctly
12. Apply your knowledge of fungal characters to effectively identify unknown fungi to family, genus and species

Course content

COURSE OUTLINE (Subject to change)

Week no.	Topic
Week 01	An introduction: Diversity of fungi
Week 02	Fungal structures and propagules
Week 03	Identification of fungi - Materials and methodology
Week 04	Physiology of fungi and adaptation
Week 05	Nutrition behaviour of fungi
Week 06	Fungal systematics
Week 07	Mycotoxigenic fungi
Week 08	Entomopathogenic fungi
Week 09	Plant-fungal interactions
Week 10	Primary and Secondary Metabolites of Fungi
Week 11	Fungal Symbiosis concept
Week 12	Plant pathogenic fungi
Week 13	Endophytic fungi
Week 14	Fungi and environment
Week 15	Survival of fungi
Week 16	Genetics of fungi: variations, sexuality and evolution
Week 17	Spore production: discharge and dispersal

Practical part:

Week no.	Topic
Week 01	Fungal colonies and fungal structures
Week 02	Fungal propagules
Week 03	Identification of fungi - Materials and methodology
Week 04	Isolation of different fungi in different habitats
Week 05	Techniques in obtaining pure cultures
Week 06	Single spore isolates
Week 07	Mycological Growth and Propagation
Week 08	Counting-enumeration

Week 09	Measuring of fungi
Week 10	Steps of identification
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	
Week 17	

Selected references

- The fifth Kingdom, by Bryce Kendrick, fourth edition, 2017.
- Introduction to fungi, by John Webster, 2007.
- Introductory Mycology, by C.J. Alexopoulos, 1996.
- Pictorial Atlas of Soil and Seed Fungi, Third Edition, by Tsuneo Watanabe, 2010.
- Pictorial Atlas of Soilborne Fungal Plant Pathogens, by Tsuneo Watanabe, 2018.