PHYS 3007 QUANTUM PHYSICS

Credit Points 10

Legacy Code 301392

Coordinator Antonio Lauto (https://directory.westernsydney.edu.au/search/name/Antonio Lauto/)

Description The subject builds on quantum concepts that have been introduced in earlier subjects such Physics 1,2, Nanotechnology and Chemistry. It aims at developing the student's understanding of quantum principles as they apply to hard and soft matter systems, including atoms , molecules and extended arrays such as metal and semiconductors as well as biological tissue

School Science

Discipline Physics

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) PHYS 1006 - Physics 2

Restrictions

Successful completion of 60 credit points

Assumed Knowledge

Mathematics 1A, Mathematics 1B, Physics 1 and Physics 2.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain the experimental evidence for a quantum theory
2. Explain the non commutativity of the product of physical magnitudes
3. Provide solutions to quantative problems in Quantum Mechanics
4. Explain the macroscopic applications of Quantum Mechanics
5. Explain the apparition of a new physical magnitude, the spin, in Relativistic Quantum Mechanics
6. Apply Quantum Mechanics to other disciplines

Subject Content

1. Experimental evidence for quantisation
2. Wave particle duality and uncertainty
3. Introduction to basic quantum mechanical equations, the wave function
4. Solution of the time independent Schrodinger equation
5. Particle in a box, the tunnel effect
6. The harmonic oscillator, The Rotator
7. Angular momentum
8. The hydrogen atom and atomic wave function
9. Introduction to molecular-orbital theory
10. Introduction to quantum computing methods: chemical applications of semi empirical , ab initio and density function methods for molecular modelling

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Practical	300-600 words	30	N	Individual
Numerical Problem Solving	300-600 words	30	N	Individual
Final Exam	2 hours	40	N	Individual

Teaching Periods

Spring (2022)

Campbelltown

Day

Subject Contact Antonio Lauto (https://directory.westernsydney.edu.au/search/name/Antonio Lauto/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=PHYS3007_22-SPR_CA_D#subjects)

Spring (2023)

Campbelltown

On-site

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View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=PHYS3007_23-SPR_CA_1#subjects)