UNIVERSITY OF SARGODHA

Department of Plant Pathology, University College of Agriculture

COURSE OUTLINE FALL 2020

Course Title: Introduction to Plant Pathogens

Course Code: PLPT-5301

Credit Hours: 3(2-1)

Instructor: Dr. Muhammad Imran Hamid

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| **DESCRIPTION & OBJECTIVES** |

1. Introduction and history of Plant Pathogens
2. Morphology and identification of Plant Pathogens
3. Nomenclature and classification of Plant Pathogens

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| **READINGS** |

1. Agrios, G.N. 2005. Plant Pathology, 5th edition. Academic press, New York.
2. Alexopoulos, C.J., C.W. Mims and M. Blackwell. 1996. Introductory Mycology, 4th edition. John and sons. New York.
3. Verma, H.N., 2003. Basic of Plant Virology. Oxford and IBH Publishing Co. New Delhi, India.
4. Hafiz, A. 1986. Plant Diseases. PARC, Islamabad, Pakistan.
5. Wahid, A., and M.A. Khan. 2006. Viruses, Bacteria and Thalloid Organism. Higher Education Commission Pakistan. PP-204
6. Singh, R.S. 2004. Plant Diseases. 7th ed. Oxford and IBH Publishing Co. New Delhi, India.

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| **CONTENTS** |

**Theory:**

1. Introduction of plant pathogens
2. Economic importance of plant pathogens
3. General characteristics of plant pathogens
4. Morphology and ecology of plant pathogens
5. Nutrition and reproduction of plant pathogens
6. Identification of plant pathogens including fungi, bacteria, mollecutes, viruses, viriods, nematodes and higher parasitic plants

**Practical:**

1. Bio-safety and dealing with laboratory materials
2. Orientation of laboratory equipment to study the plant pathogens
3. Handling of laboratory glassware and chemicals
4. Preparation of different media recipes
5. Isolation of different plant pathogens
6. Study of various plant pathogens by preparing temporary and permanent glass slides
7. Inspection of live specimen and their comparative account/study.

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| **COURSE SCHEDULE** | | |
| **Week** | **Topics and Readings**: *Give Reading No from your list of readings above and its Page Nos. relevant to the topic(s) covered each week* | **Dates** |
| 1 | Importance of micro-organism in agriculture with examples of commercially important plant pathogens  Comparative characters of Prokaryotes and eukaryotes with definitions of plant pathogens  (Agrios, 2005; Alexopoulos *et al*., 1996) | Sep, 5-8 |
| 2 | Virus as plant pathogens, their morphology, nutrition  Physical and chemical properties of virus and their replication in brief  (Verma, 2003; Agrios, 2005) | Sep, 11-15 |
| 3 | Taxonomic status of mosaic of tobacco, tomato and potato, leaf roll of potato, leaf curl of tomato and cotton, bunchy top of banana. (from etiology point of view)  Bacteria as plant pathogens, their morphology, nutrition and their morphology  (Agrios, 2005; Goto, 1992) | Sep, 18-22 |
| 4 | Reproduction of bacteria, nitrogen fixation  Taxanomic status of *Xanthomonas aryzae* pv. *Oryzae*, *X. axonopodis* pv. *Citri,* *X. compestris* pv *malveacerum*, *Erwinia carotovora, Pseudomonas solanacearum, Streptomyces scabies, Agrobacbacterium timefacians* (from etiology point of view)  (Agrios, 2005) | Sep, 25-29 |
| 5 | Nematode as plant pathogens, their morphology and anatomy and characteristics of plant parasitic nematodes  Taxonomic status of *Meloidogyne, Heterodera, Anguina, Tylenchulus, Pratylenchus* and *Radopholus*. (from etiology point of view)  (Agrios, 2005) | Oct, 2-6 |
| 6 | Introduction to Phanerogamic parasites, with brief description of mode of infection/nutrition  Taxonomic status of cuscuta, striga, Orobanche and Mistletoe  (Agrios, 2005. Hafiz, 1986. Singh, 2004) | Oct, 9-13 |
| 7 | Introduction to stress physiology with detailed description of Abiotic agents  Diseases due to environment, industrial population, imbalance of water and nutrients, macro and micro element deficiency in our soil  (Singh, 2004) | Oct, 16-20 |
| 8 | Revision | Oct, 23-27 |
| 9 | Mid term Examination | Oct, 30- Nov, 3 |
| 10 | Fungi as plant pathogens, General characteristics, morphology, nutrition and reproduction  Fungal systematics, a brief introduction. Introduction to five major phyla Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota and Oomycota  (Alexopoulos *et al*., 1996; Wahid and Khan, 2006) | Nov, 6-10 |
| 11 | Phylum Zygomycota its brief characters and taxonomic status of *Rhizopus stoloifer*  Difference between Rhizopus and Mucor. Phylum Ascomycota, its brief characters, Generalized life of ascomycetes, sexual and asexual fruiting bodies  (Alexopoulos *et al*., 1996) | Nov, 13-17 |
| 12 | Asexual Ascomycetes (Deuteromycetes) general characters  Taxonomic status of *Ascochyta rabiei, Collectotrichum gloeosporioides, C. falcatum, Aspergillus niger, Penicillium* spp*., Alternaria solani, Cercospora personata, Helminthosporium oryzae, Pyricularia oryzae, Fusarium oxysporum* f.sp. *ciceris, Rhizoctonia solani, Taphrina defprmans* and *Sacchromyces cerevisiae*  (Alexopoulos *et al*., 1996) | Nov, 20-24 |
| 13 | Cleistothecial Fungi, different types of appendages, taxonomic status *Eyrotium, Erysiphe graminis, E. cichoracearum, E. polygoni, Phylacctinia daldergiae, pododphaera leucotricha*  Prithecial fungi. Taxonomic status of *Claviceps purpurea*  Apothecial fungi, taxonomic status of *Monilinia fructicola*.  Pseudothecial fungi,Taxonomic status of *Venturia inaequalis*  (Alexopoulos *et al*., 1996) | Nov, 27-Dec, 1 |
| 14 | Phylum Basidiomycato and its general characteristics. Agaricales, brief characters of edible and poisonous mushroom  Taxonomic status of *Agericus bispours, Amanita phalloides. Uredinales,* Brief characters and important rust fungi, taxonomic status of *Puccinnia graminis* f.sp. *tritici, P.g.* f.sp. *hordei, p.g.* f.sp. *secalis. P. recondite* f.sp*. tritici P. striiformis* f.sp. *tritici, Uromyces fabae* and *M. lini*  (Alexopoulos *et al*., 1996) | Dec, 4-8 |
| 15 | Ustilaginales and its brief characters  Taxonomic status of *Ustilago tritici, U. hordei, U. nuda, U. maydis, U. scitaminea, U. secali, U. kolleri, Spacellotheca sorghi, S. reiliana, Nevossia indica, N. horrida*  (Alexopoulos *et al*., 1996) | Dec, 11-15 |
| 16 | Phylum Oomycota and its brief characters  Taxonomic status of *Phytopathora infestans, Phythium debaryanum, Plasmopora viticola, Albugo candida, Sclerospora graminiscola, Pseudoperonospora cubensis, Peronospora destructor, Basidiophora* and *Bremia*  (Alexopoulos *et al*., 1996) | Dec, 18-22 |

***Note****: You can reserve one week for sessional or mid-term exam, and if you wish, one week for student presentations of the assigned research project*

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| **RESEARCH PROJECT** |

1. Bio-safety precautions while working at laboratory
2. Collection of plant samples infected by viruses, bacteria, nematodes and fungi
3. Identification of disease on the basis of visual symptoms

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| **ASSIGNMENT CRITERIA** |

*Write here the distribution of marks. You can chose any or all from the below for the purpose*

Sessional: 4

Project: 4

Presentation:

Participation:

Final Exam:

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| **RULES AND REGULATIONS** |

75% attendance is mandatory to appear in the final examination