The Hebrew University of Jerusalem

Syllabus

CURRENT GREENHOUSE CROP PRODUCTION - 73914

Last update 19-02-2023

HU Credits: 2

Degree/Cycle: 2nd degree (Master)

Responsible Department: Field and Vegetable Crops-International Prog.

Academic year: 2023

Semester: 2nd Semester

Teaching Languages: English

Campus: Rehovot

Course/Module Coordinator: Dr. Meir Teitel

Coordinator Email: grteitel@agri.gov.il

Coordinator Office Hours: By appointment

Teaching Staff:

Dr. Meir Teitel

Course/Module description:

Students will learn the basic principles of greenhouse microclimate management and control. Information on current greenhouse structures and crops grown in greenhouses will be provided. In the first part of the course the students will be introduced to principles of heat transfer, fluid mechanics and psychrometrics. The second part will deal with greenhouse heating, ventilation, cooling, shading, CO2 enrichment, sensors for climate control and basic control and management strategies.

Course/Module aims:

To provide a comprehensive understanding of basic processes in greenhouse microclimate management. To practice quantitative analysis of problems associated with greenhouse microclimate.

Learning outcomes - On successful completion of this module, students should be able to:

On successful completion of this module, students should be able to:
•Describe the current status of greenhouse production in various countries.
•Understand basic principles in heat transfer in greenhouses
•Understand basic principles in air flow in greenhouses
•Understand basic principles in treatment of humid air in greenhouses
•Understand basic principles of measurement of environmental parameters such as temperature, humidity, radiation, wind speed, CO2 concentration, net radiation, soil heat flux.
•Know and understand basic principles of control systems.
•Know and understand the basic principles of microclimate management
•Carry out a principle design and calculations of greenhouse systems for heating, ventilating, cooling, enriching with CO2, shading, etc.

Attendance requirements(%):

100

Teaching arrangement and method of instruction: frontal lectures with student presentations of relevant topics

Course/Module Content:

1.Introduction

2, 3, 4, 5 - Basic principles in thermodynamics, fluid mechanics and heat transfer. Psychrometrics, Solar energy, Energy balance (heat loss and gain) and covering materials.
6.Heating: theory and equipment
7.Ventilation: theory and equipment
8.Cooling systems: theory and equipment
9.CO2 balance and enrichment techniques
10.Sensors used in greenhouses and typical measurements
11.Strength of materials, typical frames and load calculations
12, 13 .Basic principles of control systems

Required Reading:
None

Additional Reading Material:
1) Greenhouse climate control: an integrated approach. 1995. Eds. J. C. Bakker, G.P.A. Bot, H. Challa and N.J. Van de Braak. Wageningen Press.
2) Computerized environmental control in greenhouses: a step by step approach. 1996. P.G.H. Kamp and G.J. Timmerman. IPC plant, Ede, The Netherlands.
3) Greenhouses, advanced technology for protected horticulture. 1998. J.J. Hanan. CRC Press.
4) Integrated greenhouse systems for mild climates. 2011. C. von Zabeltitz, Springer.
5) Greenhouse technology and management 2nd edition. 2013. N. Castilla, CABI

Course/Module evaluation:
End of year written/oral examination 50 %
Presentation 25 %
Participation in Tutorials 0 %
Project work 25 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
None