COURSE DETAIL

QUANTUM PHYSICS
Country United Kingdom - Scotland
Host Institution University of Edinburgh
Program(s) University of Edinburgh
UCEAP Course Level Upper Division
UCEAP Subject Area(s) Physics
UCEAP Course Number 110
UCEAP Course Suffix
UCEAP Official Title QUANTUM PHYSICS
UCEAP Transcript Title QUANTUM PHYSICS
UCEAP Quarter Units 4.00
UCEAP Semester Units 2.70

Course Description

In this course, students study practical applications of quantum mechanics. Students begin with a review of the basic ideas of quantum mechanics and give an elementary introduction to the Hilbert-space formulation. They then develop time-independent perturbation theory and consider its extension to degenerate systems. They derive the fine structure of Hydrogen-like atoms as an example. They study the ground state and first excited state of the Helium atom and discuss multi-electron atoms. The Rayleigh-Ritz variational method is introduced and applied to simple atomic and molecular systems. Students then examine quantum entanglement, exploring Bell's inequality, quantum teleporatation, superdense coding, quantum computing including Deutsch's and Grover's algorithms, and the role of information theory in quantum entanglement. Students then study time-dependent perturbation theory, obtain Fermi's Golden Rule, and look at radiative transitions and selection rules. Subsequently students study scattering in the Born Approximation and end by studying the Born-Oppenheimer approximation.

Language(s) of Instruction
English

Host Institution Course Number
PHYS10043

Host Institution Course Title
QUANTUM PHYSICS

Host Institution Course Details
http://www.drps.ed.ac.uk/24-25/dpt/cxphys10043.htm

Host Institution Campus

Host Institution Faculty
School of Physics and Astronomy

Host Institution Degree

Host Institution Department

Course Last Reviewed
2024-2025

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