האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

Syllabus

Topics in Variational Calculus - 80733

Last update 01-09-2021

<u>*HU Credits:*</u> *3*

<u>*Responsible Department:*</u> *Mathematics*

<u>*Academic year:*</u> *0*

<u>*Semester:*</u> *2nd Semester*

<u>*Teaching Languages:*</u> *Hebrew*

<u>*Campus:*</u> *E. Safra*

<u>*Course/Module Coordinator:*</u> *Dr. Cy Maor*

<u>*Coordinator Email:*</u> *cy.maor@mail.huji.ac.il*

<u>*Coordinator Office Hours:*</u> *By appointment*

<u>*Teaching Staff:*</u>
Dr. Cy Maor

<u>*Course/Module description:*</u>
The calculus of variations is concerned with minimum-maximum problems in

infinite dimensional spaces (usually, functions spaces). In this course we will introduce this field from a modern perspective, and focus on the "direct method", which is the main framework to prove existence of extremal points, and much of the modern research in the field is related to it.

Through the direct method we will address a variety of topics in analysis and some examples from various fields.

Course/Module aims:

Learning outcomes - On successful completion of this module, students should be able to:
Ability to prove and apply the theorems presented in the course.

Ability to understand and explain the subjects taught in the course.

Ability to apply correctly the mathematical methodology learned in the course.

Attendance requirements(%):

Teaching arrangement and method of instruction:

Course/Module Content:
  1. What is the Calculus of Variations? Motivation and examples
2. Preliminaries: properties of functions spaces
3. Euler-Lagrange equation
4. The direct method:
 a. General framework
 b. Young measures
 c. Quasiconvexity
 d. Polyconvexity|
Other or additional topics may be studied.

Required Reading:
 None

Additional Reading Material:

Course/Module evaluation:
End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 10 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information: