

## Mathematics I (E701033)

**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 2023-2024**

A (semester 1)

Dutch

Gent

seminar

**Lecturers in academic year 2023-2024**

Van Hecke, Tanja

TW05

lecturer-in-charge

Tonesi, Cristina

TW05

co-lecturer

**Offered in the following programmes in 2023-2024**

|  | crdts | offering |
|--|-------|----------|
| Bachelor of Science in Engineering Technology(main subject Chemical Engineering Technology)                          | 6     | A        |
| Bachelor of Science in Engineering Technology(main subject Civil Engineering Technology)                             | 6     | A        |
| Bachelor of Science in Engineering Technology(main subject Electromechanical Engineering Technology)                 | 6     | A        |
| Bachelor of Science in Engineering Technology(main subject Electronics and ICT Engineering Technology)               | 6     | A        |
| Bachelor of Science in Engineering Technology(main subject Information Engineering Technology)                       | 6     | A        |
| Bachelor of Science in Engineering Technology (Joint Section)  | 6     | A        |
| Linking Course Master of Science in Electrical Engineering Technology(main subject Automation)                       | 6     | A        |
| Linking Course Master of Science in Electrical Engineering Technology(main subject Electrical Engineering)           | 6     | A        |
| Linking Course Master of Science in Electronics and ICT Engineering Technology(main subject Electronics Engineering) | 6     | A        |
| Linking Course Master of Science in Electronics and ICT Engineering Technology(main subject Embedded Systems)        | 6     | A        |
| Linking Course Master of Science in Electronics and ICT Engineering Technology(main subject ICT)                     | 6     | A        |
| Linking Course Master of Science in Chemical Engineering Technology  | 6     | A        |
| Linking Course Master of Science in Civil Engineering Technology   | 6     | A        |
| Linking Course Master of Science in Electromechanical Engineering Technology   | 6     | A        |
| Linking Course Master of Science in Information Engineering Technology   | 6     | A        |
| Linking Course Master of Science in Land Survey Engineering Technology   | 6     | A        |

**Teaching languages**

Dutch

**Keywords**

Complex numbers, vectors, analytical geometry, real functions of one variable, continuity, limit, differential calculus, integral, parametric curves, polar curves

**Position of the course**

The aim of the course is to provide insight into the theory and practice of essential mathematical concepts and methods related to complex numbers, real vectors, 3-dimensional analytic geometry, continuity, limits, differential calculus and integrals of one variable functions, parametric and polar curves. The treated subjects are primarily chosen in relation with the study programme.

**Contents**

- Complex numbers: different representations, calculation rules, Euler's formula, n-th roots, polynomial solving, applications.
- Vectors: representation, calculation rules, scalar product, vector product, scalar triple product, properties and applications.
- Classification of quadratic curves.
- 3-dimensional analytic geometry: classification of quadratic surfaces, spherical and cylindrical coordinates.
- One variable real functions: definitions and properties.
- Continuity, limits: definitions, theorems and applications. First and higher order derivative and differential: definitions, calculation rules, theorems and applications.
- Integration techniques, definite integrals and their applications.
- Polar curves, parametric representation of planar curves.

### Initial competences

Mathematical knowledge from secondary school, as treated during the summer course mathematics.

### Final competences

- 1 To have acquired insight in the mathematical, geometric and physical interpretation of the notions continuity, derivative, differential, integral
- 2 To have acquired insight in the different representations of planar curves
- 3 To have acquired insight in the mathematical, geometric and physical interpretation of notions from 2D geometry and 3D geometry
- 4 Being able to make computations with complex numbers
- 5 To have acquired insight in the mathematical, geometric and physical interpretation of vectors and being able to apply them on engineering problems
- 6

### 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

### Learning materials and price

- Lecture notes in Dutch (+/- 6 Euro).
- Slides available on the electronic learning platform.
- Additional learning material available electronically as tests that the students can make independently.

### References

- Calculus, B. Thomas, Pearson
- Wiskunde voor het hoger technisch onderwijs, Lothar Papula, Academic Service
- Advanced Calculus, Murray R. Spiegel, Schaum's Outline Series

### Course content-related study coaching

- Tutorial service
- The lecturer can be asked questions immediately after the lessons or by appointment or by means of Ufora

### Assessment moments

end-of-term and continuous assessment

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

Written assessment with multiple-choice questions, Written assessment with open-ended questions

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

Written assessment with multiple-choice questions, Written assessment with open-ended questions

**Examination methods in case of permanent assessment**

Written assessment with open-ended questions

**Possibilities of retake in case of permanent assessment**

examination during the second examination period is not possible

**Extra information on the examination methods**

- First and second exam session: written, closed-book examination, without calculator.
- In between term evaluation: written, closed-book evaluation without calculator (only exercises) during the semester.

**Calculation of the examination mark****First session:**

Final score= $\max(0.2 \times \text{NPE} + 0.8 \times \text{PE1}, 0.1 \times \text{NPE} + 0.9 \times \text{PE1})$

NPE=in between term evaluation (/20)

PE1=exam first session (/20)

**Second session:**

Final score= $\max(\text{PE2}, 0.2 \times \text{NPE} + 0.8 \times \text{PE2})$

PE2=exam second session (/20)