GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

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	TWO5	lecturer-in-charge
Tonesi, Cristina	TWO5	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
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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 **x** NPE + 0.8 **x** PE1, 0.1 **x** NPE + 0.9 **x** PE1)
NPE=in between term evaluation (/20)
PE1=exam first session (/20)

Second session:
Final score=max(PE2 ; 0.2 **x** NPE + 0.8 **x** PE2)
PE2=exam second session (/20)