



The Hebrew University of Jerusalem

Syllabus

Modeling Environmental Systems - 70897

Last update 09-10-2021

HU Credits: 3

Degree/Cycle: 2nd degree (Master)

Responsible Department: Geology

Academic year: 0

Semester: 1st Semester

Teaching Languages: English and Hebrew

Campus: E. Safra

Course/Module Coordinator: Efrat Morin

Coordinator Email: efrat.morin@mail.huji.ac.il

Coordinator Office Hours: Tuesday 11-12

Teaching Staff:

Prof Efrat Morin

Course/Module description:

Models are used for system investigation for in research areas. The current course deals with modeling environmental systems in Geography and Earth sciences. We will learn what is a model, steps in model development, types of models, calibration and validation methodologies, sensitivity and uncertainty analyses. We will also learn the principles of with spatial models, data-driven models, numerical models and stochastic models. The course includes exercises of model development and application of the studied methodologies.

A modeling project from the student research or interest area is a main target.

Course/Module aims:

To acquaint and understand the "model" tool and related concepts, to impart theoretical and practical capabilities of model development for environmental systems and a wise use of models.

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

- Categorize models according to different criteria
- Identify model limitations
- Assess reliability of scientific results obtained with a model
- Develop a conceptual model for environmental systems
- Construct a computer model for a given conceptual model

Attendance requirements(%):

The course is planned assuming students' attendance in lectures and tutoring, but it is not a formal requirement of the course.

Teaching arrangement and method of instruction: Lecture, exercise, exam, project

Course/Module Content:

- General background
- Models calibration and verification
- Sensitivity analysis
- Uncertainty analysis
- Spatial component of models
- Data-driven models
- Numerical models
- Stochastic models

Required Reading:

None

Additional Reading Material:

The nature of Mathematical Modeling, Neil Gershenfeld, Cambridge University Press, 1999

Sensitivity Analysis, Edited by: A. Saltelli, K. Chan, E. M. Scott, Wiley, 2000

Course/Module evaluation:

End of year written/oral examination 0 %

Presentation 5 %

Participation in Tutorials 0 %

Project work 40 %

Assignments 40 %

Reports 0 %

Research project 0 %

Quizzes 15 %

Other 0 %

Additional information:

Final project presentation will be held on 16/2/2022. Participation in this meeting is mandatory.