

Course Manual MA1

Mathematics 1

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– General information

Long name	Mathematics 1
Approving CModule	MA1 BaET
Responsible	Prof. Dr. Christoph Bold <small>Professor Fakultät IME</small>
Valid from	winter semester 2020/21
Level	Bachelor
Semester in the year	winter semester
Duration	Semester
Hours in self-study	120
ECTS	10
Professors	Prof. Dr. Christoph Bold <small>Professor Fakultät IME</small>
Requirements	Knowledge of school mathematics to achieve university entrance as well as logical thinking.
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 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

EN Klausur

– Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	<p>Analysis:</p> <p>Basics: logic, sets, natural numbers, real numbers, functions</p> <p>Elementary functions: Algebraic Functions, Transcendental Functions</p> <p>Convergence and divergence of sequences, continuity of functions</p> <p>Complex numbers</p> <p>Linear algebra:</p> <p>Systems of linear equations</p> <p>Vectors in three-dimensional space</p> <p>General vector spaces</p> <p>Matrix algebra</p> <p>Determinants</p> <p>Eigenvalues and diagonalization</p> <p>Orthogonality</p> <p>Linear maps</p>
Skills	<p>Master mathematical notation and symbols.</p> <p>Understanding and evaluating given mathematical argumentations.</p> <p>Independent drawing of logical conclusions</p> <p>Differentiate between different mathematical statements</p> <p>Solving problems from the area of the knowledge conveyed in the lecture (mathematical foundations, analysis of one variable, linear algebra)</p> <p>Understanding and communicating mathematical statements</p>

Special requirements

none

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

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

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

