



INTRODUCTION TO QUANTUM MECHANICS

Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	FIS/03 (MATERIAL PHYSICS)
Department	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC ENGINEERING
Curriculum	Microelectronics
Year of study	1°
Period	1st semester (27/09/2021 - 21/01/2022)
ECTS	3
Lesson hours	23 lesson hours
Language	English
Activity type	ORAL TEST
Teacher	BAJONI DANIELE (titolare) - 6 ECTS
Prerequisites	<ul style="list-style-type: none">- Classical Mechanics- Classical Electromagnetism- Calculus
Learning outcomes	Basic understanding of quantum mechanics and quantum technologies
Course contents	<p>Introduction to Quantum Mechanics:</p> <p>The crisis of classical physics. Schrödinger equation. The wavefunction, statistical distributions. Simple systems in 1D: quantum well, tunneling, harmonic oscillator. 3D Schrödinger 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>
Teaching methods	oral lectures
Reccomended or required readings	Griffiths, "Introduction to Quantum mechanics"
Assessment methods	<p>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.</p>
Further information	<p>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.</p>
Sustainable development goals - Agenda 2030	\$Ibl legenda sviluppo sostenibile