The Hebrew University of Jerusalem

Syllabus

WATER QUALITY IMPROVEMENT AND RECLAMATION - 71612

Last update 22-10-2020

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: Sara Elhanany

Coordinator Email: sara.elhanany@mail.huji.ac.il

Coordinator Office Hours: by appointment

Teaching Staff:
Ms. ,
Mr.

Course/Module description:

Preservation, monitoring and remediation of the natural water resources, Water and wastewater treatment and effluents recycling in Israel.

Course/Module aims:
Provide students with basic knowledge about: water quality of the natural water resources in Israel, monitoring and remediation methods, risk assessment, water and wastewater treatment and reclamation, water and effluent quality standards for the protection of human health, soil and aquatic environment.

Learning outcomes - On successful completion of this module, students should be able to:
To characterize the changing quality of the water resources and to identify pollution sources by using advanced monitoring methods, in order to take corrective actions to preserve and rehabilitate their quantity and quality. To recognize remediation methods of water sources and treatment methods of wastewater and of drinking water.

Attendance requirements(%):
100

Teaching arrangement and method of instruction: lectures, excersizes and tours

Course/Module Content:
Introductory overview of water resources preservation and Water resources sustainable management principals in Israel
Water resources Quality and characterization - Anthropogenic and natural contamination sources. Point source pollution and wide spatial pollution
Groundwater Quality Monitoring principals –overview of the monitoring systems, setting a national early warning monitoring network using GIS mapping, historical surveys and criteria for monitoring wells layout.
Analytical supporting system - principals and methods.
Using tracers and indicators as a monitoring tool – organic micro pollutants and

"immerging contaminants", unregulated contaminants, of industrial and domestic waste water and their presence in water resources.
Monitoring, drilling and sampling methods for organic micropollutants and monitoring the unsaturated zoon– principals and methods and case studies
Aquifer contamination by chlorinated volatile organic compounds (Cl-VOCs) – the impact on groundwater and on public health
Risk assessment and modeling - Introduce risk assessment various methods as a tool for the remedial plane decision making (RBCA – risk based corrective action), application of numerical models for remedial scenarios prediction, Case study of remedial action base on risk assessment.
Remedial strategies of ground water and pollution control (2X3 hrs) – soil and water remedial methods, case studies of treatment strategies "in-situ" and "ex-situ" well head/supply water systems treatment
Legislation and regulation aspects in Israel of -
Water resources Pollution prevention, Implementing and enforcement of corrective action to remediate and to treat soil and water pollution, Quality standards for wastewater effluent reuse, Quality standard of drinking water
Water treatment (Ex-Situ)- Methods, technologies and water Types.
Sea Water and Brackish Water Desalination in Israel – the need for desalination, desalination plants, methods and technologies.
Wastewater Treatment and reuse in Israel - hydrological and agricultural aspects and quality standards

Required Reading:

Viessman, Jr., W. and Hammer, M. J. Water Supply and Pollution Control. 8th, Edition. Harper Collins College Publishers, New York 2014
B.H. Kueper, H.F. Stroo, C.M. Ward Editors, Chlorinated Solvents Source Zone Remediation, Springer Science + Business Media, New York 2014
גבירצמן, חיים. משאבי המים של ישראל.(תשס"ג). הוצאת יד בן-צבי.

Additional Reading Material:

Course/Module evaluation:
End of year written/oral examination 70 %
Presentation 0 %
Participation in Tutorials 10 %
Project work 0 %
Assignments 10 %

Reports 0 %
Research project 0 %
Quizzes 0 %
Other 10 %
field trip report

<u>Additional information:</u>
There may be surprise exams during classes that will count as bonus points in case the entire course is be given via zoom course evaluation will change:
1.Final examination - 60%
2.Participation and assignments - 30%
3.Field trip and report – 10% (if trip will not be feasible the 10% will be added to section2 (participation and assignments)