**The University of Jordan**

**Faculty: Agriculture Department: Hort. & Crop Sc.**

**Program: PH.D Academic year: \_\_\_\_\_\_\_**

**Course: Plant Growth Regulators 601945**

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| --- | --- | --- | --- | --- | --- |
| **Credit hours** | **3** | **Level** | **PH.D**  | **Pre-requisite** | **-** |
| **Coordinator/ Lecturer** | **Prof. M. Qrunfleh****Prof. J. Ayad** | **Office number** | **217** | **Office phone** | **22339** |
| **Course website** |  | **E-mail** |  | **Place** |  |

|  |
| --- |
| **Office hours** |
| **Day/Time** | **Sunday** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** |
|  | **11-12** |  | **11-12** |  |  |
|  |  |  |  |  |  |

**Course Description**

Plant bioregulators is an advanced course that provide students with and advanced discussion of plant hormones (biosynthesis, destruction, transport, metabolism), phytohormones and synthetic plant bioregulators used in induction, stimulation or change horticultural and field plant characters, types and advantages of *plant bioregulators used in agriculture and problems associated with miss use of applications.* An introduction to the recent literature on the physiology, biochemistry, molecular biology and practical applications of the primary plant hormones

**Learning Objectives**

1. To develop an understanding of the modes and pathways involved in the biosynthesis of plant hormones.
2. To highlights the role of plant hormones at the cellular levels as well as the whole plant level.
3. To develop an understanding of characterization and quantification of environmental factors affecting plants and how plants sense and respond to environmental factors and the ways that environmental factors impact yield and productivity.

**Intended Learning Outcomes (ILOs):**

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

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

A.1 Knowledge of major natural and synthetic plant regulators that are use in agriculture.

A.2 Identify the physiological factors that regulate the synthesis and metabolism of plant hormones.

A.3 Knowledge of the mechanisms by which plant bioregulators regulate plant growth and development.

A.4 Knowledge of environmental factors that interact with plant bioregulators role in plant development.

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

B.1 Have the ability to think analytically and develop logical arguments with respect to plant hormones biosynthesis, regulation and signal transduction pathways.

B2. Demonstrate clear understanding of crop-plant hormones interactions and its implication on crop growth and yield**.**

B.3 Integrate and apply their knowledge of bioregulators for analytical thinking and solving practical problems experienced in applications of plant growth regulators.

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

C.1 Formulate the biosynthetic and signal transduction pathways for each plant hormone.

C.2 Enumerate the physiological responses elicited by plant hormones.

C.3 Review the physiological basis for the use of plant bioregulators in plant production..

C.4 Read topics in review/research articles assigned to them and make a class presentation.

**D. Transferable Key Skills:** Students is expected to

D.1 Expand their knowledge in the physiological aspects of plant growth, development, and its interaction with the surrounding environment.

D.2 Develop critical thinking and problem solving skills with respect to crop physiology.

D.3 Relate crop physiological processes with agronomic practices used in crop production systems.

D.4 Have improved oral and written communication skills, and an in depth appreciation of specific topics in crop physiology

*At the end of the course students will be able to, and will have read at least one review article for each primary hormone.*

# ILOs: Learning and Evaluation Methods

|  |  |  |
| --- | --- | --- |
| **ILO/s** | **Learning Methods** | **Evaluation Methods** |
|  | Lectures and discussions, Homework and Assignments, Projects, Presentation, … | Exam- Quiz 40%Presentation-project 20%Assignments, .. 40% |

**Course Contents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Content** | **Reference**  | **Week** | **ILO/s** |
| ***Homework:- Assign your team and project,*** ***-Write proposal about your project.*** |  | ***Due date: 5th week*** |  |
| Introduction | (1) | 1st |  |
| Auxins | (1), (2) | 2nd and 3rd |  |
| *Gibberellins* | (1), (2) | 4th and 5th |  |
| *Cytokinins* | (1), (2) | 6th and 7th |  |
| Abscisic acid | (1), (2) | 8th and 9th |  |
| Ethylene | (1), (2) | 10th and 11th |  |
| Phytochrome | (1), (2) | 12th |  |
| Other plant hormones | (2) | 13th |  |
| Application of regulators | (3) | 14th and 15th |  |

**Learning Methodology**

Lectures.

**Projects and Assignments**

Presentations using data show

# Evaluation

|  |  |  |
| --- | --- | --- |
| **Evaluation** | **Point %** | **Date** |
| **2 Midterm Exam2**  | 40 | 6th and 11th week |
| * **Review paper and class participation**
* **Project**
 | 20 | 8th week |
| **Final Exam**  | 40 | 15th week |

**Main Reference/s:**

1. Biochemistry physiology of plant hormones. T.C. Moore. 1979. Springer-verlag, New York Inc.

# References:

1. Phytohormones and related compounds: A comprehensive treatise, Vol. 1, 1978, Elsevier/ North Holland Biochemical Press.
2. Phytohormones and related compounds: A comprehensive treatise, Vol. 2, 1978, Elsevier/ North Holland Biochemical Press.

**Intended Grading Scale (Optional)**

0-39 **F**

40-49 **D**-

50-54 **D**

55-59 **D+**

60-64 **C**-

65-69 **C**

70-73 **C+**

74-76 **B**-

77-80 **B**

81-84 **B+**

85-89 **A**-

90-100 **A**

**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>