Valid from 2024.HS

Module description: Analysis 2

Module Code	t.BA.XXM1.AN2.19HS
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	Basic concepts and methods of differential and integral calculus of one real variable, as well as their application.
Module Content	**1. Extension of integral calculus** • Elementary integration methods (partial integration, substitution method, integration with partial fraction decomposition), applications of integral calculus, Bernoulli's rule, improper integrals **2. Power series and Taylor series** • Convergence and divergence of series, power series, radius of convergence, Taylor series, approximation formulas for functions **3. Introduction to ordinary differential equations** • Graphical solution methods (direction fields, integral curves), symbolic solution methods for linear and separable differential equations
Prerequisite Knowledge	• Mathematik der technischen BM • Knowledge of the contents of the Analysis 1 module

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Learning Objectives (Competences)

Students...	Competencies	Taxonomies
use the elementary integration methods: partial integration, substitution method and integration with partial fraction decomposition.	M, F	K3
use integral calculus to calculate the length of a curve, the coordinates of a centroid and the volume of a solid of revolution.	M, F	K2
use Bernoulli's rule and determine the values of improper integrals using symbolic methods.	F, M	K3
determine the convergence or divergence of a series of numbers using the quotient criterion.	M, F	K3
determine the radius of convergence for a given power series and use operations with power series correctly.	F, M	K3
expand a given function into a Taylor series and use this to derive approximation formulas.	F, M	K3
determine the direction fields for ordinary differential equations and graphically determine integral curves for given initial values.	M, F	K3
solve the initial value problem for simple linear and separable differential equations using various methods.	F, M	K3

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.