

## COMMON POOL OF DISCIPLINE SPECIFIC ELECTIVES

### DISCIPLINE SPECIFIC ELECTIVES (BOT-DSE-05)

#### Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
<b>Plant Pathology</b> <b>BOT-DSE-05</b>	4	2	0	2	Class XII pass with Biology/ Biotechnology	

#### **Learning Objectives:**

- To introduce students with the phytopathology, its concepts and principles\
- To acquaint with various plant diseases, causal organisms and their control

#### **Learning Outcomes:** Upon completion of this course, the students will be able to:

- Understand the economic and pathological importance of fungi, bacteria and viruses
- Identify common plant diseases and their control measures

#### **Unit 1: Introduction** **03 Hours**

Definition of disease and its components (disease pyramid); Classification of diseases (on the basis of pathogens; geographical distribution; extent of occurrence); History and significance of Phytopathology (with special reference to India); Eminent plant pathologists and their contributions (Anton de Bary; E.J. Butler; Louis Pasteur; PMA Millardet; E.F. Smith; Adolf Mayer; K.C. Mehta, J.F. Dastur ; B.B. Mundkur; R.N. Tandon).

#### **Unit 2: Basic concepts of Plant Pathology** **04 Hours**

Definitions (Pathogenesis; Pathogen; symptoms; etiology); Types of pathogens and their Symptoms (Fungus, Oomycetes, Bacteria, Virus, Nematode, Phytoplasma); Koch's Postulates; Disease cycle (Components) - Epidemiology and forecasting of Plant diseases.

#### **Unit 3: Host- -Pathogen relationship** **04 Hours**

How pathogens attack plants (brief concept on mode of penetration; post-penetration and colonization). Plant defence mechanisms (Constitutive and induced, structural and biochemical).

#### **Unit 4: Fungal diseases** **05 Hours**

Causal Organism, Symptoms, Disease Cycle and control: Powdery mildew of Pea; Ergot of Rye; Apple scab, Early blight of potato, red rot of sugarcane, Black, Yellow and Brown rust of Wheat; Smut of Barley (Loose and Covered Smut).

**Unit 5: Oomycete Diseases** **02 Hours**

Causal organism, symptoms, disease cycle and control: Late Blight of Potato; White Rust of Crucifers; Downy mildew of Grapes.

**Unit 6: Bacterial Diseases** **01 Hours**

General symptoms; Disease cycle and Control measures - Citrus canker; Angular leaf spot of Cotton.

**Unit 7: Viral Diseases** **01 Hours**

General symptoms; Mode of transmission and Control measures-Tobacco mosaic disease; Vein Clearing of Bhindi

**Unit 8: Nematode Diseases** **01 Hours**

General symptoms, Disease cycle and Control measures-Root knot disease of Brinjal.

**Unit 9: Plant Disease Control** **07 Hours**

Plant quarantine and its significance; Methods of disease control: Physical (Heat treatment, drying, radiation and regeneration); Chemical methods (foliar spray; dust, seed treatment; soil treatment; treatment of wounds). Types of fungicides - Inorganic (Bordeaux mixture, Fixed copper; Sulphur, Lime Sulphur); Organic (Dithiocarbamates, quinones); Systemic fungicides and their mode of action (Oxanthin, Strobilurins, Benzimidazole, Pyrimidine). Cultural practices (Host eradication, sanitation, crop rotation, Polythene traps, Mulches) Biological Control (Antibiosis, hyper - parasitism, Hypovirulence, Predation, Induced systemic Resistance).

**Unit 8: Plant Disease Control** **02 Hours**

Quarantine, Cultural practices, Physical methods, Chemical methods, Biological control (Antibiosis, Hyper-parasitism, Hypovirulence, Predation, Induced Systemic Resistance).

**Practicals** **60 hours**

4. Study of Late blight of Potato through specimens, temporary mounts (V.S. of leaf showing infection) and permanent slides.
5. Study of Black stem Rust of Wheat: Symptoms on wheat and barberry. Observe uredospores and teleutospores on V.S. wheat leaf/ to study stem spore stages of *Puccinia graminis tritici* with the help of temporary tease/section mount of wheat. Permanent slides of somatic and reproductive phases on both the hosts.
6. Study of smut of barley, symptoms of loose and covered smut and temporary spore mount.
7. Study of Powdery mildew of pea, Symptoms with the help of live or preserved specimens. Study of *Erysiphe* asexual and sexual stages with the help of temporary tease/section mount/ permanent slides.
8. Study of symptoms of Red rot of sugarcane, W.M. of conidia through temporary tease mount.

9. Study symptoms of bacterial diseases: Citrus canker, Angular leaf spot of Cotton.
10. Study symptoms of viral diseases: Tobacco mosaic Disease, Vein clearing of *Abelmoschus esculentus/Ageratum* sp.
11. Study of nematode diseases: Root knot disease of Brinjal.
12. Isolation of seed borne mycoflora by moist chamber method technique.
13. Study of biocontrol agents: Nematophagous fungi; *Trichoderma* sp.
14. The students should submit specimens of any two plant diseases studied by them.

**Suggested Readings:**

7. Agrios, G.N. (2005) *Plant Pathology* 5 th edition: Elsevier Academic Press, Amesterdam.
8. Sharma, P.D. (2014) *Plant Pathology* Rastogi Publications, Meerut, U.P.
9. Singh, R.S. (2018) *Plant Diseases*. 10th Edition Medtech, New Delhi.

**Additional Readings:**

- Ownley, Bonnie and Trigiano, Robert N. (2017). *Plant Pathology: Concepts and Laboratory Exercises*, 3<sup>rd</sup> Edition, CRC Press.

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.