COURSE SYLLABUS
ACP601 PLANT BACTERIOLOGY

1. COURSE INFORMATION
Classes taught: MSc Crop protection and MSc Plant Pathology
Pre-requisite courses: Microbiology, principles of plant pathology and disease control
Course duration: 22 contact hours (half a course)

2. INSTRUCTOR’S CONTACT INFORMATION
Instructor: Dr. James W. Muthomi, Senior lecturer, Department of Plant Science and Crop Protection
Range Management Building, Room 212
Office hours: Monday to Friday 8.00 am to 10.am, except when in class, attending meetings or in the field
Cell phone 0722 984 179
e-mail: james.muthomi@uonbi.ac.ke

3. COURSE DESCRIPTION
Economic importance of bacterial diseases; plant pathogenic bacteria; ecology and spread of bacterial diseases; host range; measurement of bacterial growth; diseases caused by plant pathogenic bacteria; entry of bacteria into plants; pathogenicity and virulence factors in bacterial diseases; plant response to bacterial infection; diagnosis of bacterial diseases: symptoms, microscopic examination, isolation, gram stain test, biochemical tests, serological tests, fatty acid-based tests, Polymerase Chain Reaction (PCR)-based analysis, pathogenicity

4. COURSE LEARNING OUTCOMES AND OBJECTIVES
Course learning outcomes:
By the end of the course, the students will be able to:
1. Discuss the importance of diseases caused by bacteria in plants
2. Describe the symptoms and types of plant diseases caused by bacteria
3. Discuss the sources of inoculum, infection and spread plant bacterial diseases
4. Describe procedures of and conduct tests in diagnosing plant diseases caused by bacteria
5. Recognize, describe the causal agents, symptoms, disease development and management of common diseases caused by bacteria in Eastern Africa

Course objectives:
1. To gain understanding on the importance of diseases caused by bacteria in crops
2. To understand the spread, infection and survival of plant pathogenic bacteria
3. To understand and gain skills in diagnosing diseases caused by bacteria in plants
4. To gain knowledge on the causes, symptoms, disease development, spread and management of key bacterial diseases affecting crops diseases in East Africa

5. COURSE OUTLINE AND SCHEDULE

Course outline
1. Introduction: Morphology and structure of bacterial cell, economic importance of diseases caused by bacteria in plants, classes of bacteria that contain plant pathogens, growth and reproduction in bacteria, measurement of growth in bacteria;
2. Types of diseases caused by phytopathogenic bacteria: spots and blights, bacterial soft rots, vascular wilts, bacterial cankers, bacterial galls, bacterial scabs, diseases caused by xylem-inhabiting fastidious bacteria, diseases caused by phloem-inhabiting fastidious bacteria;
3. Epidemiology of bacterial diseases of plants: sources of inoculum, infection routes in plants, survival and spread of bacterial diseases;
4. Diagnosis of bacterial diseases of plants: preliminary diagnosis based on symptoms, collection and transport of bacteria infected plant specimens, test for bacterial streaming, microscopy of diseased tissues, isolation of suspected bacterial pathogen, cultural characteristics, test for flagellation and motility, gram staining, physiological and biochemical tests, serology, nucleic acid based analysis, fatty acid analysis, pathogenicity tests;
5. Management of bacterial diseases of plants: sanitation, good agricultural practices, host resistance, chemical options;

Semester schedule:

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<tr>
<th>Week No</th>
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<th>Lecture Topic</th>
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<th>Date</th>
<th>Laboratory topic</th>
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<td>1</td>
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<td>Economic importance of bacterial diseases, classes of bacteria containing plant pathogens, types of diseases caused by bacteria</td>
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<td>Preparation of bacterial culture media; Symptoms of diseases caused by bacteria, bacterial streaming. Isolation of plant pathogenic bacteria;</td>
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<td>Presumptive diagnosis (symptoms, sample collection and handling), Isolation, cultural characteristics,</td>
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<td>Cultural characteristics, Gram stain, KOH solubility test, catalyse test;</td>
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<td>3</td>
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<td>Gram staining, physiological and biochemical tests</td>
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<td>Set up tests for identification of bacteria: Levan formation, gelatine hydrolysis, starch hydrolysis, oxidative/fermentative test, nitrate reduction, salt tolerance</td>
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<td>Serology, nucleic acid analysis, fatty acid</td>
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<td>Results of identification tests, set up hosts inoculation tests</td>
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<td>Bacterial growth, measurement of growth in</td>
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<td>Results of host inoculation tests; Start presentation of specific</td>
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<td>Epidemiology of bacterial diseases, management</td>
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<td>**Continuous Assessment Test 1 – Plant</td>
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6. REFERENCES

7. SAMPLE QUESTIONS AND ASSIGNMENTS
• Sample review questions will be provided at the beginning of the course
• Case studies and practicals will contribute to the continuous assessment marks. Each practical will be accompanied by questions and the answers must be handed in at the end of each laboratory exercise.

8. EXAMINATION GRADING
As per the University of Nairobi policy, the examination will be out of 100, of which 70% will be for main examination and 30% for continuous assessment tests (CAT). The marks will be distributed as follows:
Laboratory exercises (practicals) - 10 %
Presentation of specific disease assignments – 10%
Written tests (CAT) - 10 %
Main Examination - 70%

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• Answers to the questions for each practical must be handed in at the end of the laboratory exercise.
• All students must take the continuous assessment test (CAT) as per schedule. A student will only be allowed to sit for a special CAT on production of a valid written explanation.
• As per University of Nairobi regulations, students who miss more than one third of the classes/ practical sessions will not be allowed to take the final examination.

9. COURSE POLICY
• Attendance and participation in practical sessions is mandatory.
• During practical sessions, students will work in the assigned groups of 4 to 5 students. Each student must stay in the assigned group during all the practical sessions.
• Ringing cell phones will not be tolerated during lecture and practical sessions; Cell phones must be in silent mode.
• Observance of order is expected of every student during lecture and practicals, including timeliness, observance of silence while a lecture is in progress.