Technology
Arts Sciences
TH Köln

Course Manual MA2

Mathematics 2

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General information

Long name	Mathematics 2
Approving CModule	MA2_BaET
Responsible	Prof. Dr. Holger Weigand Professor Fakultät IME
Valid from	summer semester 2021
Level	Bachelor
Semester in the year	summer semester
Duration	Semester
Hours in self-study	120
ECTS	10
Professors	Prof. Dr. Holger Weigand Professor Fakultät IME
Requirements	Knowledge of school mathematics to achieve university entrance as well as logical thinking. Modul MA1
Language	German
Separate final exam	Yes

Literature

L. Papula, Mathematik für Ingenieure und Naturwissenschaftler, Band 1 und 2, Vieweg+Teubner Verlag

Final exam

Details	The exam sets tasks from the area of the analysis of one and several variables, including ordinary differential equations, which shall be solved without tools (or if necessary with a given collection of formulas). On the one hand, the correctness of the approach, respectively the solution, is evaluated. It also assesses the extent to which symbolic and formal mathematical language is used correctly. In order to take part in the summary examination at the end (written exam), students must first prove that they have satisfactorily completed the exercises, which are usually held on a weekly basis.
Minimum standard	Students - Show that they understand simple mathematical statements and can comprehend simple given proofs - Can explain and apply the most important concepts of analysis - Can solve simple tasks of known type from the field of analysis without electronic aids. The written representation of the solution and the way to solve it is done in the formal language of mathematics and uses the correct mathematical symbols.
Exam Type	EN Klausur

− Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Differential calculus: definition of the derivative, tangent, derivatives of elementary functions, derivation rules, monotony, higher derivatives, Taylor polynomial, elements of the curve discussion, rule of de l'Hospital, Taylor series and power series Higher complex functions and complex equations Integral calculus: Definition of the Riemann integral, main theorem of differential and integral calculus, basic integrals, partial integration, substitution rule, partial fraction decomposition, improper integrals, multidimensional integration in Cartesian coordinates and in polar coordinates. Ordinary Differential Equations: Differential equations of first order, linear differential equations of second order with constant coefficients. Functions of several variables: limit and continuity, partial derivatives, extreme values, total differential, error propagation.
Skills	The students master the handling of complex functions. They master the Riemann integral and can estimate integral values. They use the law of differential and integral calculus and the most important integration rules for calculating integrals. They are able to solve linear differential equations of first order and second order with constant coefficients. You can calculate partial derivatives for functions of several variables and determine their extremes.

Special requirements

none

Accompanying material	Lecture notes printed and electronic Exercises with solutions only electronic
Separate exam	Yes

Separate exam

Exam Type	EN Übungsaufgabe mit fachlich / methodisch eingeschränktem Fokus lösen
Details	Presence exercises and self-learning exercises, see also exam concept of summary final exam
Minimum standard	50% of the maximum achievable credit points

Expenditure classroom teaching

Type	Attendance (h/Wk.)

Lecture	5
Exercises (whole course)	3
Exercises (shared course)	2
Tutorial (voluntary)	2