

## 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

**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**

[Bachelor of Science in Engineering\(main subject Engineering Physics\)](#)

**crdts**

6

**offering**

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**