

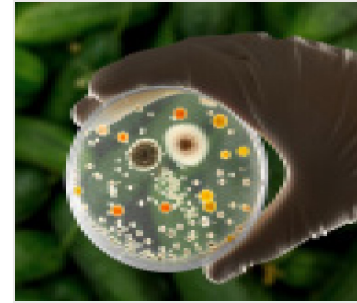
# 21PATH171 FUNDAMENTALS OF PLANT PATHOLOGY I (PLANT PATHOGENS - AN INTRODUCTION)

Hours Per Week :

L	T	P	C
1	-	2	2

Total Hours :

L	T	P
15	-	30



Source :

<https://www.newfoodmagazine.com/news/107313/uk-research-shows-societal-burden-of-foodborne-pathogens/>

## Course Description and Objectives:

This course makes the students learn and understand the plant disease causing organisms and their life cycles and relationships with host plants

## Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Gain knowledge about various pathogens including bacteria, fungus, virus and nematodes and their life cycles
2	Know about concept of disease, causal agents of plant diseases.
3	Identify important microorganisms and understand host pathogen interactions.

## SKILLS:

- ✓ Identify plant pathogens viz., fungal, bacterial, viral and phytoplasma etc.
- ✓ Isolation and multiplication of fungal and bacterial pathogens from soil and diseased plants.
- ✓ Prepare slides of plant pathogens and handling of microscope.

**ACTIVITIES:**

- o *Demonstrate the different structure of fungi*
- o *Staining and identification of plant pathogenic bacteria*
- o *Conduct experiment on Transmission of plant viruses*
- o *Extra ction of plant parasitic nematodes*
- o *Demonstrate morphological differences in identification of plant parasitic nematodes*

**UNIT - 1**

**Introduction to Plant Pathology:** History of Plant Pathology; Importance of plant diseases- Brief mention of Important epidemics of international importance – Irish Famine (1845), Bengal Famine (1942), Coffee rust (1868), Wheat Rust (1940), Southern Corn Leaf blight in USA; Epidemics of local significance – Peanut Stem Necrosis Disease (Anantapurdt), Mung bean yellow mosaic virus (AP) etc. Brief mention of economic importance of micro organisms; Scope and objectives of Plant Pathology

**UNIT - 2**

**General characteristics of fungi:** Definition of fungus; Fungal cell structure; types of fungal thalli - unicellular and filamentous; ectophytic and endophytic fungi; Fungal classification; Nomenclature; characters of different groups of fungi up to generic level: (1) Myxomycetes, (2) Chytridiomycetes, (3) Oomycetes, 4) Zygomycetes, 5) Ascomycetes, 6) Basidiomycetes, v) Deuteromycetes; Systematic position of important fungal pathogens

**UNIT - 3**

**Reproduction in fungi:** Asexual reproduction (Fragmentation, Fission, Budding and Asexual Spores); Sexual Reproduction (Planogametic copulation, Gametangial contact, Gametangial copulation, Somatogamy, Spermatization Asexual fruiting bodies with examples; Types of conidia (Saccardo's conidial types); Lifecycles of economically important plant pathogens

**UNIT - 4**

**Viruses and viroids:** Structure and composition of viruses; Physical and chemical properties of viruses; Virus - vector relationship; Methods of transmission of plant viruses with examples of vector transmitted virus diseases; Management of Viral diseases of crop plants; Examples of important viroid diseases - potato spindle tuber viroid and coconut cadang-cadang disease.

**UNIT-5**

**Nematodes:** Economic importance of nematodes in Agriculture; General characters of plant parasitic and entomo-pathogenic nematodes; Nematode classification; symptoms and nature of damage caused by plant nematodes (*Heterodera*, *Meloidogyne*, *Anguina*, *Ditylenchus*, *Tylenchorhynchus*, *Aphelenchoides*etc.); Life cycles of Economically important plant parasitic Nematodes; Emerging nematode problems, survey, sampling isolation and identification methods; Methods of Nematode diseases management

**LABORATORY EXPERIMENTS****LIST OF EXPERIMENTS**

1. Microscopy - study of the parts of microscope
2. Study of vegetative structures of fungi and their modifications
3. Study of reproductive (sexual and asexual) structures of fungi
4. Study of Zygomycetous fungus – Rhizopus, Choanephora.

5. Study of downy mildew fungi – *Sclerospora*, *Peronosclerospora*, *Pseudoperonospora*, *Peronospora*, *Plasmopara* and *Bremia*. Study of *Pythium*, *Phytophthora* and *Albugo*
6. Study of powdery mildew fungi – *Oidium*, *Oidiopsis*, *Ovulariopsis*
7. Study of ascocarps of *Erysiphe*, *Phyllactinia*, *Uncinula*, *Podosphaera* and *Microsphaera*
8. Study of rust fungi – *Puccinia* (different stages), *Uromyces*, *Hemileia* and *Melampsora*
9. Study of smut fungi – *Sphacelotheca*, *Ustilago* and *Tolyposporium*. Study of *Ganoderma* and *Agaricus*
10. Study of acervulous imperfect fungi – *Colletotrichum* and *Pestalotiopsis*. Study of pycnidial imperfect fungi – *Septoria*
11. Study of imperfect fungi – *Aspergillus*, *Penicillium* and *Pyricularia*, *Helminthosporium*, *Alternaria*
12. Study of imperfect fungi – *Cercospora* and *Phaeoisariopsis*, *Fusarium*, *Rhizoctonia* and *Sclerotium*
13. Isolation of phytopathogenic bacteria (locally available diseased plant material) and study of colony characteristics
14. Identification of vectors and Demonstration of mechanical transmission of plant viruses
15. Extraction of plant parasitic nematodes from soil and identification of plant parasitic nematodes; Preservation of disease samples – dry and wet methods

## REFERENCES:

1. Dube, H. C. 2013. *An Introduction to Fungi. 4<sup>th</sup> (Ed)*. Scientific Publishers, Jodhpur, India
2. Agrios, G.N. 2004. *Plant Pathology. (5<sup>th</sup> Ed.)*. Elsevier Academic Press. 882p.
3. Alexopoulos, C.J., Mims, C.W. and Blackwell, M. 2014. *Introductory Mycology (4<sup>th</sup> Ed.)* Wiley India Pvt Ltd. 833p
4. Ravichandra, N.G. 2013. *Fundamentals of Plant Pathology*. PHI Learning Pvt Ltd. 639p
5. Walkey, D. G. 1991. *Applied Plant Virology (2<sup>nd</sup> Ed.)* Springer, 352
6. Webster, J. and Weber, R. W. S. 2007. *Introduction to Fungi. (3<sup>rd</sup> Ed.)*. Cambridge University press. 817p

