



# UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

## 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"><li>- Classical Mechanics</li><li>- Classical Electromagnetism</li><li>- Calculus</li></ul>
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>
<b>Metodi didattici</b>	oral lectures
<b>Testi di riferimento</b>	Griffiths, "Introduction to Quantum mechanics"
<b>Modalità verifica apprendimento</b>	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.
<b>Altre informazioni</b>	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.
<b>Obiettivi Agenda 2030 per lo sviluppo sostenibile</b>	<a href="#">\$lbl_legenda_sviluppo_sostenibile</a>