Technology
Arts Sciences
TH Köln

Course
MA1 - Mathematics 1

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General information

Long name	Mathematics 1
Approving CModule	MA1_BaET
Responsible	Prof. Dr. Holger Weigand Professor Fakultät IME
Level	Bachelor
Semester in the year	winter 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.
Language	German
Separate final exam	Yes

Final exam

Details

The exam sets tasks from the area of linear algebra and analysis of one variable, 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 LA and AN
- Can solve simple tasks of known type from the field of LA and AN 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.

Abbreviation: LA - Linear Algebra, AN - Analysis of one Variable

Exam Type

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Lecture / Exercises

Learning goals

Knowledge

Analysis:
Basics: logic, sets, natural numbers, real numbers, functions
Elementary functions: Algebraic Functions, Transcendental Functions
Convergence and divergence of sequences, continuity of functions
Complex numbers
Linear algebra:
Systems of linear equations
Vectors in three-dimensional space
General vector spaces
Matrix algebra
Determinants
Eigenvalues and diagonalization
Orthogonality
Linear maps

Skills

Master mathematical notation and symbols.
Understanding and evaluating given mathematical argumentations.
Independent drawing of logical conclusions
Differentiate between different mathematical statements
Solving problems from the area of the knowledge conveyed in the lecture (mathemathical foundations, analysis of one variable, linear algebra)
Understanding and communicating mathematical statements

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	5
Exercises (whole course)	3
Exercises (shared course)	2
Tutorial (voluntary)	2

Separate exam

Exam Type

solving exercises within limited functional / methodical scope

Details

Presence exercises and self-learning exercises, see also exam concept of summary final exam

Minimum standard

50% of the maximum achievable credit points