

DDM Module 4201 – Numerical Methods in CAE

1	Module Number 4201	Study Programme DDM	Semester 1	Offered in <input checked="" type="checkbox"/> WS <input type="checkbox"/> SS	Duration 1 Semester	Module Type Compulsory	Workload (h) 120	ECTS Points 4
2	Courses		Teaching and Learning Forms		Contact Time		Self-Study Time	Language
	a) CAE Methods and Algorithms b) Numerical Mathematics		Lecture Lecture		(SWS) (h) 2 30 2 30		(h) 30 30	English
3	Learning Outcomes and Competences Once the module has been successfully completed, the students... Knowledge and Understanding <ul style="list-style-type: none"> can understand the basics of mathematical concepts within the framework of the topics in section 4 have advanced knowledge of engineering mathematics and numerical methods in particular understand the relevance of mathematics for mechanical engineering Use, Application and Generation of Knowledge <ul style="list-style-type: none"> can apply mathematical concepts within the framework of the topics in section 4 can decide whether a solution is plausible or not can analyse advanced problems of mechanical engineering and work out mathematical solutions Communication und Cooperation <ul style="list-style-type: none"> can make use of the knowledge, abilities and competences in order to evaluate a given application problem can communicate within a team to work out a solution to a given problem Scientific Self-Conception/ Professionalism <ul style="list-style-type: none"> can justify a solution methodically can assess their abilities in comparison to their fellow students 							
4	Contents <ul style="list-style-type: none"> Advanced topics of matrix calculus Analysis of functions of several variables (especially optimisation) Iterative methods for solving linear equation systems Power series, Taylor series, Fourier series Numerical methods for initial value problems of ordinary differential equations 							
5	Participation Requirements compulsory: Mathematics from the bachelor studies							
6	Examination Forms and Prerequisites for Awarding ECTS Points Written examination (90 mins); graded							
7	Further Use of Module Compulsory module for DMM studies							
8	Module Manager and Full-Time Lecturer Prof. Dr. rer. nat. Axel Stahl							

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9	Literature <ul style="list-style-type: none">• Lecture notes (provided for download)• Koch-Stämpfle, Mathematik für das Ingenieurstudium, Hanser Verlag• Mohr, Numerische Methoden in der Technik, Grenzwert Verlag• Weller, Numerische Mathematik für Ingenieure, Vieweg Verlag• O'Neil, Advanced Engineering Mathematics, Cengage Learning• Kreyszig, Advanced Engineering Mathematics, Wiley
10	Last Updated 17.02.2024