GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Mathematics II (E701034)

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 2)	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

Functions of multiple variables, differential calculus, double integral, differential equations, geometry, linear algebra, diagonlization of matrices, eigenvalues and eigenvectors.

Position of the course

With this course we want to give the student the fundamentals of techniques and solution methods to solve a variety of engineering problems. We want them to be able to solve exercises even with a certain degree of abstraction. With this, the student must be able to understand scientific texts with mathematical derivations.

Contents

Solid geometry:

- Lines and planes
- Angles and distances
- Quadric surfaces
- Coordinate systems

Calculus:

- Functions of multiple variables: partial derivatives, total derivative, gradient, extrema
- Double integrals: calculation, coordinate transformations
- Differential equations: structure of the solution space, first order equations, higher order equations

Linear algebra:

- Matrices and determinants
- Linear systems
- Linear transformations
- Eigenvalues and eigenvectors

Initial competences

This course relies on some final competences of Wiskunde I

Final competences

1 To know the important properties and calculation methods concerning matrices. To have insight in the different possible solutions of a system of linear equations and to be able to find them using row reduction.
2 To be able to solve applications concerning eigenvalues and eigenvectors.
3 To have insight in the positions of planes and lines in space, to be able to find their equations and to find distances in space. To be able to classify quadratic surfaces.
4 To be able to give the mathematical and the fysical interpretation of the partial derivatives, the total differential for functions of two variables.
5 To be able to use the chainrules and to be able to find the extreme values of a function of 2 variables.
6 To have the insight to calculate the volume and the surface area using double integrals.

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

- Syllabus in Dutch (+/- 6 Euro).
- Presentations in Dutch from Ufora.
- Additional learning material available (electronic testings).

References

- Calculus, B. Thomas, Pearson
- Lothar Papula, Wiskunde voor het hoger technisch onderwijs, Academic Service
- Murray R. Spiegel, Advanced Calculus, Schaum's Outline Series
- Linear Algebra and its applications, Lay, Pearson
- Elementary Differential Equations, Boyce & Di Prima, Wiley

Course content-related study coaching

The lecturer can be asked questions immediately after the course, during the tutorial service or by appointment.

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

Periodic evaluation: written, closed-book examination. Without a calculator.

Permanent evaluation: written closed-book test during the semester. Only exercises. Without a calculator.

Calculation of the examination mark

First examination period:
End Score = 1/4 **x** NPE + 3/4 **x** PE1,
NPE = permanent evaluation (/20)
PE1 = periodic evaluation first examination period (/20)
Second examination period:
end score = Maximum (score PE2 ; 1/4*score NPE + 3/4*score PE2)
PE2 = periodic evaluation second examination period (/20)

If the score of the PE is 7/20 or less, then the given end score will be changed into 9/20 if the calculated weighted end score is 10 at least.