The Hebrew University of Jerusalem

Syllabus

Topics in Geometric Analysis - 80931

Last update 15-10-2024

<u>HU Credits:</u> 3

<u>Degree/Cycle:</u> 2nd degree (Master)

<u>Responsible Department:</u> Mathematics

<u>Academic year:</u> 0

<u>Semester:</u> 1st Semester

<u>Teaching Languages:</u> Hebrew

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

<u>Course/Module Coordinator:</u> Or Hershkovits

<u>Coordinator Email:</u> Or.Hershckovit@mail.huji.ac.il

<u>Coordinator Office Hours:</u>

<u>Teaching Staff:</u>

Prof. Or Hershkovits

Course/Module description:
The course will concern with elliptic partial differential equation of order two. The guiding problem for the class will the 19th problem that Hilbert posed in his famous lecture at the beginning of the previous century: Whether solution to Euler Lagrange equations with analytic coefficients are analytic themself.
In the class we will develop ideas and estimates which will, eventually, lead us to the resolution of the above problem. We will also see some applications of the method we see to geometry and encounter few recent results in the field.

Course/Module aims:

Learning outcomes - On successful completion of this module, students should be able to:
At the end of the class, students will be able to begin to read current papers in the field.

Attendance requirements(%):

Teaching arrangement and method of instruction:

Course/Module Content:
1. Maximum princilpes and their usage (pointwise and ABP)
2. Schauder estimates and existence
3. Sobolev spaces and weak solution
4. L^p estimates
5. divergence form equations, Nash and Moser iteration. Moser's Harnack inequality.

6. Gradient estimates and Holder gradients estimate, both interior and up to the boundary.
7. Existence and regularity to quasi linear elliptic equations.

Required Reading:

Additional Reading Material:
  1. Gilbarg and Trudinger- elliptic partial differential equations of second order.
2. Han and Lin - Elliptic differential equations

Grading Scheme:
 Other 100 %

Additional information: