האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Waves and Optics - 77305

Last update 25-07-2023

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: Hagai Eisenberg

Coordinator Email: hagai.eisenberg@mail.huji.ac.il

Coordinator Office Hours: Monday 3pm

Teaching Staff:

Prof. Hagai Eisenberg,
Mr. Elyovich Jonathan,
Mr. Daniel Ben Hamo

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

 Grading Scheme:

Additional information: