Course Specification
(Bachelor)

Course Title:	**Plant Pathology**
Course Code:	**BIO- 1324**
Program:	**BIOLOGY**
Department:	**BIOLOGY**
College:	**College of Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**1**
Last Revision Date:	**-**

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (Lectures 2 + Laboratory 2)					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 6 / 3rd Year)					
4. Course General Description:					
This course provides an introduction to the basic principles of plant pathogens, their interactions with the host plants, and the impact of plant diseases on agricultural activities and ecosystems. The course topics enable the students to explore the causative agents of plant diseases, including the biotic pathogens (fungi, bacteria, viruses, nematodes, and other microorganisms) and abiotic factors (drought, salinity, temperature extremes, and nutrient deficiencies). The course emphasizes identification, diagnosis, and management of the significant plant diseases through diverse integrated approaches, including cultural, chemical, and biological control methods.					
5. Pre-requirements for this course (if any)**:**					
Plant Anatomy & Physiology BIO 1322					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The main course objectives can be liste as follow: 1- Equip the students with the necesary knowledge to identify, diagnose, and manage plant diseases caused by either abiotic stresses (e.g., drought, salinity, temperature extremes) or biotic stresses (e.g., fungi, bacteria, viruses, nematodes).					

2- Develop the practical skills of the students through practicing the laboratory techniques required for pathogen identification as well as disease diagnosis and management.

3- Foster an understanding of plant-pathogen interactions, plant defense mechanisms, and the role of integrated pest management (IPM) in sustainable agriculture.

4- Highlight the impact of climate change in the development of emerging plant diseases and the global efforts that are focused disease surveillance and management.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	28
3.	**Field**	2
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Define the discipline of plant pathology and elucidate its importance to work in the field of agriculture and in ecosystems-related professions.**	**K1**	Lectures, discussions, and case studies.	-Exams -Quizzes -Assignment -Data search -Presentations
1.2	**Classify plant pathogens (fungi, bacteria, viruses, nematodes) and describe their life cycles.**	**K2**	Interactive lectures, visual aids (microscopic images, diagrams)	-Exams -Quizzes -Assignment -Data search -Presentations
1.3	**Explain the physiological and biochemical mechanisms integrated in the plant-pathogen interactions.**	**K3**	Lectures, group discussions, and real-life examples.	-Exams -Quizzes -Assignment -Data search -Presentations
2.0	**Skills**			
2.1	**Diagnose plant diseases caused by biotic and abiotic factors using the proper laboratory techniques.**	S1	Hands-on laboratory sessions, microscopy, and pathogen isolation.	-Lab reports -Presentaions

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.2	**Apply the integrated pest management (IPM) strategies to control plant diseases.**	S2	Case studies, field training, and problem-solving exercises.	-Group activities - Presentations
2.3	**Analyze and interpret experimental and field data and draw conclusions related to disease management.**	S3	Data analysis workshops Statistical tools Software training.	-Lab reports Presentations.
3.0	**Values, autonomy, and responsibility**			
3.1	**Demonstrate responsibility and the ability to be integrated in a teamwork and collaborate in laboratory and field activities.**	V1	Group activities Collaborative lab work	-Lab reports -Peer evaluations - Group presentations.
3.2	**Participate in specialized meetings and communicate the scientific findings effectively through oral presentation and written formats.**	V2	Scientific writing workshops presentation practice Feedback sessions.	-Written reports Oral Presentations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.3	**Adher to ethical rules and regulations while performing research work relevant to the field of plant pathology**	V3	Hands-on training, safety workshops, and virtual labs.	-Reports -Lab performance Safety quizzes

C. Course Content (Lectures)

No	List of Topics	Contact Hours
1.	Introduction to Plant pathology, Overview of Abiotic Stresses	4
2.	Drought and Waterlogging in Plants	2
3.	Temperature Extremes and Plant Stress	2
4.	Soil Salinity and pH Effects on Plant Health	2
5.	Introduction to Biotic Stresses and Plant Pathogens	2
6.	Fungal Pathogens and Their Impact on Plants	2
7.	Midterm 1: Abiotic Stresses and Introduction to Biotic Stresses	2
8.	Bacterial Pathogens and Plant Diseases	2
9.	Viral Pathogens and Their Role in Plant Infections	2
10.	Nematode Pathogens and Their Effects on Plants	2
11.	Plant-Pathogen Interactions and Defense Mechanisms	2
12.	Midterm 2: Bacterial, Viral, Nematode Pathogens, and Plant-Pathogen Interactions	2
13.	Disease Management Strategies and Integrated Pest Management (IPM)	2
14.	Emerging Plant Diseases and the Impact of Climate Change	2
Total		30

Course Content (Lab)

No	List of Topics	Contact Hours
1	-Introduction to laboratory tools and techniques in plant pathology -Measuring plant growth and development (leaf morphology, leaf area, wilting index, plant height, …)	4
1.	-Observation of symptoms caused by abiotic stresses (e.g., leaf scorch, chlorosis, wilting, …etc.) -Soil analysis for nutrient deficiencies	4
2.	-Experiments on drought stress (e.g., wilting point, stomatal closure) -Observation of waterlogging effects on root systems	2
4	-Experiments on temperature stress (e.g., heat shock proteins, frost damage) -Observation of temperature-induced symptoms	2
5.	-Soil salinity and pH testing -Observation of salt stress symptoms (e.g., leaf burn, stunted growth)	2
6	-Identification of common plant pathogens under the microscope -Collection and preservation of diseased plant samples	2
7	-Microscopic examination of fungal structures (e.g., spores, hyphae) -Isolation and culturing of fungi from infected plants	2
8	-Microscopic examination of bacterial cells (Gram staining) -Isolation and culturing of bacteria from infected plants	2
9	-Observation of viral symptoms (e.g., mosaic patterns, leaf curling) -Serological tests for virus detection (e.g., ELISA)	2
10	-Microscopic examination of nematodes -Extraction of nematodes from soil samples	2

11	-Demonstration of hypersensitive response (HR) in plants -Analysis of defense-related enzymes (e.g., peroxidase, polyphenol oxidase)	2
12	-Demonstration of disease control methods (e.g., fungicides, biocontrol agents) -Case studies on successful disease management	2
13	-Group presentations on emerging plant diseases -Review of course material and practical skills	2
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Semester Exam	5th week	15%
2.	Second Semester Exam 2	10th week	15%
3.	Quizzes, Attendance, Participation, Home works	During the course period	10 %
4.	Lab reports.	During the course period	5%
5.	Lab Exam	15th week	15 %
6.	Final Exam.	16th week	40 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Taiz, L., and E. Zeiger. Plant Physiology. 5th ed. Sinauer Associates, Inc. Publishers, Sunderland, MA (2010). ISBN: 978-0-87893-866-7 (casebound). Available at bookstore or online. William G. Introduction to plant physiology. 4 ed., university of weseren.(2008). ISBN 978-0470-24766-2. **Agrios GN.** Plant Pathology. 5th ed. Burlington, MA: Academic Press; 2005. ISBN: 978-0-12-044565-3.

Supportive References	**Schumann GL, D'Arcy CJ.** Essential Plant Pathology. 2nd ed. St. Paul, MN: American Phytopathological Society (APS Press); 2010. ISBN: 978-0-89054-381-8. **Lucas JA.** Plant Pathology and Plant Pathogens. 4th ed. Hoboken, NJ: Wiley-Blackwell; 2020. ISBN: 978-1-119-51199-9.
Electronic Materials	1. **American Phytopathological Society (APS) Education Center** ○ **Website:** https://www.apsnet.org/edcenter/ ○ **Description:** Offers online courses, teaching resources, and webinars on plant pathology topics. 2. **Coursera: Plant Pathology Courses** ○ **Website:** https://www.coursera.org/ ○ **Courses:** ▪ "Plant Biology" by University of Illinois. ▪ "Sustainable Agricultural Land Management" by University of Florida. ○ **Description:** Online courses covering plant pathology and related topics. 3. **edX: Plant Science Courses** ○ **Website:** https://www.edx.org/ ○ **Courses:** ▪ "Fundamentals of Plant Biology" by Tel Aviv University. ▪ "Introduction to Biology: Ecology, Evolution, and Biodiversity" by Rice University. ○ **Description:** Online courses with modules on plant pathology and disease management.
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, lab
Technology equipment (projector, smart board, software)	Projector, smart board
Other equipment (depending on the nature of the specialty)	-

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct
Effectiveness of Students assessment	Faculty Members	Indirect
Quality of learning resources	Peer Reviewers	Indirect
The extent to which CLOs have been achieved	Program Manager, Peer Reviewers	Indirect
Other	-	-

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	