



UNIVERSITÀ DI PAVIA

Anno Accademico 2020/2021

INTRODUCTION TO QUANTUM MECHANICS AND QUANTUM TECHNOLOGIES

Anno immatricolazione	2020/2021
Anno offerta	2020/2021
Normativa	DM270
SSD	FIS/03 (FISICA DELLA MATERIA)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	ELECTRONIC ENGINEERING
Curriculum	Space Communication and Sensing
Anno di corso	1°
Periodo didattico	Primo Semestre (28/09/2020 - 22/01/2021)
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>

Crystals, Bloch theorem.
Tight binding model, band and band gaps.

Introduction to Quantum Technologies:

Brief Introduction to statistical mechanics
The Qubit
Entanglement
Quantum Key Distribution
Quantum Teleportation
Quantum Computing

Metodi didattici

oral lectures

Testi di riferimento

Griffiths, "Introduction to Quantum mechanics"

**Modalità verifica
apprendimento**

Oral examination, with 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.

Altre informazioni

**Obiettivi Agenda 2030 per lo
sviluppo sostenibile**

[Sbl legenda sviluppo sostenibile](#)