

Quantum Mechanics II (E023060)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2025-2026

A (semester 1)	Dutch	Gent	lecture seminar
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Lecturers in academic year 2025-2026

Van Speybroeck, Veronique	TW17	lecturer-in-charge
Van Neck, Dimitri	WE05	co-lecturer

Offered in the following programmes in 2025-2026

	crdts	offering
Bachelor of Science in Engineering(main subject Engineering Physics)	6	A
Bridging Programme Master of Science in Engineering Physics	6	A

Teaching languages

Dutch

Keywords

Quantum mechanics, angular momentum, perturbation theory

Position of the course

Advanced quantum mechanics with the aim to learn the student all the basic concepts required for other diverse disciplines such as solid-state physics, atomic and molecular physics, molecular modelling, quantum statistics, many-body systems, quantum electrodynamics, etc. The course includes solving central problems required within atomic physics, angular momentum theory, perturbation theory and applications.

Contents

- Three-dimensional problems - momentum: Generalities, Intrinsic momentum, Generalised momentum, 3D Schrodinger equation with spherical symmetry
- Perturbation calculus: Stationary perturbation theory on a discrete, bound spectrum, Stationary perturbation theory on a continuous spectrum, Time-dependent perturbation theory

Initial competences

Quantummechanics I

Final competences

- 1 Possess detailed knowledge of concepts related to angular momentum and spin and have the ability to explain them.
- 2 Understand solution methods for Schrodinger equation in a spherical potential and being able to communicate about them.
- 3 Have detailed knowledge of Perturbation theory (stationary and time-dependent) and scattering theory and being able to apply it to relevant problems.
- 4 Have the skills for analyzing and applying two-level systems.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture

Extra information on the teaching methods

Classroom lectures; Classroom problem solving sessions

Study material

Type: Syllabus

Name: Kwantummechanica II

Indicative price: € 10

Optional: yes

Language : Dutch

Number of Pages : 250

Available on Ufora : No

Online Available : No

Available in the Library : No

Available through Student Association : No

Additional information: The course material for the course Quantum Mechanics II consists of a syllabus and slides. The slides will be posted on Ufora during the academic year and there is the possibility to purchase the syllabus.

Type: Slides

Name: Slides

Indicative price: Free or paid by faculty

Optional: no

Language : Dutch

Available on Ufora : Yes

Online Available : Yes

Available in the Library : Yes

Available through Student Association : Yes

References

- Quantum Mechanics - B.H.Bransden and C.J.Joachain

Course content-related study coaching

The lecturers are available before and after lessons or by appointment.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Oral assessment, Written assessment

Examination methods in case of periodic assessment during the second examination period

Oral assessment, Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

During examination period:

Theory and Exercise exam

Theory : Oral exam with a written preparation for the theory, closed book

Exercises : Written exam, open book

Calculation of the examination mark