



INTRODUCTION TO QUANTUM MECHANICS AND QUANTUM TECHNOLOGIES

Anno immatricolazione	2021/2022
Anno offerta	2021/2022
Normativa	DM270
SSD	FIS/03 (FISICA DELLA MATERIA)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	ELECTRONIC ENGINEERING
Curriculum	Photonics
Anno di corso	1°
Periodo didattico	Primo Semestre (27/09/2021 - 21/01/2022)
Crediti	6
Ore	45 ore di attività frontale
Lingua insegnamento	English
Tipo esame	ORALE
Docente	BAJONI DANIELE (titolare) - 6 CFU
Prerequisiti	<ul style="list-style-type: none">- Classical Mechanics- Classical Electromagnetism- Calculus
Obiettivi formativi	Basic understanding of quantum mechanics and quantum technologies
Programma e contenuti	<p>Introduction to Quantum Mechanics:</p> <p>The crisis of classical physics. Shroedinger equation. The wavefunction, statistical distributions. Simple systems in 1D: quantum well, tunneling, harmonic oscillator. 3D Shroedinger equation, the hydrogen atom. Dirac formalism, Hermitian operators, time evolution. Heisenberg uncertainty principle.</p>

	<p>Crystals, Bloch theorem. Tight binding model, band and band gaps.</p> <p>Introduction to Quantum Technologies:</p> <p>Brief Introduction to statistical mechanics The Qubit Entanglement Quantum Key Distribution Quantum Teleportation Quantum Computing</p>
Metodi didattici	oral lectures
Testi di riferimento	Griffiths, "Introduction to Quantum mechanics"
Modalità verifica apprendimento	Questions aiming at understanding which are the concepts acquired by the student and his/her ability to explain the topics discussed in the course. The minimum score to pass the exam is 18/30, the maximum score is 30/30 cum laude. The student will be required to answer the questions in either written or oral form.
Altre informazioni	Questions aiming at understanding which are the concepts acquired by the student and his/her ability to explain the topics discussed in the course. The minimum score to pass the exam is 18/30, the maximum score is 30/30 cum laude. The student will be required to answer the questions in either written or oral form.
Obiettivi Agenda 2030 per lo sviluppo sostenibile	Gli obiettivi