

Title of the module: Crop Irrigation Regimes

Reference number of the module: 001-2-2035

BGU Credits: 3

ECTS credits: ??

Academic year:

Semester: 1st

Hours of instruction: 2 weekly hours

Location of instruction: Zoom; BGU University

Language of instruction: English

Cycle: 1st year of M.Sc. program.

Position: Obligatory for irrigation and plant environment, elective for other students in the BIDR.

Field of Education: Irrigation.

Responsible department: The French-Associates Institute for Dryland Agriculture and Biotechnology

General prerequisites: Basic Biology, Basic Physics, Basic Chemistry, Soil science

Grading scale: Percentage

Module's Description: The course will address various modern irrigation and fertilization (fertigation) methods and will provide tools to deal with problems associated with arid and semi-arid conditions. The course combines lectures and practice on the fundamentals of fertigation system design and operation. During the course, devices that are currently used for irrigation scheduling will be introduced to the students.

Aims of the module: To provide tools to deal with irrigation problems associated with arid and semi-arid conditions (e.g., high water demand, saline water).

Learning outcomes of the module: On successful completion of the module, the student should be able to:

1. Understand the interactions between soil-plant-atmosphere and the irrigation system.
2. Be familiar with fertigation scheduling principals.
3. Design a sprinkler and drip irrigation system.
4. Conduct an irrigation experiment

Attendance regulation: Obligatory (1 lecturer coordinated meeting- exempted). Students are responsible to self-study missed material.

Teaching arrangement and method of instruction: 1. Frontal lectures and discussions. Home exercises. 2. Designing a research project (individual guiding). Research questions selected by each student with lecturer assistance. Paper project includes literature review, research question and hypotheses, methodology and measures (gained in class and from the literature). Final project paper will be presented during the last meeting.

Lecturer: Prof. Naftali Lazarovitch

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Office hours: In coordination with the lecturer.

Module evaluation: at the end of the semester the students will evaluate the module according to the university's evaluation process, in order to draw conclusions, and for the university's internal needs.

Confirmation: the syllabus was confirmed by the faculty academic advisory committee to be valid on **XXX (academic year)**

Last update: May. 2022

Assessment:

1. Participation in class discussions	5% (bonus)
2. Exercises (3)	30%
3. Final written research paper	35%
4. Final presentation of paper	35%
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	105%

Module Content\ main subject units:

Week 1 - Review of irrigation methods and their effect on water availability (sprinkler, surface, drip, Irrigation machines)

Weeks 2 and 3 - Design of sprinkler irrigation system (hydraulics, head loss, soil infiltrability, one-dimensional soil water flow)

Weeks 4 and 5 - Design of drip irrigation system (hydraulics, head loss, multidimensional soil water flow, compensated and uncompensated emitters)

Week 6 and 7 - The system head (pumps, hydraulic valves, filters, controller, water gauge, backflow preventer, local head loss)

Week 8 - Fertigation (Fertilizers for fertigation, fertilizer pumps, fertigation program)

Week 9 - The soil as a water and nutrient reservoir for plants (water content and availability, nutrient content and availability)

Week 10 - Fertigation scheduling methods (soil, plant, atmosphere, combinations)

Week 11 - Wireless network sensors (network configuration, spatial and temporal variability, optimization)

Week 12 - Fertigation with saline water (soil salinity and sodicity, salinity stress, salt load, salt balance)

Week 13 - Field trip: Visiting open field (orchard, field crop) and greenhouse with soilless culture.

Literature

Hillel, D. (1998). Environmental Soil Physics: Fundamentals, Applications, and Environmental Considerations. Academic Press.

Dasberg, S. and Or, D. (1999) Drip irrigation. Springer-Verlag.

Hillel, D. (2000). Salinity Management for Sustainable Irrigation. World Bank Publications.

Moshe Sne (2006). Micro Irrigation in Arid and Semi-Arid Regions -Guidelines for Planning and Design. ICID Publications.