The Hebrew University of Jerusalem

Syllabus

SOIL CONSERVATION - 71605

Last update 23-12-2023

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Soil and Water Sciences

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: Rehovot

Course/Module Coordinator: Dr. Gil Eshel

Coordinator Email: gil.eshel@mail.huji.ac.il

Coordinator Office Hours:

Teaching Staff:

Dr. Gil Eshel,
Mr. Simon Futerman

Course/Module description:
The first phase of the course will focus on the processes of soil degradation that result from anthropogenic activity, mainly agricultural activity, and its' environmental effects. The second phase will focus on the means to deal with soil degradation by understanding of the use of the common chemical additives, physical and agronomic means. And at the last phase we will dive into the world of Conservation/ Regenerative Agriculture and Soil Health.

Course/Module aims:
1.Familiarity and awareness to the processes and mechanisms for soil degradation while emphasizing understanding the impact of human activity on the extent and rates of soil erosion.
2. Understanding the effects and interactions between soil properties, topography, climate, land use, on soil degradation processes.
3. Familiarity with models that describe soil erosion.
4. Familiarity with rain and wind simulation systems.
5.Familiarity with the various agrotechnical means for soil, water and environment conservation.
6. Familiarity with the world of Conservation/Regenerative Agriculture and soil health.

Learning outcomes - On successful completion of this module, students should be able to:
Ability to identify soil erosion and soil degradation in the field,
define the focal of the problem,
to build an initial strategy for soil and water conservation.

Attendance requirements(%):
90

Teaching arrangement and method of instruction: Frontal lectures that you will need to attend in class, self-learning, assignments, self-reading, working in discussion groups, practicing, experimenting and field trips.

Course/Module Content:
1. Introduction: why soil and water conservation is needed? soil and ecosystem

services.
2.Processes causing degradation of soil, water erosion, wind erosion, tillage erosion, compunction, salinization, agronomic problems such as pest outbreak and herbicide resistant weeds, soil diseases.
3.Soil erosion and worldwide and local extent of the problem.
4.Processes that promote soil erosion.
5.Environmental impacts of soil erosion from agricultural fields.
6.Soil degradation: events causing change.
7.Water erosion: processes and mechanisms, rain characterization, Raindrop kinetic energy, crusting - physical sealing, detachment, transportation and sedimentation, erosion types (rill to interrill, gully channel).
8.Variables affecting water erosion: precipitation, vegetation cover, topography, soil properties, rain erosivity, runoff erosivity.
9.Soil erosion at different scales: micro, plot, field, drainage basin.
10.Methods for measuring runoff and erosion: Rain simulators, measurements in the field.
11.Wind erosion processes and mechanisms: wind erosion and air quality, wind erosion simulators, tillage erosion.
12.Empirical models: the universal soil loss equation (RUSLE). Wind erosion equation (WEQ).
13.Coupling between soil conservation and water conservation.
14.Strategy and methods for soil and water conservation: engineered waterway and runoff drainage, growing crops in contour pattern, terraces, “depression markers”, “Diked furrow” soil stabilizer, buffer strips, minimum tillage no tillage, cover crops.
15.The effect of tillage management on soil quality health, soil and water conservation, food security and environment protection.

Required Reading:
Will be deliverd

Additional Reading Material:
Blanco-Canqui, Humberto, and Rattan Lal. 2010. Principles of Soil Conservation and Management. Springer Netherlands.
Morgan, R. P. C. 2005. Soil Erosion and Conservation. 3rd ed., Blackwell Pub.UK.

Grading Scheme:
Essay / Project / Final Assignment / Home Exam / Referat 50 %
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 15 %
Clinical Work / Lab Work / Practical Work / Workshops 25 %
Attendance / Participation in Field Excursion 10 %

Additional information: