Valid from 2024.HS

Module description: Analysis 1

Module Code	t.BA.XXM1.AN1.19HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IAMP
Module Coordinator	Lukas Lichtensteiger
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 lab bi-weekly 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

Learning Objectives (Competences)

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

Module description: Analysis 1

Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Form
written exam	Grade	90	80	acc. to module agreement

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
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.