Course Specifications

Valid as from the academic year 2016-2017

Mathematics II (E701034)

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

Credits 6.0	**Study time 180 h**	**Contact hrs**	60.0 h

Course offerings and teaching methods in academic year 2016-2017

A (semester 2)	lecture	36.0 h
	lecture: plenary exercises	24.0 h

Lecturers in academic year 2016-2017

Ghysels, An	TW17	lecturer-in-charge
Tonesi, Cristina	TW05	co-lecturer

Offered in the following programmes in 2016-2017	crdts	offering
Bachelor of Science in Civil Engineering Technology	6	A
Bachelor of Science in Chemical Engineering Technology	6	A
Bachelor of Science in Electronics and ICT Engineering Technology	6	A
Bachelor of Science in Electromechanical Engineering Technology	6	A
Joint Section Bachelor of Science in Engineering Technology	6	A
Bachelor of Science in Information Engineering Technology	6	A

Teaching languages

Dutch

Keywords

Parametric and polar equation of curves, Riemann integral, functions of several variables, differential calculus, double integral, differential equations.

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 definite integrals, functions of several variables, partial derivatives, differentials, double integrals, ordinary differential equation of first order and linear differential equations of first and higher order.
The subjects are chosen primarily to answer the needs of a course in engineering.

Contents

Parametric curves.

Polar curves.

Riemann integral: definition, improper integral, calculation and applications.

Functions of several variables: introductory concepts.
Differential calculus: partial derivatives and differential, definitions, theorems.
Applications such as gradient, tangent plane and tangent line, extrema.

Double integral: definition, calculation, Jacobian determinant and applications.

Differential equations of first order, first and higher degree: introductory concepts, general, particular and singular solutions, solving techniques and applications.
Linear differential equations of higher order: structure of the general solution, applications.

Initial competences

Contents of 'Basiskennis wiskunde', differentiation and integration techniques, analytical geometry, vector calculus.

Final competences

1 To have acquired insight in the mathematical, geometric and physical interpretation of definite integrals and being able to apply this on engineering problems.

2 To have acquired insight in curves with different coordinates of representation.
3 To have acquired insight in the mathematical, geometric and physical interpretation of ordinary differential equations and being able to translate scientific-technical problems into differential equations.
4 To have acquired insight in the mathematical, geometric and physical interpretation of functions with multiple variables and their derivatives, integrals and being able to apply this on engineering problems.

Conditions for credit contract

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

Conditions for exam contract

Access to this course unit via an exam contract is unrestricted

Teaching methods

Lecture, lecture: plenary exercises

Extra information on the teaching methods

During the lectures the concepts are introduced and made clearer by examples and applications.
During the coached exercises the students are further trained using standard and similar exercises.

Learning materials and price

Lecture notes in Dutch.
Additional learning material available electronically from the Minerva course “Zelftesten Wiskunde Academische Bachelor”.

References

LotharPapula, Wiskunde voor het hoger technisch onderwijs, Academic Service.

Murray R. Spiegel, Advanced Calculus, Schaum’s Outline Series.

Frank Ayres Jr., Differential Equations, Schaum’s Outline Series

Course content-related study coaching

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

Evaluation methods

end-of-term evaluation and continuous assessment

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

Written examination

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

Written examination

Examination methods in case of permanent evaluation

Written examination

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

PE1 and PE2: written, closed-book examination.

NPE: written closed-book test during the semester.

If unlawful absence for NPE test: score NPE = 0.

Calculation of the examination mark

First examination period:
end score = 1/4*score NPE + 3/4*score PE1

Second examination period:
end score = Maximum(score PE2 ; 1/4*score NPE + 3/4*score PE2)
In other words, the NPE only contributes to the end score of the second examination period when this has a positive effect on the student's end score.

Remark:
If the score of PE1 is 7/20 or less, then the given end score will be at most 9/20 in the first examination period.
Similarly, if the score of PE2 is 7/20 or less, then the given end score will be at most 9/20 in the second examination period.