The Hebrew University of Jerusalem

Syllabus

Waves and Optics - 77305

Last update 04-10-2021

HU Credits: 5

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Physics

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Yaron Bromberg

Coordinator Email: yaron.bromberg@mail.huji.ac.il

Coordinator Office Hours: Wednesday 5pm

Teaching Staff:

Dr. Yaron Bromberg,
Ms. Ayala Glick,
Mr. Omry Ginzburg

Course/Module description:

Study of waves, with an emphasis on optics. The course teaches basic physical (dispersion, wave packets, monochromaticity, diffraction and polarization) and mathematical (Linear response, Fourier analysis, Separation of variables and complex numbers) concepts.

Course/Module aims:

Understanding wave and optics phenomena, with emphasis on everyday effects.

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

1. Calculate wave properties from a microscopic model.
2. Analyze optical systems (diffraction, interference and polarization).

Attendance requirements(%):

0

Teaching arrangement and method of instruction: Frontal lecturing, including some lab demonstrations. Some video and visual aids.

Course/Module Content:

1.Introduction
2.Transverse waves in an infinite string
3.Transverse waves in an finite string
4.Energy of waves
5.Reflection and transmission of waves
6.Longitudinal waves
7.Dispersion and wavepackets
8.Waves in higher dimensions
9.Geometrical optics
10.Interference
11.Diffraction
12.Electromagnetic waves

Required Reading:
None

Additional Reading Material:
1.גלים ואופטיקה, פרופ' עודד אגם, הוצאת האוניברסיטה הפתוחה (הספר המרכזי שילווה את הקורס)
2. Waves – Lecture notes by David Morin
3. Vibrations and Waves, A.P. French, M.I.T
4. Lectures on Physics, Richard Feynman
5. Waves, Berkley Physics Course, Vol III
6. Waves, C.A. Coulson
7. Physics of Vibrations and Waves, H.J. Pain
8. Optics, Eugene Hechet
9. Introduction to Fourier Optics, J. Goodman

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: