

<b>Module title</b>		<b>Abbreviation</b>
Applied Mathematics		10-M-ANW-122-m01
<b>Module coordinator</b>		<b>Module offered by</b>
Dean of Studies Mathematik (Mathematics)		Institute of Mathematics
<b>ECTS</b>	<b>Method of grading</b>	<b>Only after succ. compl. of module(s)</b>
20	numerical grade	--
<b>Duration</b>	<b>Module level</b>	<b>Other prerequisites</b>
2 semester	undergraduate	By way of exception, additional prerequisites are listed in the section on assessments.
<b>Contents</b>		
<p>Two of the following topics in applied mathematics:</p> <p><b>Numerical Mathematics 1</b> (Solution of systems of linear equations and curve fitting problems, nonlinear equations and systems of equations, interpolation with polynomials, splines and trigonometric functions, numerical integration)</p> <p><b>Numerical Mathematics 2</b> (Solution methods and applications for eigenvalue problems, linear programming, initial value problems for ordinary differential equations, boundary value problems)</p> <p><b>Stochastics 1</b> (Combinatorics, Laplace models, selected discrete distributions, elementary measure and integration theory, continuous distributions: normal distribution, random variable, distribution function, product measures and stochastic independence, elementary conditional probability, characteristics of distributions: expected value and variance, limit theorems: law of large numbers, central limit theorem)</p> <p><b>Stochastics 2</b> (Elements of data analysis, statistics of data in normal and other distributions, elements of multivariate statistics)</p>		
<b>Intended learning outcomes</b>		
The student is acquainted with the fundamental concepts and notions of some field in applied mathematics. He/she is able to interconnect these concepts and and realises the advantages of thinking across the borders of different branches in mathematics.		
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)		
<p>This module has 5 components; information on courses listed separately for each component.</p> <ul style="list-style-type: none"> <li>• 10-M-NUM-1-122, 10-M-NUM-2-122, 10-M-STO-1-122, and 10-M-STO-2-122: V + Ü (no information on language and number of weekly contact hours available)</li> <li>• 10-M-ANW-P-112: M (no information on language and number of weekly contact hours available)</li> </ul>		
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
<p>This module has the following 5 assessment components. To pass this module, students must pass one out of the 4 assessment components that are first in the list below and the assessment component that is last in the list below.</p> <p><b>Assessment in module component 10-M-NUM-1-122:</b> Numerische Mathematik 1 (Numerical Mathematics 1), <b>in module component 10-M-NUM-2-122:</b> Numerische Mathematik 2 (Numerical Mathematics 2), <b>in module component 10-M-STO-1-122:</b> Stochastik 1 (Stochastics 1), and <b>in module component 10-M-STO-2-122:</b> Stochastik 2 (Stochastics 2) :</p> <ul style="list-style-type: none"> <li>• 8 ECTS credits, pass / fail</li> <li>• written examination (approx. 90 to 180 minutes). If announced by the lecturer, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 30 minutes). The module component will also be considered successfully completed if it is selected as subject of the oral examination covering several modules (separate module component for assessment purposes (Prüfungsteilmodul)) and this examination is passed.</li> <li>• Language of assessment: German; English if agreed upon with examiner(s)</li> <li>• Additional prerequisites: To qualify for admission to assessment, students must meet certain prerequisites. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If stu-</li> </ul>		

dents have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

**Assessment in module component 10-M-ANW-P-112:** Prüfung Angewandte Mathematik (Assessment Applied Mathematics)

- 4 ECTS credits, numerical grading
- oral examination of one candidate each (approx. 30 minutes). Assessment will have reference to the topics covered in the two module components selected by students.
- Language of assessment: German; English if agreed upon with examiner(s)
- Only after successful completion of module components: Module component 10-M-ANW-P can only be taken by students who passed the written examination in one of the other four module components.

**Allocation of places**

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**Additional information**

Additional information on module duration: 1 to 2 semesters.

**Workload**

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**Teaching cycle**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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**Module appears in**

Bachelor' degree (1 major) Mathematics (2012)

Bachelor' degree (1 major) Mathematics (2013)