INSTITUTE	**FACULTY OF AGRICULTURE**
PROGRAM	**BACHELOR OF SCIENCE (Hons.) AGRICULTURE**
SEMESTER	**1**
COURSE TITLE	**FUNDAMENTALS OF PLANT PATHOLOGY**
COURSE CODE	**16AS0108**
COURSE CREDITS	**3**

Objective:

1 To acquire knowledge about plant pathogens, diseases and their management.
2 To gain skills in the isolation and identification of plant pathogens.
3 To impart the knowledge about various lab equipment and their uses in plant pathology.

Course Outcomes: After completion of this course, student will be able to:

1 Students will be able to identify the plant diseases caused by various disease organisms.
2 Students will be able to isolate the various disease organisms in the laboratory.
3 Students will able to know about mechanism of disease development in plant.
4 Students will be able to learn about pathogen survival, transmission and multiplication.

Pre-requisite of course: Require knowledge about the plant pathogens and disease of the different crops.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introduction: Importance of plant diseases, scope and objectives of Plant Pathology** Introduction: Importance of plant diseases, scope and objectives of Plant Pathology	1
2	**History of Plant Pathology with special reference to Indian work** History of Plant Pathology with special reference to Indian work	1
3	**Terms and concepts in Plant Pathology** Terms and concepts in Plant Pathology	1
4	**Causes and factors affecting disease development: Disease triangle and tetrahedron and classification of plant diseases** Causes and factors affecting disease development: Disease triangle and tetrahedron and classification of plant diseases	2

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Contents : Unit	Topics	Contact Hours
5	**Important plant pathogenic organisms (different groups): fungi, bacteria, phytoplasma, spiroplasma, viruses, viroids, algae, protozoa and phanerogamic plant parasites with example of diseases caused by them** Important plant pathogenic organisms (different groups): fungi, bacteria, phytoplasma, spiroplasma, viruses, viroids, algae, protozoa and phanerogamic plant parasites with example of diseases caused by them	2
6	**Diseases and symptoms due to abiotic causes** Diseases and symptoms due to abiotic causes	1
7	**Pathogenesis, Role of enzymes, toxins and growth regulators in disease development** Pathogenesis, Role of enzymes, toxins and growth regulators in disease development	2
8	**Defence mechanism in plants** Defence mechanism in plants	1
9	**Epidemiology: Factors affecting disease development** Epidemiology: Factors affecting disease development	1
10	**Fungi: General characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modification of thallus, reproduction (asexual and sexual)** Fungi: General characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modification of thallus, reproduction (asexual and sexual)	2
11	**Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi** Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi	1
12	**Key to divisions, sub-divisions, orders and classes** Key to divisions, sub-divisions, orders and classes	1
13	**Bacteria and mollicutes: General morphological characters** Bacteria and mollicutes: General morphological characters	1
14	**Basic methods of classification and reproduction** Basic methods of classification and reproduction	1
15	**Viruses: Nature, architecture, multiplication and transmission** Viruses: Nature, architecture, multiplication and transmission	1
16	**Growth and reproduction of plant pathogens** Growth and reproduction of plant pathogens	1
17	**Liberation, dispersal and survival of plant pathogens** Liberation, dispersal and survival of plant pathogens	1
18	**Types of parasitism and variability in plant pathogens** Types of parasitism and variability in plant pathogens	1
Total Hours		**22**

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DR. KANTHA DEVI ARUNACHALAM
Digitally signed by (Name of Dean/ Principal)

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Acquaintance with various laboratory equipments and microscopy** Acquaintance with various laboratory equipments and microscopy	2
2	**Preparation of media, isolation and Koch's postulates** Preparation of media, isolation and Koch's postulates	2
3	**General study of different structures of fungi** General study of different structures of fungi	2
4	**Study of symptoms of various plant diseases** Study of symptoms of various plant diseases	2
5	**Study of representative fungal genera** Study of representative fungal genera	2
6	**Staining and identification of plant pathogenic bacteria** Staining and identification of plant pathogenic bacteria	2
7	**Transmission of plant viruses** Transmission of plant viruses	2
8	**Study of phanerogamic plant parasites** Study of phanerogamic plant parasites	2
9	**Study of fungicides and their formulations** Study of fungicides and their formulations	2
10	**Methods of pesticide application and their safe use** Methods of pesticide application and their safe use	2
11	**Calculation of fungicide sprays concentrations** Calculation of fungicide sprays concentrations	2
Total Hours		**22**

Textbook :

1 NA, NA, NA, NA

References:

1 Modern Plant Pathology, Modern Plant Pathology, Dube H. C. , Scientific Publication Ltd., 1990

2 Plant Pathology, Plant Pathology, Agrios G. N, Academic Press, 2005

3 Plant Pathology, Plant Pathology, Alica D. and Jayalakshmi C., A. E., 2011

4 Introduction to Principles of Plant Pathology, Introduction to Principles of Plant Pathology, Singh R. S., Oxford, 2017

5 A text book of Fungi, Bacteria and Viruses, A text book of Fungi, Bacteria and Viruses, Dube H. C., Student Edition, 2018

6 Fundamentals of Plant Bacteriology, Fundamentals of Plant Bacteriology, Jayaraman J. and Verma J. P., Kalyani Publishers Pvt. Ltd., New Delhi, 2018

7 Experiments in Microbiology, plant pathology and biotechnology, Experiments in Microbiology, plant pathology and biotechnology, K. R. Aneja, New Age International New Delhi, 2001

DR. HIMALAY PATEL
Digitally signed by (Name of HOD)

DR. KANTHA DEVI ARUNACHALAM
Digitally signed by (Name of Dean/ Principal)

References:

8 An Introduction to fungi, An Introduction to fungi, Dube H. C., Scientific Publishers, 2013

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
25.00	25.00	20.00	10.00	10.00	10.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board may also use any of tools such as demonstration, role play, quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

DR. HIMALAY PATEL
Digitally signed by (Name of HOD)

DR. KANTHA DEVI ARUNACHALAM
Digitally signed by (Name of Dean/ Principal)