	CMS-CE-EL1	Computational Engineering Basics		Responsible Lecturer:	Prof. Dr. Michael Beitelschmidt					M1100-CMS61
	Katalogmodul (Soll: 8 SWS)		Catalogue Module (Setpoint: 8 SWS (Lecture hours per week))							
	Eine Lehrveranstaltung des Katalogs CMS-CE-EL1 kann nicht gewählt werden, wenn diese bereits in einem anderen Pflichtmodul mit wahlpflichtigem Inhalt bzw. in einem Wahlpflichtmodul der Grundlagenausbildung im Masterstudiengang Computational Modeling and Simulation gewählt wurde.									
	Please note that any course of the catalogue CMS-CE-EL1 cannot be selected if it has been already selected for another CMS-module.									
	Die Modulnote ergibt sich aus dem nach Semesterwochenstunden (SWS) gewichteten Durchschnitt der Noten der Prüfungsleistungen. The module grade is the average of the grades of the individual examinations, weighted by course effort (SWS, semester-week-hours).									

Nr.	Title	Faculty	Lecturer	Effort	Language	Semester	Examiner	Examination performance	Duration	Weighting according to SWS	Course number Selma
1	Antennen / Antennas	EuI	Dirk Plettemeier	2V/1Ü	German	Summer	Dirk Plettemeier	Oral Assessment		3	K1210-1I0150
2	Electromechanical Networks	EuI	Uwe Marschner	2V/1Ü	English	Winter	Uwe Marschner	Written Examination	120 min	3	K1212-500060
3	Numerische Mathematik / Numerical mathematics	EuI	Ralf Theo Jacobs	2V/1Ü	German	Winter	Ralf Theo Jacobs	Written Examination	120 min	3	K1202-100030
4	Theory of Nonlinear Networks = Future Computing Strategies in Nano-Electronic Systems	EuI	Alon Ascoli	2V/1Ü	English	Winter	Alon Ascoli	Written Examination 90 min/Oral Assessment 30 min <= 5 Participants		3	K1208-500170
5	Wellenausbreitung / Wave propagation	EuI	Dirk Plettemeier	2V/1Ü	German	Summer	Dirk Plettemeier	Oral Assessment		3	K1210-1I0151
6	Computer Vision 1	INF	Björn Andres	2V/2Ü	English	Winter	Björn Andres	Oral Assessment	30 min	4	K1107-MA0009
7	Computer Vision 2	INF	Björn Andres	2 Seminar	English	Summer	Björn Andres	Oral Presentation	30 min	2	K1107-MA0016S
8	Computer Graphics 1	INF	Stefan Gumhold	2V/2Ü	German/ English	Winter	Gumhold	Written Examination 90 min/Oral Assessment 20 min <=15 Participants		4	K1104-MA0025
9	Data Visualization	INF	Dachselt/Gumhold	2V/2Ü	German/ English	Winter	Dachselt Gumhold	Written Examination 90 min/Oral Assessment 30 min <=10 Participants		4	K1104-CMS03
10	Design Patterns and Frameworks	INF	Uwe Aßmann Sebastian Götz	2V/2Ü	English	Winter	Uwe Aßmann Sebastian Götz	Written Examination 90 min/Oral Assessment 15 min < 20 Participants		4	K1104-MA0020
11	Digitization and Data Analytics: Architectures, Methods and Consequences	INF	Wolfgang Nagel Sunna Torge	2V/2Ü	English	Summer	Wolfgang Nagel	Written Examination 90 min/Oral Assessment 20 min <= 10 Participants		4	K1102-ZIH03
12	Knowledge Graphs	INF	Markus Krötzsch Maximilian Marx	2V/2Ü	English	Winter	Markus Krötzsch	Written Examination 90 min/Oral Assessment 30 min < 10 Participants		4	K1101-MA0024
13	Machine Learning 1	INF	Björn Andres	2V/2Ü	English	Winter	Björn Andres	Written Examination 90 min/Oral Assessment 30 min <=10 Participants		4	K1107-MA0060
14	Machine Learning 2	INF	Björn Andres	2 Seminar	English	Summer	Björn Andres	Oral Presentation	30 min	2	K1107-MA0062S
15	Particle Methods	INF	Ivo Sbalzarini	2V/2Ü	English	Summer	Ivo Sbalzarini	Written Examination 90 min/Oral Assessment 30 min <=10 Participants		4	K1107-MA0006
16	Problem Solving and Search in Artificial Intelligence	INF	Dr. Lucía Gómez Álvarez Sarah Alice Gaggl	2V/2Ü	English	Winter	Sebastian Rudolph	Written Examination 90 min/Oral Assessment 30 min < 10 Participants		4	K1107-MA0056
17	Scientific Visualization	INF	Stefan Gumhold	2V/2Ü	English	Summer	Stefan Gumhold	Written Examination 90 min/Oral Assessment 20 min <=15 Participants		4	K1104-MA0032
18	Scientific Programming – Advanced Aspects	MATH	Wolfgang Walter Simon Praetorius	3V/1Ü	German/ English	every	Wolfgang Walter Simon Praetorius	Oral Assessment (Group Test) 20 min		4	K0108-40643x

19	Wissenschaftliches Rechnen - Fortgeschrittene Aspekte = Scientific Arithmetic - Advanced Aspects	MATH	Axel Voigt Marco Salvalaglio	3V/1Ü	English	Summer	Axel Voigt Marco Salvalaglio	Oral Assessment (Group Test) 20 min		4	K0108-40642x
20	Gekoppelte Simulation/ Echtzeitsimulation / Coupled simulation/Real Time simulation	MW	Michael Beitelschmidt	2V	English	Winter	Michael Beitelschmidt	Written Examination	90 min	2	K1301-EX0190V
21	Mehrkörpersysteme - Praktikum / Multi Body Systems	MW	Michael Beitelschmidt Volker Quarz	2 SWS Placement	German/ English	every	Michael Beitelschmidt	Ungraded Assignment (must be passed)		2	K1301-1H1625P
22	Numerische Modellierung von Mehrphasenströmungen / Numerical modeling of multiphase flows	MW	Jochen Fröhlich	2V/1Ü/1P	German	Summer	Jochen Fröhlich	Written Examination 90 min/Oral Assessment 30 min <=10 Participants		4	K1302-1H1630
23	Systemdynamik / System Dynamics	MW	Michael Beitelschmidt Zhirong Wang	2V/2Ü	German	Winter	Michael Beitelschmidt	Written Examination	120 min	4	K1301-1H0500
24	Turbulente Strömungen und deren Modellierung / Turbulent Flows and their Modeling	MW	Jochen Fröhlich Jörg Stiller	2V/2Ü	German	Summer	Jochen Fröhlich	Written Examination	90 min	4	K1302-1H0521
25	Teamproject	chosen freely	chosen freely	8 SWS Project processing	German/ English	Summer	after confirmation by examination board CMS	1. Project Report 70 Hours 2. Oral Presentation 30 Minutes		8	

CMS-CE-AT	Advanced Topics in Finite Element Analysis				Responsible Lecturer:		Prof. Dr. Markus Kästner	M1100-CMS631
Compulsory Module for Track CE								**PO 2020**
Course title	**Faculty**	**Lecturer**	**SWS Effort**	**Language**	**Semester**	**Examiner**	**Examination performance**	**Course number Selma**
Finite Element Analysis - Multifield Methods	MW	Markus Kästner Marreddy Ambati	2V/2Ü	English	Summer	Markus Kästner	Written Examination 120 min/Oral Assessment 20 min < 25 Participants	K1301-EX3045
CMS-CE-AT	Advanced Topics in Finite Element Analysis Multifield Methods				Responsible Lecturer:		Prof. Dr. Markus Kästner	M1100-CMS63
Compulsory Module for Track CE								**PO 2018**
Course title	**Faculty**	**Lecturer**	**SWS Effort**	**Language**	**Semester**	**Examiner**	**Examination performance**	**Course number Selma**
Finite Element Analysis - Multifield Methods	MW	Markus Kästner Marreddy Ambati	2V/2Ü	English	Summer	Markus Kästner	Written Examination 120 min/Oral Assessment 30 min <= 25 Participants	K1301-EX3045

CMS-CE-MBD	Multibody Dynamics		Responsible Lecturer:			Prof. Dr. Michael Beitelschmidt		M1100-CMS64
Compulsory Module for Track CE								
Course title	**Faculty**	**Lecturer**	**SWS Effort**	**Language**	**Semester**	**Examiner**	**Examination performance**	**Course number Selma**
Kinematik und Kinetik der Mehrkörpersysteme / Kinematics and Kinetics of Multibody Systems	MW	Michael Beitelschmidt David Bernstein	2V/2Ü	German/ English	Summer	Michael Beitelschmidt	Written Examination 90 min	K1301-1H1305

CMS-CE-MP	Multifield Problems		Responsible Lecturer:			Prof. Dr. Thomas Wallmersperger		M1100-CMS65
Compulsory Module for Track CE								
Course title	**Faculty**	**Lecturer**	**SWS Effort**	**Language**	**Semester**	**Examiner**	**Examination performance**	**Course number Selma**
Multifield Problems	MW	Thomas Wallmersperger Marco Rossi	2V/2Ü	English	Summer	Thomas Wallmersperger Marco Rossi	Written Examination 120 min/Oral Assessment 30 min < 15 Participants	K1301-1H1270V K1301-EX1270Ü

	CMS-CE-EL2	Computational Engineering Advanced			Responsible Lecturer:		Prof. Dr. Michael Beitelschmidt				M1100-CMS62
	Katalogmodul (Soll: 12 SWS)		Catalogue Module (Setpoint: 12 SWS (Lecture hours per week))								
	Eine Lehrveranstaltung des Katalogs CMS-CE-EL2 kann nicht gewählt werden, wenn diese bereits in einem anderen Pflichtmodul mit wahlpflichtigem Inhalt bzw. in einem Wahlpflichtmodul der Grundlagenausbildung im Masterstudiengang Computational Modeling and Simulation gewählt wurde.										
	Please note that any course of the catalogue CMS-CE-EL2 cannot be selected if it has been already selected for another CMS-module.										
	Die Modulnote ergibt sich aus dem nach Semesterwochenstunden (SWS) gewichteten Durchschnitt der Noten der Prüfungsleistungen. The module grade is the average of the grades of the individual examinations, weighted by course effort (SWS, semester-week-hours).										

Nr.	Title	Faculty	Lecturer	Effort	Language	Semester	Examiner	Examination performance	Duration	Weighting according to SWS	Course number Selma
1	Electromechanical Networks	EuI	Uwe Marschner	2V/1Ü	English	Winter	Uwe Marschner	Written Examination	120 min	3	K1212-500060
2	Numerische Verfahren der Theoretischen Elektrotechnik / Numerical Methods for Electromagnetic Theory	EuI	Ralf Theo Jacobs	2V/1Ü	German	Summer	Ralf Theo Jacobs	Written Examination 120 min/Oral Assessment 30 min <=20 Participants		3	K1202-1E0080
3	Optical Computing - Introduction to Optical Non-classical Computing: Concepts and Devices	EuI	Kambiz Jamshidi	4V/2Ü	English	Winter	Kambiz Jamshidi	1. Oral Assessment 30 min 2. Presentation 20 min		6	K1210-500240
4	Theory of Nonlinear Networks = Future Computing Strategies in Nano-Electronic Systems	EuI	Alon Ascoli	2V/1Ü	English	Winter	Alon Ascoli	Written Examination 90 min/Oral Assessment 30 min <= 5 Participants		3	K1208-500170
5	Wissenschaftliches Programmieren / Scientific Programming	EuI	Ralf Theo Jacobs	1V/2P	German	Summer	Ralf Theo Jacobs	Laboratory Protocol		3	K1202-1E0081
6	Advanced User Interfaces	INF	Raimund Dachselt Anke Lehmann	2V/2Ü	German /English	Summer	Raimund Dachselt Anke Lehmann	Written Examination	90 min	4	K1104-MA0001
7	Computer Vision 1	INF	Björn Andres	2V/2Ü	English	Winter	Björn Andres	Oral Assessment	30 min	4	K1107-MA0009
8	Computer Graphics 1	INF	Stefan Gumhold	2V/2Ü	German /English	Winter	Stefan Gumhold	Written Examination 90 min/Oral Assessment 20 min <=15 Participants		4	K1104-MA0025
9	Data Visualization	INF	Raimund Dachselt Stefan Gumhold	2V/2Ü	German /English	Winter	Raimund Dachselt Stefan Gumhold	Written Examination 90 min/Oral Assessment 30 min < 10 Participants		4	K1104-CMS03
10	Design Patterns and Frameworks	INF	Uwe Aßmann Sebastian Götz	2V/2Ü	English	Winter	Uwe Aßmann Sebastian Götz	Written Examination 90 min/Oral Assessment 15 min < 20 Participants		4	K1104-MA0020
11	Digitization and Data Analytics: Architectures, Methods and Consequences	INF	Wolfgang Nagel Sunna Torge	2V/2Ü	English	Summer	Wolfgang Nagel	Written Examination 90 min/Oral Assessment 20 min <= 10 Participants		4	K1102-ZIH03
12	Knowledge Graphs	INF	Markus Krötzsch Maximilian Marx	2V/2Ü	English	Winter	Markus Krötzsch	Written Examination 90 min/Oral Assessment 30 min < 10 Participa		4	K1101-MA0024
13	Machine Learning 1	INF	Björn Andres	2V/2Ü	English	Winter	Björn Andres	Written Examination 90 min/Oral Assessment 30 min < 10 Participants		4	K1107-MA0060

14	Machine Learning 2	INF	Björn Andres	2 Seminar	English	Summer	Björn Andres	Oral Presentation	30 min	2	K1107-MA0062S
15	Particle Methods	INF	Ivo Sbalzarini	2V/2Ü	English	Summer	Ivo Sbalzarini	Written Examination 90 min/Oral Assessment 30 min <=10 Participants		4	K1107-MA0006
16	Problem Solving and Search in Artificial Intelligence	INF	Lucía Gómez Álvarez Sarah Alice Gaggl	2V/2Ü	English	Winter	Sebastian Rudolph	Written Examination 90 min/Oral Assessment 30 min < 10 Participants		4	K1107-MA0056
17	Scientific Visualization	INF	Stefan Gumhold	2V/2Ü	English	Summer	Stefan Gumhold	Written Examination 90 min/Oral Assessment 20 min <=15 Participants		4	K1104-MA0032
18	User Interface Engineering	INF	Raimund Dachselt Anke Lehmann	2V/2Ü	German /English	Winter	Dachselt	Written Examination 90 min/Oral Assessment 20 min <= 10 Participants		4	K1104-MA0024
19	Teamproject	any	chosen freely	8 SWS Project Processing	German /English	Summer	after confirmation by examination board CMS	1. Project Report 70 Hours 2. Oral Presentation 30 Minutes		8	
20	Wissenschaftliches Rechnen - Fortgeschrittene Aspekte = Scientific Arithmetic - Advanced Aspects	MATH	Axel Voigt Marco Salvalaglio	3V/1Ü	English	Summer	Axel Voigt Marco Salvalaglio	Oral Assessment (Group Test) 20 min		4	K0108-40642x
21	Scientific Programming – Advanced Aspects	MATH	Wolfgang Walter Simon Praetorius	3V/1Ü	German /English	every	Wolfgang Walter Simon Praetorius	Oral Assessment (Group Test) 20 min		4	K0108-40643x
22	Gekoppelte Simulation/ Echtzeitsimulation / Coupled simulation/Real Time simulation	MW	Michael Beitelschmidt	2V	English	Winter	Michael Beitelschmidt	Written Examination	90 min	2	K1301-EX0190V
23	Mehrkörpersysteme - Praktikum / Multi Body Systems	MW	Michael Beitelschmidt Volker Quarz	2 SWS Placement	German /English	every	Michael Beitelschmidt	Ungraded Assignment (must be passed)		2	K1301-1H1625P
24	Numerische Modellierung von Mehrphasenströmungen / Numerical modeling of multiphase flows	MW	Jochen Fröhlich	2V/1Ü/1P	German	Summer	Jochen Fröhlich	Written Examination 90 min/Oral Assessment 30 min <=10 Participants		4	K1302-1H1630
25	Systemdynamik / System Dynamics	MW	Michael Beitelschmidt Zhirong Wang	2V/2Ü	German	Winter	Michael Beitelschmidt	Written Examination	120 min	4	K1301-1H0500
26	Turbulente Strömungen und deren Modellierung / Turbulent Flows and their Modeling	MW	Jochen Fröhlich Jörg Stiller	2V/2Ü	German	Summer	Jochen Fröhlich	Written Examination	90 min	4	K1302-1H0521