The Hebrew University of Jerusalem

Syllabus

Equations of Mathematical Physics - 77313

Last update 28-10-2020

HU Credits: 6

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Physics

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Baruch Meerson

Coordinator Email: meerson@mail.huji.ac.il

Coordinator Office Hours: will be set in the first week of class

Teaching Staff:

Prof Baruch Meerson,
Mr. Daniel Cohen,
Mr. Ohad Vilk,
Mr. eyal atias

Course/Module description:
Methods of Mathematical Physics

Course/Module aims:
To teach the students advanced mathematical methods which are extensively used in physics and other sciences

Learning outcomes - On successful completion of this module, students should be able to:
master advanced mathematical methods which will help them in physics courses

Attendance requirements(%):
0

Teaching arrangement and method of instruction: lectures, recitations by teaching assistants and home assignements

Course/Module Content:
Vector analysis in curvilinear coordinates. An introduction to generalized functions. The boundary value problem and the Sturm-Liouville theory. The Green function. Partial differential equations (PDEs) of first order: the method of characteristics. PDEs of the second order: classification and canonical forms. Cauchy, Dirichlet and Neumann problems. The wave equation: the d'Alembert's formula, vibrating string, vibrating membrane. The heat equation. The Laplace equation. Inhomogeneous problems. An intro to variational calculus. An intro to integral equations.

Required Reading:
None

Additional Reading Material:

1. G.B. Arfken. Mathematical Methods for Physicists.
2. K.F. Riley, M.P. Hobson, and S.J. Bence. Mathematical Methods for Physics and Engineering.
3. J. Mathews and R.L. Walker. Mathematical Methods of Physics.
4. M.L. Boas. Mathematical Methods in the Physical Sciences.

Course/Module evaluation:

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

Additional information:

The exam will take place via ZOOM. Every student, taking the exam, must be alone in the room, and the camera of his/her computer must be open during the whole duration of the exam. The students will be required to solve 3 out of 4 questions.
The students will be allowed to use notes, books or online materials.

The students can request help of the teaching staff via ZOOM if the formulation of a question is unclear.