

Module Description for Module 2: Calculus

Module title	Calculus
Module number	M2
Programme	Computer Science
Applicability of the module	Applicable to other Computer Science Bachelor programmes
Module duration	1 semester
Status	Compulsory module
Recommended semester during the programme	1
Credit points (Cp) of the module	5
Prerequisites for module participation	None
Prerequisites for module examination	None
Module examination	Written exam - 90 minutes
Intended learning outcomes /acquired competences of the module	<p>The students are acquainted with the most important concepts, processes and techniques in differential and integral calculus. Thereby, the understanding of specific methods of analysis is predominant.</p> <p>The students have the ability to implement simple application problems into mathematical formulations and to solve them. Thereby, they fully understand the requirements and limits of differential and integral calculus methods.</p> <p>The following extracurricular skills are acquired: analytical thinking, development of methodological expertise, handling abstract methods, structures and models, the abstract implementation of practical application problems into formal models is enhanced.</p>
Contents of the module	<p>Lecture Analysis</p> <p>Exercise Analysis</p>
Teaching methods of the module	Lectures and exercise
Total workload	150 h (5% extracurricular skills)
Language of the module	English
Frequency of the module	Annually

Unit Description for Module 2: Lecture Analysis

Name of the unit	Lecture Analysis
Code	
Corresponding module	Analysis
Lecturer	Prof. Dr. Egbert Falkenberg, Prof. Dr. Manfred Hannemann, Prof. Dr. Ruth Schorr, Prof. Dr. Matthias Schubert
Contents of the unit	<p>In the following there is a list of possible topics for the contents focuses. The focuses can be treated at different depths.</p> <ul style="list-style-type: none"> - Real Numbers: sequences, series, convergence - Real functions: basic concepts, limits, continuity, intermediate value theorem - Differential calculus of one variable: differentiability, derivative rules, mean value theorem, rules of de l'Hospital, Taylor's theorem, curve sketching - Integral calculus: integrability, primitives and main theorem of differential and integral calculus, elementary integration techniques - Approximation method for solving nonlinear equations
Teaching methods	Lecture
Contact hours per week	4
Total workload of the unit (h)	100
Total time of contact hours (h)	60
Total time of examination incl. preparation (h)	10
Total time of practical training (h)	0
Total time of self-study (h)	30
Language of the unit	English
Recommended reading	<ul style="list-style-type: none"> • Brill, Manfred: Mathematik für Informatiker, Hanser, 2005 • Forster, Otto: Analysis 1, Vieweg + Teubner, 2011 • Teschl, Gerold und Susanne: Mathematik für Informatiker, Band 2 Analysis, Springer, 2007 <p>Current literature will be announced at the beginning of the semester</p>
Type and form of assessment	Written exam 90 minutes
Grading of the assessment	Differentiated
Further information	

Unit Description for Module 2: Exercise Analysis

Name of the unit	Exercise Analysis
Code	
Corresponding module	Analysis
Lecturer	Prof. Dr. Egbert Falkenberg, Prof. Dr. Manfred Hannemann, Prof. Dr. Ruth Schorr, Prof. Dr. Matthias Schubert
Contents of the unit	<p>Tasks and examples of the lecture topics.</p> <p>The exercises serve to ensure that the students learn to understand the algebraic topics of tasks and solve them with the methods discussed.</p> <p>The students are continuously provided with qualified individual feedback which supports their specific learning experience..</p>
Teaching methods	Exercise
Contact hours per week	2
Total workload of the unit (h)	50
Total time of contact hours (h)	30
Total time of examination incl. preparation (h)	0
Total time of practical training (h)	0
Total time of self-study (h)	20
Language of the unit	English
Recommended reading	See Unit Lecture Analysis
Type and form of assessment	No proficiency certificate
Grading of the assessment	
Further information	