**The University of Jordan**

**Faculty of AgricultureDepartment: Plant Protection**

**Program:Academic Year2013/2014 First Semester**

**Course Name (Course Number)**

Phytopathogenic Bacteria 606325

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| --- | --- | --- | --- | --- | --- |
| **Credit hours** | **3** | **Level** | **Third year** | **Pre-requisite** | 0606221 |
| **Coordinator/ Lecturer** | **Prof. HamedKhlaif** | **Office number** | 227 | **Office phone** | **22524** |
| **Course website** |  | **E-mail** | H-khlaif@ju.edu.jo | **Place** | **181** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Office hours** | | | | | |
| **Day/Time** | **Sunday** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** |
|  | (10-11) | (10-11) | (10-11) | (10-11) | (10-11) |
|  |  |  |  |  |  |

**Course Description**

The purpose of this course is to give an idea to the students about the plant diseases caused by phytopathogenic bacterial genera, their characteristic and taxonomy, economic importance, causal agents, epidemiology and control.

**Learning Objectives**

1. To give the students an idea about the symptoms of bacterial diseases
2. The economic importants of these diseases
3. Some examples about the common bacterial diseases in Jordan, their causal agents, epidemiology and control

**Intended Learning Outcomes (ILOs):**

Successful completion of the course should lead to the following outcomes:

**A. Knowledge and Understanding:** Student is expected to

**A1- Have an idea about the bacterial diseases, their symptoms**

**A2- their economic importants**

**A3- developing,epidemiology and control of bacterial diseases**

**.….**

**B. Intellectual Analytical and Cognitive Skills:** Student is expected to

B1- have an idea about bacterial cell, shapes and structures

B2-different growth requirement for the bacteria and their population determination

B3- idea about the different bacterial genera causing plant diseases

B4- isolation of the causal agents from the different disease symptoms

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**C. Subject- Specific Skills:** Students is expected to

C1- have an idea about characterization of these causal agents through biochemical, physiological and pathological tests.

C2- classification of the different bacterial genera

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**D. Transferable Key Skills:** Students is expected to have an idea

D1- examples of the different bacterial diseases

D2- epidemiology and development of these diseases

D3- Integrated control methods of these diseases(cultural and biological)

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# ILOs: Learning and EvaluationMethods

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| --- | --- | --- |
| **ILO/s** | **Learning Methods** | **Evaluation Methods** |
| A. Knowledge and Understanding  (A1-A3) | Lectures and Discussions | **Exam, Quiz,** |
| B. Intellectual Analytical and Cognitive Skills  (B1-B4) | : Lectures and Discussions | **Exam, Quiz,** |
| C. Subject- Specific Skills  (C1-C2) | Lectures and Discussions | **Exam, Quiz,** |
| D. Transferable Key Skills (D1-D3) | Lectures and Discussions | **Exam, Quiz,** |

**Course Contents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Content** | **Reference** | **Week** | **ILO/s** |
| Introduction: Historical overview, Economic importance | 1,7 | 1 | A1,A2,A3 |
| Prokaryotic cell shape, size and arrangement.  Internal and external structures.  Differences between prokaryotic and eukaryotic cells.  Nutritional and growth:  Nutritional requirements, physical and chemical requirements, factors affecting growth, growth curve, measurements of growth. | 6,7 | **2,3** | **B1, B2** |
| Genera of phytopathogenic bacteria, characteristics, taxonomy and identification.  Dissemination, sources of inoculum and entrance to the plant | 1,3,6,5,7,9 | 4,5 | B3 |
| Virulence factors:  Sugars, Pectic, CWD enzymes, Toxins, Growth Regulators and Ice nucleation | 7,8,9 | 6 | C1 |
| Disease symptoms:  Spots, Blight, cankers, tumors, vascular wilt, soft rot and scab. | 1,3,6,7 | 7 | B1 |
| Spots and blights, tomato speck, tomato spot, angular leaf spot of cucumber, Bean blights, angular leaf spot of strawberry, Cereals stripes and blights, wild fire of tobacco, angular leaf spot of cotton, fire blight, citrus blast, bacterial blight and pustules of soybean | 1,3,5,6,7 | 8,9 | D1-D4 |
| Cankers:  Bacterial canker of tomato, citrus and stone fruits. | 1, 3, 5,6,7 | **10** | **D1-D4** |
| Tumors: crown gall and olive knot  Vascular wilt: wilt of cucurbits, solanaceae, and ring rot of potato, black rot of crucifers and Stewarts of corn.  Soft rot and scab: soft rot of vegetables, black leg of potato and scab of potato | 1, 3, 5,6,7 | 11,12 | **D1-D4** |
| Fastidious vascular bacteria:  Pierece disease of grapes, citrus greenings, Aster yellow, pear decline, stubborn of citrus and corn stunt. | 1, 3, 5,6,7 | 13,14 | **D1-D4** |
| Control of bacterial diseases:  Legislation, eradication, cultural, chemical and biocontrol | 1, 3, 5,6,7 | 15,16 | D4 |

**Learning Methodology**

## Power point theoretical Lectures and discussion. Practical laboratory exercises.

# Evaluation

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| --- | --- | --- |
| **Evaluation** | **Point %** | **Date** |
| **Midterm Exam** | 30 | 25/11/2013 |
| Lab. First | 10 | 18/11/2013 |
| **Final exam** | 35 | University schedule |
| Lab.Final | 10 | University schedule |
| Lab. Report | 5 |  |
| Lab Work( Quizzes+ Home works) | 10 |  |

**Main Reference/s:**

Agrios, G. N. 2005. Plant Pathology.5-th edition.University of Florida. Academic press

Janes, J.D. 2005. Phytobacteriology Principles and Practices.Plant protection service.Wageningen.The Nethrlands.

Khlaif, H. 2001. Phytopathogenic Bacteria ( Arabic). Research Dean ship. University of Jordan.

# References:

1. Agrios, G. N. 2005. Plant Pathology. 5-th edition. University of Florida. Academic press
2. Bradbury, J. F. 1986. Guide to Plant Pathogenic Bacteria. CAB International Agricultural Institute, England.
3. Fahy.P. C., and Persley, G. J. 1983. Plant Bacterial Diseases. A diagnostic Guide. Academic Press. Orland.391 pp

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1. Gnanamanickam S. Sam et al. 2006. Plant Associated Bacteria, springer. Netherland.
2. Goszczynska. J.J. Serfontein and S. Serfontein. 2000. Introduction to Practical Phytobacteriology. Bacterial Disease Unit, ARC-Plant Protection Research Institute. Pretoria, South Africa.
3. Janes, J.D. 2005. Phytobacteriology Principles and Practices. Plant protection service. Wageningen. The Nethrlands.
4. Khlaif, H. 2001. Phytopathogenic Bacteria ( Arabic). Research Dean ship. University of Jordan.
5. Perombelon, M .C. and Vander Wolf J. M. (2002). **Methods for the detection and quantification of *Erwiniacarotovora* subsp. *atroseptica*(*Pectobacteriumcarotovorum*subsp. *atrosepticum*) on potatoes**: a laboratory manual, Scottish Crop Research Institute, Scotland, UK.
6. Schaad, N.2002 Laboratory Guide for Plant Pathogenic Bacteria. APS.

**Intended Grading Scale (Optional)**

**A 95-100**

**A- 90-94**

**B+ 85-89**

**B 80-84**

**B- 75-79**

**C+ 70-74**

**C 65-69**

**C- 60-64**

**D+ 55-59**

**D 50-54**

**D- 45-49**

**F Below 45**

**Notes:**

* Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming, then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter, problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President.For final complaints, there will be a committee to review grading the final exam.
* For more details on University regulations please visit:

<http://www.ju.edu.jo/rules/index.htm>