Valid from 2026.HS

Module description: Analysis 2

Module Code	t.BA.XXM6.AN2.26HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IAMP
Module Coordinator	Nadin Stahn
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	Advanced calculus
Module Content	**Differential calculus in one real variable** • L'Hospital's rule • applications of differential calculus - curve sketching and extremal problems • power series, Taylor polynomials and series **Introduction to differential equations** **Integral calculus in one real variable** • definite and indefinite integral • fundamental theorem of calculus • rules and methods of integration, improper integrals • applications of integral calculus in geometry, science and technology **plane curves** • curves in parametric representation • differential calculus of plane curves: tangent vector, curvature, arc length
Prerequisite Knowledge	module Analysis I

Module description: Analysis 2

Learning Objectives (Competencies)

Students...	Competencies	Taxonomies
You know the consept of the approximation of functions by Taylor polynomials and are able to estimate the approximation error. You are able to develop analytical functions in Taylor series	F, M	K2, K3
You know the concept of a differential equation and the corresponding vocabulary. You know the concept of the solution to a differential equation. You are able to plot (with the help of a tool) the direction field of a first order differential equation. You are able to realize a separable differential equation and to solve it by separation of the variables.	M, F	K2, K3
You know the fundamental concepts of differential and integral calculus. In particular you know the central role of the fundamental theorem of calculus.You are able to calculate derivatives and to apply them among others to graph discussions and to the solution of extremal problems. You are able to use integration methods to calculate definite and indefinite integrals. You are able to apply integrals in geometry, science and technology.	M, F	K2, K3
You are able to parametrize simple plane curves and to interpret given parametric representations. With differential calculus you can determine the tangent vector, the curvature and the arc length of a plane curve.	F, M	K2, 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
at least one assessment	Grade		20%	acc. to module agreement	

Classroom Attendance Requirement

None

Learning material

- Papula, L. (2018). Mathematik für Ingenieure und Naturwissenschaftler. 15 Edition. Wiesbaden: Springer. ISBN 978-3-658-21745-7.