**UNIVERSITY OF SARGODHA**

**DEPARTMENT OF PLANT PATHOLOGY**

COURSE OUTLINE Winter 2019-2020

Course Title: Plant Virology

Course Code: PP-705

Credit Hours: 3(2-1)

Instructor: Dr. Yasir Iftikhar

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DESCRIPTION AND OBJECTIVES

Objective:

To introduce students to the applied and advanced concepts of plant viruses.

Theory

History and scope of plant virology; taxonomy and nomenclature; effects of viruses on plants; recent trends in virus transmission and movement in plants; structure of plant viruses; virus purification, replication, gene organization; physiology of virus infected plants; virus-vector-host interactions; natural and acquired resistance to virus infection; management of plant viruses; study of economically important viral diseases in Pakistan.

Practical

Field diagnosis of plant virus diseases; isolation and purification of plant viruses; basic virus characterization; serological techniques; electron microscopy; molecular techniques in virus detection.

INTENDED LEARNING OUTCOMES

Students will be able to understand the advanced concepts of plant virus replication and diseases they cause. This course will also be helpful for the students in their practical life.

COURSE CONTENTS

THEORY:

1. Introduction, History and Economic importance of Virus.
2. Taxonomy and nomenclature
3. Symptomology of plant viruses
4. Viruses and virus-like pathogens
5. Physiology of plant viruses
6. Replication of plant viruses
7. Recent trends in transmission of plant viruses
8. Virus-vector interaction
9. Diagnose of plant viruses
10. Major viral diseases in Pakistan

PRACTICAL:

1. Symptoms of plant viruses
2. Collection of diseased specimen
3. Biological Indexing
4. Serological Indexing
5. Molecular Indexing

READINGS

1. Ahlawat, Y.S. 2010. Diagnosis of Plant Viruses and Allied Pathogens. Stadium Press (India) Pvt. Ltd.
2. Compendia of different crops, American Phytopathological Society, St Paul, Minnesota, USA.
3. Foster, G.D. and S.C. Taylor. 1998. Plant Virology Protocols-From Virus Isolation to Transgenic Resistance. Humana Press, New Jersey.
4. Foster, G.D., I.E. Johansen, Y. Hong and P.D. Nagy. (Eds.). 2008. Plant Virology Protocols – From Viral Sequence to Protein Function 2nd Ed. Humana Press
5. Hadidi, A., R.K. Khetarpal and H. Koganezawa (Eds). 1998. Plant Virus Disease Control. American Phytopathological Society, St Paul, Minnesota, USA.
6. Hull, R. 2009. Comparative Plant Virology, 2nd Ed. Academic Press
7. Hull, R. 2002. Matthews’ Plant Virology, Fourth Ed. Elsevier Ltd.
8. Loebenstein, G. and G. Thottappilly. (Eds.) 2004. Virus and Virus-like Diseases of Major Crops in Developing Countries. Springer.
9. Matthews. R.E.F. 1991. Plant Virology. 3rd revised edition. Academic Press.

 COURSE SCHEDULE

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| Week  | Topics and Readings | Books with Page No. |
| 1 | Introduction to plant virus and Koch’s postulates | Comparative Plant Virology, 2nd Ed., (9-13),  |
| 2 | History and economic importance of plant viruses | (Comparative Plant Virology, 2nd Ed., 3-9, 23-24) |
| 3 | Taxonomy of plant viruses | Comparative Plant Virology, 2nd Ed., (13-20) |
| 4 | Introduction to Virus-like pathogens | (Comparative Plant Virology, 2nd Ed., (43-57) |
| 5 | Physiology of plant viruses  | Basics of Plant Virology(56-61)  |
| 6 | Viroids and their replication | Viroid (15-22), Comparative Plant Virology, 2nd Ed., (47-48) |
| 7 | Replication of plant viruses (RNA viruses) | Comparative Plant Virology, 2nd Ed., (139-155) |
| 8 | Mid Term |  |
| 9 | Replication of Plant viruses (DNA viruses) | Comparative Plant Virology, 2nd Ed., (156-158) |
| 10 | Transmission of Plant viruses (Mechanical transmission) | Diagnosis of Plant Viruses and Allied Pathogens (16-17) |
| 11 | Transmission of Plant viruses (Vegetative propagation+ Seed transmission) | Diagnosis of Plant Viruses and Allied Pathogens (13-16)Testing methods for seed-transmitting viruses: Principles and protocols. (13-18) |
| 12 | Virus vector interaction  | Comparative Plant Virology, 2nd Ed., (228-230) |
| 13 | Insect transmission of plant viruses | Comparative Plant Virology, 2nd Ed., (231-237) |
| 14 | Nematode transmission of plant viruses | Comparative Plant Virology, 2nd Ed., (239-240) |
| 15 | Diagnosis of plant viruses | Plant Viruses, Unique and Intriguing Pathogens. (193-213) |
| 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%