האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Quantum Theory I - 77318

Last update 09-10-2018

HU Credits: *6*

Degree/Cycle: *1st degree (Bachelor)*

Responsible Department: *Physics*

Academic year: *0*

Semester: *2nd Semester*

Teaching Languages: *Hebrew*

Campus: *E. Safra*

Course/Module Coordinator: *Prof Shmuel Elitzur*

Coordinator Email: *shmuel.elitzur@mail.huji.ac.il*

Coordinator Office Hours: *By appointment*

Teaching Staff:

Prof Hagai Eisenberg
Mr. Tuvia Gefen
Mr. Noam Chai

Course/Module description:
The course will deal briefly with the history of quantum mechanics, the basis of the the theory (inc. formalism), and in Schrodinger's equation.

Course/Module aims:
See learning outcomes

Learning outcomes - On successful completion of this module, students should be able to:
1. Solve simple spectrum and one-dimension scattering problems.
2. Make use of the formalism of quantum mechanics.
3. Solve problems of the harmonic oscillator.

Attendance requirements(%):
0

Teaching arrangement and method of instruction: Lecture, recitation.

Course/Module Content:
1. Historical introduction - key experiments.
2. The mathematical foundations of QM – The state vector, Operators, representation in different bases, the Postulates, Expectation values, the uncertainty principle
3. Position and Momentum representation, Particle as a wave packet, Ehernfest theorem, Time dependant and independent Schrödinger’s equation
4. A particle in on dimension – Bound and propagating states, Scattering, Tunneling, Probability current, free falling
5. Multiple degrees of freedom – Tensor product spaces
5. Harmonic Oscillator – Eigenstates in Energy, Position and Momentum representation, Coherent states
6. The WKB approximation

Required Reading:
None

Additional Reading Material:

Cohen-Tannoudji
Massiah
Griffiths

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:

None