Valid from 2026.HS

Module description: Analysis 1

Module Code	t.BA.XXM4.AN1.26HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IAMP
Module Coordinator	Heidi Gebauer
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3a 2 lecture lessons per semester week and class+ 2 weekly lab lessons per semester and half-class
Module Description	In this course, students learn the basic concepts of calculus of one real variable.
Module Content	**1. Concepts of differential and integral calculus** • Derivative (tangent, curve discussion) • Antiderivatives and areas for polynomials, fundamental theorem **2. Sequences, series (with sums) and limits** • Sequences (direct, recursive, arithmetic/geometric) • Limit concept (calculation rules, limit of a function), continuity • Series (arithmetic/geometric) **3. Extension of differential calculus** • Derivatives of elementary functions • Derivative rules • Curve discussion • Fractional rational functions (poles, removable gaps in definition, asymptotes) • Extreme value problems • Newton method
Prerequisite Knowledge	Mathematik der technischen BM

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Learning Objectives (Competencies)

Students...	Competencies	Taxonomies
calculate limits using symbolic methods.	M, F	K3
form recursion formulas using Newton's method	F, M	K3
carry out a curve discussion and calculate certain integrals of polynomial functions using the fundamental theorem.	M, F	K3
know the derivatives of elementary functions.	M, F	K1
understand the concept of a sequence and calculate values of sequences that are given explicitly or recursively.	F, M	K2, K3
understand the concepts of derivative and definite integral	M, F	K2
use the rules of differentiation, conduct a curve discussion and solve extreme value problems.	F, M	K2, K3
show the convergence of a sequence using the limit definition.	F, M	K3

Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
written exam		90	80%	acc. to module agreement	

	Assessment	Length (min.)	Weighting	Social Form	Scenario/Format
written exam	Grade	45	20%	acc. to module agreement	

Classroom Attendance Requirement

None

Learning material

- Papula, L. Mathematik für Ingenieure und Naturwissenschaftler. Vieweg+Teubner. ISBN 978-3-658-05619-3.

Comments

During the first week of classes, a module agreement will be communicated which applies to all module courses and in which the exact number and scope of the graded assignments during the semester as well as the calculation method for the module grade are determined. As the assessment during the semester is concerned, minor changes are possible; these will be communicated timely to the students.