**UNIVERSITY OF SARGODHA**

**DEPARTMENT OF PLANT PATHOLOGY**

COURSE OUTLINE Spring 2020

Course Title: Biochemistry and Physiology of diseased plants

Course Code: PLPT-7109

Credit Hours: 3(2-1)

Instructor: Dr. Yasir Iftikhar

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DESCRIPTION AND OBJECTIVES

Pre-requisite: M.Sc. (Hons.) Plant Pathology

Objective:

To study biochemical and physiological changes in diseased plants.

Theory:

Infection process of fungi, bacteria, viruses and nematodes; comparative analysis of biochemical and physiological changes in diseased and healthy plants; influence of plant pathogens on photosynthesis, respiration, translocation, transpiration, cell wall composition and metabolism, nucleic acid and protein metabolism; changes in secondary metabolites, membrane alterations; growth regulators phytoallexins and toxins; nature of morphological and biochemical resistance in host plants; energy use and metabolic regulation in plant-pathogen interactions.

Practical:

Experiments to illustrate infection processes by plant pathogens; histopathology of infected plant tissue; biochemical analysis to demonstrate changes induced by biotic and abiotic factors; bioassay of toxin and selection for host resistance.

INTENDED LEARNING OUTCOMES

This course will be helpful in understanding the relationship between plant pathogens and microbial activity to alter the physiological functions.

COURSE CONTENTS

Theory

1. Infection process of fungi, bacteria, viruses and nematodes
2. Comparative analysis of biochemical and physiological changes in diseased and healthy plants
3. Influence of plant pathogens on photosynthesis, respiration, translocation, transpiration, cell wall composition and metabolism, nucleic acid and protein metabolism
4. Changes in secondary metabolites, membrane alterations
5. Growth regulators phytoallexins and toxins; lectin degrading enzymes affecting host cell and cell wall
6. Cutin and suberin degrading enzymes; effect of pathogens on trans-cellular and vascular transport
7. Nature of morphological and biochemical resistance in host plants
8. Energy use and metabolic regulation in plant-pathogen interactions
9. Effects of root infecting fungi on structure and function of cereal roots
10. Effects of disease on plant water relations

Practical

1. Experiments to illustrate infection processes by plant pathogens
2. Histopathology of infected plant tissue
3. Biochemical analysis to demonstrate changes induced by biotic andabiotic factors
4. Bioassay of toxin and selection for host resistance

READINGS

## Guar H.N. 2018. Physiological and Molecular Plant Pathology springer.

## Agrios, G.N. 2005. Plant Pathology 5th edition. Elsevier Academic press.

## Ayres, P.G. 1981. [Effects of Disease on the Physiology of the Growing Plants‎](http://books.google.com.pk/books?id=RbA8AAAAIAAJ&dq=PHYSIOLOGY+OF+DISEASED+PLANTS&lr=&cd=14).Cambridge University Press.

1. D. Šutić and J. B. Sinclair. 1991. Anatomy and Physiology of Diseased Plants. CRC Press. 232 pp.
2. Goodman, R.N., Z. Kiraly and K.R. Wood.1986. The Biochemistry and Physiology of Plant Disease. Univ.of Missouri Press, Columbia, USA.

COURSE SCHEDULE

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| Week | Topics and Readings | Books with Page No. |
| 1 | Introduction to Biochemistry and Physiology of Plants | Handouts |
| 2 | Introduction to Biochemistry and Physiology of Plants | Handouts (Soft notes) |
| 3 | Infection process in plants | Handouts |
| 4 | Physiology of diseased plants | Handouts |
| 5 | Biochemical changes in diseased plants | Handouts |
| 6 | Parasitism and pathogenesis | Plant Pathology by Agrios 5th Edition (77-95) |
| 7 | Parasitism and pathogenesis | Plant Pathology by Agrios 5th Edition (77-95) |
| 8 | Mid Term |  |
| 9 | Photosynthesis, Translocation and respiration | Plant Pathology by Agrios 5th Edition (105-121) |
| 10 | Permeability of Cell membrane, Transcription, translation and Plant growth | Plant Pathology by Agrios 5th Edition (105-121) |
| 11 | Secondary metabolites in diseased plants | Plant Pathology by Agrios 5th Edition (134-150) |
| 12 | Toxins, enzymes and growth regulators in disease development | Plant Pathology by Agrios 5th Edition (180-201) |
| 13 | Toxins, enzymes and growth regulators in disease development | Plant Pathology by Agrios 5th Edition (180-201) |
| 14 | Resistance in plants and nature of resistance | Research articles |
| 15 | Revision |  |
| 16 | Final Term |  |

RESEARCH PROJECT /PRACTICALS/LABS/ASSIGNMENTS

Lab assignments to the students will be assigned during the semester. Practical will be conducted during the week in respective classes according to the manual in the Department of Plant Pathology, College of Agriculture, UOS.

ASSESSMENT CRITERIA

Sessional: 20% (Participation, Presentation, Assignment)

Project: -

Presentation: -

Participation: -

Mid Exam: 30%

Final Exam (including practical): 50%