האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Recent advances in Plant Protection for Global Food Security - 73560

Last update 06-11-2024

HU Credits: *2*

Degree/Cycle: *2nd degree (Master)*

Responsible Department: *Agroecology & Plant Health*

Academic year: *0*

Semester: *1st Semester*

Teaching Languages: *English*

Campus: *Rehovot*

Course/Module Coordinator: *Yael Heifetz*

Coordinator Email: *yael.heifetz@mail.huji.ac.il*

Coordinator Office Hours: *By appointment*

Teaching Staff:
Dr. Yael Heifetz,
Prof. Kavya Dashora

Course/Module description:
The course aims to address the advances in plant protection starting from the basic definition and historical overview, discussing about various methods of managing the pests by chemical, physical and biological methods. The course will cover the modern technologies including Omics with special reference to PGPRs; more topics like marker assisted selection, genome wide assisted selection and RNA sequencing techniques will elaborate on how modern techniques in plant protection are facilitation detailed taxonomic investigation, characterization and identification of the pest.
The next topic of use of Artificial intelligence and machine learning will help the students to apply different models to predict the diseases forecast, yield, crop loss and its impact on food security, importance of data collection and application of sensor technologies for it. In AI, mainly the advantages of image processing will be taught , bad imaging, noisy data, removing the noise, otsu method, etc. for training and testing pest detection models.

Course/Module aims:
The course will cover the journey of plant protection so far and the future to detect, characterize manage and prevent plant pests as much as possible for preventing the food loss and make more food available.

Learning outcomes - On successful completion of this module, students should be able to:
1. Classical Plant Protection Methods
2. Omics Technologies in Plant Protection
3. AI and Machine Learning Models in Plant Protection

Attendance requirements(%):
100

Teaching arrangement and method of instruction: Lectures
case studies

Course/Module Content:

A. Classical Plant Protection Methods

1. Introduction to Plant Protection
2. Chemical Control Methods
3. Biological Control Methods
4. Physical and Cultural Control Methods
B. Omics Technologies in Plant Protection
1. Introduction to Omics Technologies
2. Genomics in Plant Protection
3. Transcriptomics and Gene Expression Analysis
4. Proteomics and Metabolomics
5. Omics Technologies in Disease Resistance Breeding
C. AI and Machine Learning Models in Plant Protection
1. Introduction to AI and Machine Learning
2. AI and ML Applications in Pest Detection and Diagnosis
3. Predictive Modelling for Pest and Disease Management
4. Precision Agriculture and Decision Support Systems
5. Challenges and Future Directions

Required Reading:

Will be given during the course

Additional Reading Material:

Grading Scheme:

Essay / Project / Final Assignment / Home Exam / Referat 40 %

Presentation / Poster Presentation / Lecture/ Seminar / Pro-seminar / Research proposal 40 %

Active Participation / Team Assignment 10 %

Attendance / Participation in Field Excursion 10 %

Additional information: