

## § 5a Wahlfachkataloge

The following table contains the elective subjects for the Information and Computer Engineering master's program. The table is structured as follows:

1st line of each subject: number, name of the subject

Further lines:

1st column: the number of the institute offering the course (this information is subject to change)

2nd column: name of the course

3rd column: semester hours (SH).

4th column: type of course (CT)

5th column: ECTS-Credits within the Information and Computer Engineering master's program

6th column: compulsory course (course must be completed if the subject is chosen)

compulsory elective course (at least 2 alternatives can be selected if the subject is chosen)

The table contains those seminar projects that are automatically assigned to the subject, seminar projects from other institutes can be assigned to the subject after discussing them with the mentor.

The list of university teachers responsible for the subject and the corresponding list of mentors is compiled by the Information and Computer Engineering Curricular Committee Working Group and is available on the webpage of the Office of the Dean of the Faculty of Computer Science and Biomedical Engineering ([www.dinf.tugraz.at](http://www.dinf.tugraz.at)).

c01	Secure and Correct Systems	SH	CT	ECTS	
705	<a href="#">Advanced Computer Networks</a>	2	VO	3.0	Comp. elective
705	<a href="#">Advanced Computer Networks</a>	1	KU	2.0	Comp. elective
705	<a href="#">Applied Cryptography</a>	2	VO	3.0	Comp. elective
705	<a href="#">Applied Cryptography</a>	1	KU	2.0	Comp. elective
705	<a href="#">Applied Cryptography 2</a>	2	VO	3.0	
705	<a href="#">Applied Cryptography 2</a>	1	KU	2.0	
716	<a href="#">Compiler Construction</a>	2	VO	3.0	Comp. elective
716	<a href="#">Compiler Construction</a>	1	KU	2.0	Comp. elective
705	<a href="#">Digital System Design</a>	2	VO	3.0	
705	<a href="#">Digital System Design</a>	1	KU	2.0	
705	<a href="#">Embedded Security</a>	3	VU	5.0	
448	<a href="#">Fault-Tolerant Computing Systems</a>	2	VO	3.0	
448	<a href="#">Fault-Tolerant Computing Systems</a>	1	UE	2.0	
448	<a href="#">Industrial Software Development and Quality Management</a>	2	VO	3.0	
448	<a href="#">Industrial Software Development and Quality Management</a>	1	UE	1.5	
705	<a href="#">IT Security</a>	2	VO	3.0	Comp. elective
705	<a href="#">IT Security</a>	1	KU	2.0	Comp. elective
705	<a href="#">Logic and Computability</a>	2	VO	3.0	
705	<a href="#">Logic and Computability</a>	1	KU	1.5	
716	<a href="#">Logic and Logic Programming</a>	2	VU	3.5	
501	<a href="#">Mathematical Foundations of Cryptography</a>	2	VO	3.0	
501	<a href="#">Mathematical Foundations of Cryptography</a>	1	UE	2.0	
716	<a href="#">Problem Analysis and Complexity Theory</a>	3	VU	5.0	
716	<a href="#">Quality Assurance in Software Development</a>	2	VU	2.5	
705	<a href="#">Security Aspects in Software Development</a>	2	VO	3.0	
705	<a href="#">Security Aspects in Software Development</a>	1	KU	2.0	
705	<a href="#">Selected Topics Design and Verification</a>	2	VO	3.0	
705	<a href="#">Selected Topics Design and Verification</a>	1	UE	2.0	
705	<a href="#">Selected Topics IT Security 1</a>	2	VO	3.0	
705	<a href="#">Selected Topics IT Security 1</a>	1	KU	2.0	
705	<a href="#">Selected Topics IT Security 2</a>	2	SE	3.5	
716	<a href="#">Selected Topics Software Technology 1</a>	2	VO	3.0	
716	<a href="#">Selected Topics Software Technology 1</a>	1	UE	2.0	
716	<a href="#">Selected Topics Software Technology 2</a>	2	VO	3.0	
716	<a href="#">Selected Topics Software Technology 2</a>	1	UE	2.0	
716	<a href="#">Software Paradigms</a>	3	VU	5.0	
716	<a href="#">Software Technology</a>	3	VU	5.0	Comp. elective
716	<a href="#">Software Technology Tools</a>	2	SE	3.5	
716	<a href="#">Software Technology, Seminar</a>	2	SE	3.5	
716	<a href="#">Software-Maintenance</a>	3	VU	4.5	

705	<a href="#">Verification and Testing</a>	2	VO	3.0	Comp. elective
705	<a href="#">Verification and Testing</a>	1	UE	2.0	Comp. elective
<b>Total ECTS</b>				<b>120.0</b>	

Selection of compulsory courses

For the Major, students must complete four of the six compulsory elective courses (VU or VO+KU/UE). For the Minor they must complete two of the six compulsory elective courses (VU or VO+KU/UE).

705	<a href="#">Seminar Project Applied Information Processing</a>	6	SP	10.0	
716	<a href="#">Seminar Project Software Technology</a>	6	SP	10.0	

<b>c02 Computer Vision and Graphics</b>		<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
710	<a href="#">Augmented Reality</a>	3	VU	5.0	Compulsory
710	<a href="#">Computer Graphics 2</a>	1.5	VU	2.5	Compulsory
710	<a href="#">Computer Vision 2</a>	1.5	VU	2.5	Compulsory
711	<a href="#">Computer-Aided Geometric Design</a>	3	VU	5.0	
716	<a href="#">Design and Analysis of Algorithm</a>	2	VO	3.0	
716	<a href="#">Design and Analysis of Algorithm</a>	1	KU	1.5	
507	<a href="#">Discrete Differential Geometry</a>	2	VO	3.0	
507	<a href="#">Freeform curves and surfaces</a>	2	VO	3.0	
507	<a href="#">Freeform curves and surfaces</a>	1	UE	1.5	
711	<a href="#">Geometric 3D-Modeling in Computer Graphics</a>	3	VU	5.0	
438	<a href="#">Image Based Measurement</a>	2	VO	3.0	
438	<a href="#">Image Based Measurement, Laboratory</a>	1	LU	2.0	
710	<a href="#">Image Processing and Pattern Recognition</a>	2	VO	3.0	Compulsory
710	<a href="#">Image Processing and Pattern Recognition</a>	1	KU	2.0	Compulsory
710	<a href="#">Image Understanding</a>	2	VO	3.0	
710	<a href="#">Image Understanding</a>	1	KU	2.0	
706	<a href="#">Information Visualisation</a>	3	VU	5.0	
710	<a href="#">Mathematical Principles in Vision and Graphics</a>	3	VU	5.0	
710	<a href="#">Medical Image Analysis</a>	2	VO	3.0	
710	<a href="#">Medical Image Analysis</a>	1	KU	2.0	
710	<a href="#">Optimization for Computer Science</a>	2	VO	3.0	
710	<a href="#">Optimization for Computer Science</a>	1	UE	2.0	
710	<a href="#">Pattern Recognition, Seminar</a>	3	SE	5.0	
711	<a href="#">Photo Realism</a>	3	VU	5.0	
710	<a href="#">Real-Time Graphics</a>	2	VO	3.0	Comp. elective
710	<a href="#">Real-Time Graphics</a>	1	KU	2.0	Comp. elective
710	<a href="#">Real-Time Graphics 2</a>	1	VO	1.5	
710	<a href="#">Real-Time Graphics 2</a>	2	KU	4.0	
710	<a href="#">Research Seminar Virtual Reality</a>	2	SE	3.5	
710	<a href="#">Robot Vision</a>	2	VO	3.0	Comp. elective
710	<a href="#">Robot Vision</a>	1	KU	2.0	Comp. elective
710	<a href="#">Selected Topics Computer Graphics</a>	2	VO	3.0	
710	<a href="#">Selected Topics Computer Graphics</a>	1	KU	2.0	
710	<a href="#">Selected Topics Computer Vision</a>	2	VO	3.0	
710	<a href="#">Selected Topics Computer Vision</a>	1	KU	2.0	
711	<a href="#">Simulation and Animation</a>	3	VU	5.0	
710	<a href="#">Virtual Reality</a>	4	VU	7.0	
<b>Total ECTS</b>				<b>118.0</b>	

Selection of compulsory courses

For the Major, students must complete all of the compulsory courses and one of the compulsory elective courses (each VO with KU). For the Minor they must either complete the combination of Image Processing and Pattern Recognition (VO+KU), Computer Vision 2 VU, and Robot Vision VO or the combination of Augmented Reality VU, Computer Graphics 2 VU, and Real-Time Graphics VO.

711	<a href="#">Seminar Project Computer Graphics</a>	6	SP	10.0	
710	<a href="#">Seminar Project Image Analysis</a>	6	SP	10.0	

<b>c03 Robotics and Computational Intelligence</b>		<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
442	<a href="#">Adaptive Systems</a>	2	VO	3.0	
442	<a href="#">Adaptive Systems</a>	1	UE	2.0	
716	<a href="#">Advanced Robotics</a>	2	VO	3.0	

716	<a href="#">Advanced Robotics</a>	1	LU	2.0	
443	<a href="#">Automation of Mechatronic Systems</a>	2	VO	3.0	
443	<a href="#">Automation of Mechatronic Systems, Laboratory</a>	1	LU	2.0	
442	<a href="#">Computational Intelligence</a>	2	VO	3.0	Compulsory
708	<a href="#">Computational Intelligence</a>	1	UE	1.5	Compulsory
708	<a href="#">Computational Intelligence Seminar A</a>	2	SE	3.5	
708	<a href="#">Computational Intelligence Seminar B</a>	2	SE	3.5	
716	<a href="#">Construction of Mobile Robots</a>	2	PR	5.0	
431	<a href="#">Control of Electric Drives and Machines</a>	2	VO	3.0	
431	<a href="#">Control of Electric Drives and Machines, Laboratory</a>	2	LU	3.0	
716	<a href="#">Expert Systems</a>	2	VO	3.0	
716	<a href="#">Expert Systems</a>	1	KU	2.0	
508	<a href="#">Integrated Navigation</a>	2	VO	3.0	
508	<a href="#">Integrated Navigation</a>	1	UE	1.5	
431	<a href="#">Introduction to Electric Drive Systems</a>	1.5	VO	2.0	
507	<a href="#">Kinematics and Robotics</a>	2	VO	3.0	
507	<a href="#">Kinematics and Robotics</a>	1	LU	2.0	
708	<a href="#">Machine Learning</a>	2	VO	3.0	Comp. elective
708	<a href="#">Machine Learning</a>	1	KU	2.0	Comp. elective
708	<a href="#">Autonomously Learning Systems</a>	2	VO	3.0	Comp. elective
708	<a href="#">Autonomously Learning Systems</a>	1	KU	2.0	Comp. elective
437	<a href="#">Methods of Simulation of Mechatronic Systems</a>	2	VO	3.0	
437	<a href="#">Methods of Simulation of Mechatronic Systems</a>	1	UE	1.5	
305	<a href="#">Mobile Robots</a>	2	VO	3.0	Compulsory
305	<a href="#">Mobile Robots</a>	1	UE	2.0	Compulsory
431	<a href="#">Modelling and Simulation of Electric Drive Systems and Machines</a>	2	VO	3.0	
431	<a href="#">Modelling and Simulation of Electric Drive Systems and Machines</a>	2	LU	3.0	
716	<a href="#">Modelling Technical Systems</a>	2	VO	3.0	
716	<a href="#">Modelling Technical Systems</a>	1	UE	2.0	
508	<a href="#">Navigation Systems</a>	2	VU	3.0	
708	<a href="#">Neural Networks</a>	2	VO	3.0	Comp. elective
708	<a href="#">Neural Networks</a>	1	KU	2.0	Comp. elective
708	<a href="#">Principles of Brain Computation</a>	2	VO	3.0	Comp. elective
708	<a href="#">Principles of Brain Computation</a>	1	KU	2.0	Comp. elective
442	<a href="#">Nonlinear Signal Processing</a>	2	VO	3.0	Compulsory
442	<a href="#">Nonlinear Signal Processing</a>	1	UE	2.0	Compulsory
716	<a href="#">Recommender Systems</a>	2	VU	3.0	
710	<a href="#">Robot Vision</a>	2	VO	3.0	
710	<a href="#">Robot Vision</a>	1	KU	2.0	
442	<a href="#">Selected Topics Robotics and Computational Intelligence</a>	2	SE	3.5	
443	<a href="#">State Estimation and Filtering</a>	2	VO	3.0	
443	<a href="#">State Estimation and Filtering</a>	1	UE	2.0	

**Total ECTS** **119.0**

Selection of compulsory courses

For the Major, students must complete all of the compulsory courses and either Machine Learning or Autonomously Learning Systems, and either Neural Networks or Principles of Brain Computation (each VO with KU). For the Minor they must complete Computational Intelligence (VO+UE) and one of the other compulsory or compulsory elective courses (each VO with UE/KU).

708	<a href="#">Seminar Project Machine Learning and Neuroinformatics</a>	6	SP	10.0	
716	<a href="#">Seminar Project Robotics</a>	6	SP	10.0	
442	<a href="#">Seminar Project Signal Processing</a>	6	SP	10.0	

<b>c04 Signal Processing and Human Communication</b>					<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
442	<a href="#">Adaptive Systems</a>	2	VO	3.0			Compulsory	
442	<a href="#">Adaptive Systems</a>	1	UE	2.0			Compulsory	
442	<a href="#">Advanced Signal Processing 1, Seminar</a>	2	SE	3.5				
442	<a href="#">Advanced Signal Processing 2, Seminar</a>	2	SE	3.5				
K17	<a href="#">Algorithms in Acoustics and Computer Music 01</a>	2	VO	3.0				
K17	<a href="#">Algorithms in Acoustics and Computer Music 01</a>	1	UE	1.5				

717	<a href="#">Biosignal Processing</a>	2	VO	3.0	
717	<a href="#">Biosignal Processing</a>	2	UE	2.5	
709	<a href="#">Cognitive Neuroscience</a>	2	VO	3.0	
709	<a href="#">Computational Biology</a>	2	LU	2.0	
709	<a href="#">Computational Biology</a>	2	VO	3.0	
442	<a href="#">Digital Audio Engineering 1</a>	2	VO	3.0	
442	<a href="#">Digital Audio Engineering 2</a>	2	VO	3.0	
442	<a href="#">Digital Audio Engineering, Laboratory</a>	2	LU	3.0	
442	<a href="#">Digital Signal Processing Laboratory</a>	2	LU	4.0	
709	<a href="#">Information Processing in Humans</a>	2	VO	3.0	
442	<a href="#">Linguistic Foundations of Speech and Language Technology</a>	2	VO	3.0	
709	<a href="#">Methods of Functional Brain Research</a>	2	VO	3.0	
442	<a href="#">Mixed-Signal Processing Systems Design</a>	2	VU	3.5	
708	<a href="#">Principles of Brain Computation</a>	2	VO	3.0	
708	<a href="#">Principles of Brain Computation</a>	1	KU	2.0	
709	<a href="#">Neurocomputing, Seminar</a>	2	SE	3.5	
709	<a href="#">Non-Invasive Brain-Computer Interfaces</a>	2	KU	3.0	Comp. elective
709	<a href="#">Non-Invasive Brain-Computer Interfaces</a>	2	VO	3.0	Comp. elective
442	<a href="#">Nonlinear Signal Processing</a>	2	VO	3.0	
442	<a href="#">Nonlinear Signal Processing</a>	1	UE	2.0	
K17	<a href="#">Psychoacoustics 01</a>	2	VO	3.0	
K17	<a href="#">Psychoacoustics 02</a>	2	VO	3.0	
709	<a href="#">Rehabilitation Engineering</a>	2	VO	3.0	
442	<a href="#">Selected Topics Signal, Biosignal and Speech Processing</a>	2	SE	3.5	
438	<a href="#">Signal Analysis</a>	2	VO	3.0	Compulsory
438	<a href="#">Signal Analysis</a>	1	UE	2.0	Compulsory
438	<a href="#">Signal Analysis, Laboratory</a>	2	LU	4.0	
448	<a href="#">Signal Processors</a>	2	VO	3.0	
448	<a href="#">Signal Processors, Laboratory</a>	1	LU	2.0	
442	<a href="#">Speech Communication 1</a>	2	VO	3.0	Comp. elective
442	<a href="#">Speech Communication 2</a>	2	VO	3.0	
442	<a href="#">Speech Communication Laboratory</a>	2	LU	4.0	Comp. elective
442	<a href="#">Spoken Language in Human and Human-Computer Dialogue</a>	2	VU	3.5	
438	<a href="#">Statistical Signal Processing</a>	2	VO	3.0	Comp. elective
438	<a href="#">Statistical Signal Processing</a>	1	UE	2.0	Comp. elective
<b>Total ECTS</b>				<b>120.0</b>	

Selection of compulsory courses

For the Major, students must complete all of the compulsory courses and either Non-Invasive Brain-Computer Interfaces (VO + KU), or Statistical Signal Processing (VO+UE), or Speech Communication1 VO and Speech Communication Laboratory. For the Minor they must complete all of the compulsory courses.

709	<a href="#">Seminar Project Brain-Computer Interface</a>	6	SP	10.0	
442	<a href="#">Seminar Project Signal Processing</a>	6	SP	10.0	
442	<a href="#">Seminar Project Speech Communication</a>	6	SP	10.0	
<b>c05</b>	<b>Communications and Mobile Computing</b>	<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
442	<a href="#">Adaptive Systems</a>	2	VO	3.0	
442	<a href="#">Adaptive Systems</a>	1	UE	2.0	
451	<a href="#">Antennas and Wave Propagation</a>	2	VO	3.0	
451	<a href="#">Antennas and Wave Propagation</a>	1	UE	2.0	
451	<a href="#">Applied Microwave Systems</a>	2	VO	3.0	
440	<a href="#">Communication Systems, Laboratory</a>	1	LU	2.0	
437	<a href="#">Computational Electromagnetics</a>	2	VO	3.0	
448	<a href="#">Context-Aware Computing</a>	2	VO	3.0	Comp. elective
448	<a href="#">Context-Aware Computing</a>	1	UE	2.0	Comp. elective
437	<a href="#">Electrodynamics ICE</a>	2	VO	3.0	Compulsory
437	<a href="#">Electrodynamics ICE</a>	1	UE	1.5	Compulsory
442	<a href="#">Fundamentals of Digital Communications</a>	2	VO	3.0	Comp. elective
442	<a href="#">Fundamentals of Digital Communications</a>	1	UE	2.0	Comp. elective

451	<a href="#">HF-Engineering</a>	2	VO	3.0	
451	<a href="#">HF-Engineering</a>	1	UE	2.0	
451	<a href="#">HF-Engineering, Laboratory</a>	1	LU	2.0	
440	<a href="#">Information Theory and Coding</a>	2	VO	3.0	Comp. elective
440	<a href="#">Information Theory and Coding</a>	1	UE	2.0	Comp. elective
451	<a href="#">Introduction to Microwave Engineering</a>	2	VO	3.0	Comp. elective
451	<a href="#">Introduction to Microwave Engineering</a>	1	UE	2.0	Comp. elective
448	<a href="#">Mobile Computing, Laboratory</a>	2	LU	3.5	
448	<a href="#">Mobile Computing, Seminar</a>	3	SE	5.0	Compulsory
442	<a href="#">Mobile Radio Systems</a>	2	VO	3.0	
437	<a href="#">Numerical Optimization</a>	2	VO	3.0	
437	<a href="#">Numerical Optimization</a>	1	UE	2.0	
451	<a href="#">Optoelectrical Communication Engineering</a>	3	VO	4.5	
451	<a href="#">Optoelectrical Communication Engineering</a>	1	UE	2.0	
448	<a href="#">Power-Aware Computing</a>	2	VU	3.0	
448	<a href="#">Power-Aware Computing, Laboratory</a>	1	LU	2.0	
451	<a href="#">Radar Seminar</a>	1.5	SE	2.5	
451	<a href="#">Introduction to Radar Systems</a>	2	VO	3.0	
440	<a href="#">Satellite Communications</a>	2	VO	3.0	
440	<a href="#">Satellite Communications</a>	1	UE	2.0	
448	<a href="#">Selected Topics Communications and Mobile Computing</a>	2	SE	3.5	
448	<a href="#">Sensor Networks</a>	2	VU	3.0	
448	<a href="#">Sensor Networks, Labor</a>	2	LU	3.5	
437	<a href="#">Simulation of Time-Dependent Fields</a>	2	VO	3.0	
437	<a href="#">Simulation of Time-Dependent Fields</a>	1	UE	2.0	
451	<a href="#">Smart Antennas</a>	2	VU	3.5	
448	<a href="#">Smart Service Development</a>	2	VO	3.0	
448	<a href="#">Smart Service Development</a>	1	UE	1.5	
440	<a href="#">Software Defined Radio</a>	2	VO	3.0	
440	<a href="#">Telecommunication Systems</a>	2	VO	3.0	
440	<a href="#">Wireless Communication Networks and Protocols</a>	2	VO	3.0	

**Total ECTS** **120.0**

Selection of compulsory courses

For the Major, students must complete all of the compulsory courses and two of the four compulsory elective courses (each VO with UE). For the Minor they must complete Electrodynamics ICE (VO + UE) and either one of the four compulsory elective courses (VO+UE) or Mobile Computing, Seminar.

437	<a href="#">Seminar Project Computational Electrodynamics</a>	6	SP	10.0	
448	<a href="#">Seminar Project Technical Informatics</a>	6	SP	10.0	
440	<a href="#">Seminar Project Telecommunications</a>	6	SP	10.0	

<b>c06</b>	<b>Embedded and Automotive Systems</b>	<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
448	<a href="#">Selected Topics Embedded and Automotive Systems</a>	2	SE	3.5	
439	<a href="#">Automotive Electronics</a>	2	VO	3.0	
439	<a href="#">Automotive Electronics, Laboratory</a>	2	LU	3.0	
331	<a href="#">Automotive Engineering for Embedded Automotive Systems</a>	2	VO	3.0	Comp. elective
438	<a href="#">Automotive Measurement</a>	2	VO	3.0	
438	<a href="#">Automotive Measurement, Laboratory</a>	1	LU	2.0	
438	<a href="#">Automotive Sensors and Actuators</a>	2	VO	3.0	
438	<a href="#">Automotive Sensors and Actuators, Laboratory</a>	2	LU	4.0	
448	<a href="#">Design of Real-Time Systems, Laboratory</a>	2	LU	4.0	
448	<a href="#">Design Patterns</a>	2	VO	3.0	
448	<a href="#">Design Patterns</a>	1	UE	2.0	
448	<a href="#">Distributed Embedded Systems, Seminar</a>	3	SE	5.0	Compulsory
261	<a href="#">Dynamical Systems</a>	3	VU	5.0	Comp. elective
439	<a href="#">Electromagnetic Compatibility of Electronic Systems</a>	2	VO	3.0	
439	<a href="#">Electromagnetic Compatibility of Electronic Systems Laboratory</a>	1	LU	2.0	
448	<a href="#">Embedded Automotive Software</a>	2	VU	3.5	Comp. elective
448	<a href="#">Embedded Systems</a>	2	VO	3.0	Compulsory
448	<a href="#">Embedded Systems, Laboratory</a>	1	LU	2.0	Compulsory

448	<a href="#">Fault-Tolerant Computing Systems</a>	2	VO	3.0	
448	<a href="#">Fault-Tolerant Computing Systems</a>	1	UE	2.0	
448	<a href="#">Industrial Software Development and Quality Management</a>	2	VO	3.0	
448	<a href="#">Industrial Software Development and Quality Management</a>	1	UE	1.5	
331	<a href="#">Innovative Power Trains</a>	2	VO	3.0	
431	<a href="#">Introduction to Electric Machines</a>	2	VO	3.0	
448	<a href="#">Microcontroller Design, Laboratory</a>	4	LU	6.0	
438	<a href="#">On Board Diagnosis</a>	2	VO	3.0	
438	<a href="#">On Board Diagnosis, Laboratory</a>	1	LU	1.5	
313	<a href="#">Piston Engines, Introduction</a>	2	VO	3.0	
443	<a href="#">Process Automation</a>	2	VO	3.0	
443	<a href="#">Process Automation, Laboratory</a>	2	LU	4.0	
438	<a href="#">Process Instrumentation</a>	2	VO	3.0	
438	<a href="#">Process Instrumentation, Laboratory</a>	2	LU	4.0	
448	<a href="#">Real-Time Bus Systems</a>	1	VO	1.5	
448	<a href="#">Real-Time Bus Systems, Laboratory</a>	1	LU	2.0	
448	<a href="#">Real-Time Operating Systems</a>	2	VO	3.0	Comp. elective
448	<a href="#">Real-Time Operating Systems</a>	1	LU	1.5	Comp. elective
438	<a href="#">Testing and Verification Methods for Distributed Software Systems</a>	2	VO	3.0	
313	<a href="#">Introduction to Thermodynamics</a>	2	VO	3.0	
438	<a href="#">Vibration Measurement</a>	2	VO	3.0	
438	<a href="#">Vibration Measurement, Laboratory</a>	1	LU	2.0	
<b>Total ECTS</b>				<b>119.0</b>	

Selection of compulsory courses

For the Major, students must complete all of the compulsory courses and additionally at least 9 ECTS out of the compulsory elective courses (each VO with LU if available). For the Minor they must complete Embedded Systems (VO+LU) and additionally at least 4.5 ECTS (each VO with LU if available).

439	<a href="#">Seminar Project Electronics</a>	6	SP	10.0	
438	<a href="#">Seminar Project Measurement Techniques</a>	6	SP	10.0	
448	<a href="#">Seminar Project Technical Informatics</a>	6	SP	10.0	

<b>c07 Measurement and Control Systems</b>		<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
443	<a href="#">Automatic Control, Supplement</a>	2	VO	3.0	
443	<a href="#">Basics of Nonlinear Control Systems</a>	1	UE	2.0	Compulsory
443	<a href="#">Basics of Nonlinear Control Systems</a>	2	VO	3.0	Compulsory
443	<a href="#">Computer Aided Control System Design</a>	2	VO	3.0	
443	<a href="#">Computer Aided Control System Design</a>	2	UE	4.0	
443	<a href="#">Computer Aided System Modeling and Simulation</a>	2	VO	3.0	
443	<a href="#">Computer Aided System Modeling and Simulation</a>	1	UE	2.0	
443	<a href="#">Control Systems 2</a>	2	VO	3.0	Compulsory
443	<a href="#">Control Systems 2</a>	1	UE	1.5	Compulsory
443	<a href="#">Descriptor Systems</a>	2	VU	3.5	
443	<a href="#">Design of Optimal Systems</a>	2	VO	3.0	
443	<a href="#">Design of Optimal Systems</a>	1	UE	2.0	
443	<a href="#">Mathematics for Engineers</a>	2	VO	3.0	
443	<a href="#">Mathematics for Engineers</a>	1	UE	2.0	
438	<a href="#">Measurement 2</a>	2	VO	3.0	
438	<a href="#">Measurement Signal Processing</a>	2	VO	3.0	
438	<a href="#">Measurement Signal Processing, Laboratory</a>	2	LU	4.0	
443	<a href="#">Mechatronic Systems Modeling</a>	2	VO	3.0	
443	<a href="#">Mechatronic Systems Modeling</a>	1	UE	2.0	
448	<a href="#">Microcontroller</a>	1.5	VO	2.0	
448	<a href="#">Microcontroller</a>	2	UE	3.0	
431	<a href="#">Modelling and Simulation of Electric Drive Systems and Machines</a>	2	VO	3.0	
431	<a href="#">Modelling and Simulation of Electric Drive Systems and Machines</a>	2	LU	3.0	
443	<a href="#">Multivariable Systems</a>	2	VO	3.0	
443	<a href="#">Multivariable Systems</a>	1	UE	2.0	
443	<a href="#">Nonlinear Control Systems</a>	2	VO	3.0	
443	<a href="#">Nonlinear Control Systems</a>	1	UE	2.0	

437	<a href="#">Numerical Optimization</a>	2	VO	3.0	
437	<a href="#">Numerical Optimization</a>	1	UE	2.0	
438	<a href="#">Optical Measurement Principles</a>	2	VO	3.0	
438	<a href="#">Physical Effects for Sensors</a>	2	VO	3.0	
443	<a href="#">Process Automation</a>	2	VO	3.0	Compulsory
443	<a href="#">Process Automation, Laboratory</a>	2	LU	4.0	Compulsory
438	<a href="#">Process Instrumentation</a>	2	VO	3.0	
438	<a href="#">Process Instrumentation, Laboratory</a>	2	LU	4.0	
443	<a href="#">Selected Topics Measurement and Control Design</a>	2	SE	3.5	
443	<a href="#">State Estimation and Filtering</a>	2	VO	3.0	
443	<a href="#">State Estimation and Filtering</a>	1	UE	2.0	
443	<a href="#">System Theory</a>	2	VO	3.0	
443	<a href="#">System Theory</a>	1	UE	2.0	

**Total ECTS**

**112.5**

Selection of compulsory courses

For the Major, students must complete all compulsory courses. For the Minor they must complete Control Systems 2 (VO+UE) and Basics of Nonlinear Control Systems (VO+UE).

439	<a href="#">Seminar Project Electronics</a>	6	SP	10.0	
438	<a href="#">Seminar Project Measurement Techniques</a>	6	SP	10.0	
443	<a href="#">Seminar Project Modeling, Simulation, and Control</a>	6	SP	10.0	

<b>c08</b>	<b>Microelectronics and IC Design</b>	<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
439	<a href="#">Advanced Analog IC Design 1</a>	3	VU	4.5	
439	<a href="#">Advanced Analog IC Design 2</a>	3	VU	4.5	
439	<a href="#">Analog Circuit Laboratory</a>	3	LU	4.0	
439	<a href="#">Analog IC Design 1</a>	2	VO	3.0	Compulsory
439	<a href="#">Analog IC Design 1</a>	2	UE	3.0	Compulsory
439	<a href="#">Analog IC Design 2</a>	2	VO	3.0	Comp. elective
439	<a href="#">Analog IC Design 2</a>	2	UE	3.0	Comp. elective
439	<a href="#">Analog IC Layout 1</a>	2	UE	3.5	
439	<a href="#">Analog IC Layout 2</a>	1	VU	1.5	
439	<a href="#">Basics of Microelectronics</a>	2	VO	3.0	
439	<a href="#">Circuit Simulation</a>	1	VO	1.5	Comp. elective
439	<a href="#">Circuit Simulation</a>	2	UE	3.0	Comp. elective
439	<a href="#">Compact Modelling and Robust IC Design</a>	1	VU	1.5	
439	<a href="#">Development of Electronic Systems</a>	4	VO	6.0	
439	<a href="#">Digital Circuit Laboratory</a>	3	LU	4.0	
705	<a href="#">Digital System Design</a>	2	VO	3.0	Compulsory
705	<a href="#">Digital System Design</a>	1	KU	2.0	Compulsory
439	<a href="#">Electromagnetic Compatibility of Electronic Systems</a>	2	VO	3.0	
439	<a href="#">Electromagnetic Compatibility of Electronic Systems Laboratory</a>	1	LU	2.0	
439	<a href="#">Electromagnetic Compatibility of ICs</a>	1	VO	1.5	
439	<a href="#">Evaluation of ICs Laboratory</a>	3	LU	4.5	
448	<a href="#">Hardware Description Languages</a>	2	VO	3.0	
448	<a href="#">Hardware Description Languages</a>	1	UE	1.5	
448	<a href="#">Hardware-Software-Codesign</a>	2	VO	3.0	
448	<a href="#">Hardware-Software-Codesign</a>	1	UE	2.0	
439	<a href="#">IC Design Fundamentals</a>	2	VO	3.0	Comp. elective
439	<a href="#">IC Design Fundamentals</a>	2	UE	3.0	Comp. elective
439	<a href="#">IC Design Project Management and Quality</a>	1	VO	1.5	
439	<a href="#">Methods for IC Evaluation and Failure Analysis</a>	2	VU	3.0	
438	<a href="#">Micro-Electromechanical Systems</a>	2	VO	3.0	
451	<a href="#">Microwave Measurement</a>	2	VU	3.0	
439	<a href="#">Noise and Crosstalk in ICs</a>	2	VU	3.0	
513	<a href="#">Physics of Semiconductor Devices</a>	2	VO	3.0	
439	<a href="#">Practical Analog Circuit Design</a>	2	UE	3.0	
439	<a href="#">Practical Analog Circuit Design, Laboratory</a>	2	LU	2.0	
439	<a href="#">Production Test and Design for Test</a>	2	VO	3.0	

451	<a href="#">RF and Microwave Component Design</a>	2	VU	3.0	
439	<a href="#">Selected Topics Advanced Analog IC Design</a>	2	SE	3.5	
451	<a href="#">Selected Topics RFID</a>	2	VO	3.0	
705	<a href="#">System-on-Chip Architectures and Modelling</a>	3	VU	5.0	Comp. elective
<b>Total ECTS</b>					<b>119.5</b>

Selection of compulsory courses

For the Major, students must complete all compulsory courses and one of the compulsory elective courses (VU or VO+UE/KU). For the Minor they must complete one of the compulsory courses (VO+UE/KU) and one of the compulsory elective courses (VU or VO+UE/KU).

439	<a href="#">Seminar Project Electronics</a>	6	SP	10.0	
438	<a href="#">Seminar Project Measurement Techniques</a>	6	SP	10.0	
448	<a href="#">Seminar Project Technical Informatics</a>	6	SP	10.0	

<b>s01 Supplementary catalogue</b>		<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
439	<a href="#">Application of Microprocessors</a>	2	VO	3.0	
439	<a href="#">Application of Microprocessors, Laboratory</a>	1	LU	2.0	
437	<a href="#">Basic Experiments in Electrodynamics, Laboratory</a>	2	LU	2.0	
709	<a href="#">Bioinformatics</a>	2	LU	3.0	
502	<a href="#">Combinatorial Optimization 1</a>	3	VO	4.5	
502	<a href="#">Combinatorial Optimization 1</a>	1	UE	2.0	
708	<a href="#">Computational Geometry</a>	2	VO	3.0	
708	<a href="#">Computational Geometry</a>	1	UE	1.5	
709	<a href="#">Computational Medicine</a>	2	VO	3.0	
709	<a href="#">Computational Medicine</a>	2	LU	2.0	
439	<a href="#">Electronic Circuit Design 3</a>	2	VO	3.0	
448	<a href="#">Embedded Internet</a>	2	VU	3.0	
448	<a href="#">Embedded Internet</a>	2	LU	3.0	
502	<a href="#">Graph Theoretic Algorithms</a>	3	VO	4.5	
502	<a href="#">Graph Theoretic Algorithms</a>	1	UE	2.0	
709	<a href="#">Interdisciplinary team-taught lecture series: Trends in Neurorehabilitation</a>	2	VO	3.0	
431	<a href="#">Power Electronics based Solid State Energy Converters</a>	2	VO	3.0	
655	<a href="#">Laboratory Information and Management Systems</a>	2	VO	3.0	
501	<a href="#">Mathematical Analysis of Algorithms</a>	3	VO	5.0	
501	<a href="#">Mathematical Analysis of Algorithms</a>	1	UE	2.0	
440	<a href="#">RFID Systems</a>	2	VO	3.0	
437	<a href="#">Simulation of Static Fields</a>	2	VO	3.0	
437	<a href="#">Simulation of Static Fields</a>	1	UE	2.0	
710	<a href="#">Software Development in Distributed Environments</a>	3	VU	5.0	
<b>Total ECTS</b>					<b>70.5</b>

<b>b01 Business, Law, and Management</b>		<b>SH</b>	<b>CT</b>	<b>ECTS</b>	
374	<a href="#">Business Informatics</a>	1	VO	1.5	
374	<a href="#">Business Informatics</a>	2	UE	3.0	
373	<a href="#">Business Sociology</a>	2	VO	3.0	
371	<a href="#">Company's Management of Innovation</a>	1	VO	1.5	
371	<a href="#">Company's Management of Innovation</a>	2	UE	2.0	
373	<a href="#">Controlling</a>	2	VO	3.0	
373	<a href="#">Controlling</a>	1	UE	1.5	
371	<a href="#">Creativity Techniques</a>	1	VO	1.5	
371	<a href="#">Creativity Techniques</a>	1	UE	1.5	
940	<a href="#">Diversity Management 1: Basic Principles</a>	2	SE	2.0	
373	<a href="#">Encyclopedia Business Economics</a>	3	VO	4.5	Compulsory
373	<a href="#">Encyclopedia Business Economics</a>	2	UE	3.0	Compulsory
372	<a href="#">Entrepreneurship and Start-Up of Corporation</a>	2	VO	3.0	
372	<a href="#">Entrepreneurship and Start-Up of Corporation</a>	1	UE	1.5	
372	<a href="#">General Management and Organization</a>	2	VO	3.0	
372	<a href="#">General Management Exercises</a>	2	UE	3.0	
372	<a href="#">General Management, Case Studies</a>	1	VO	1.5	



372	<a href="#">General Management, Case Studies</a>	2	UE	3.0
371	<a href="#">Industrial Management</a>	3	VO	4.5
371	<a href="#">Industrial Management</a>	3	UE	3.0
374	<a href="#">Information and Communication Management</a>	1	VO	1.5
374	<a href="#">Information and Communication Management</a>	1	UE	1.5
372	<a href="#">Information Management</a>	1	VO	1.5
372	<a href="#">Information Management</a>	2	UE	3.0
940	<a href="#">Intercultural Social Competence for Business</a>	2	SE	2.0
373	<a href="#">International Economic Relationship</a>	1	VO	1.5
371	<a href="#">Logistics</a>	1	VO	1.5
371	<a href="#">Logistics</a>	1	UE	1.5
373	<a href="#">Marketing Management</a>	2	VO	3.0
373	<a href="#">Marketing Management</a>	1	UE	1.5
372	<a href="#">Process Management</a>	2	VO	3.0
372	<a href="#">Process Management</a>	2	UE	3.0
371	<a href="#">Product Innovation Project</a>	3	PR	5.0
374	<a href="#">Production Planning &amp; Control</a>	2	VO	3.0
374	<a href="#">Production Planning &amp; Control</a>	2	UE	3.0
372	<a href="#">Project Management</a>	2	VO	3.0
374	<a href="#">Quantitative Methods for Business</a>	2	VO	3.0
374	<a href="#">Quantitative Methods for Business</a>	3	UE	4.5
374	<a href="#">Selected Topics Business Informatics</a>	2	VO	3.0
374	<a href="#">Selected Topics Business Informatics</a>	1	UE	1.5
710	<a href="#">Start-Ups and Small Business Management</a>	3	VU	3.0
371	<a href="#">Value Management I</a>	1	VO	1.5
371	<a href="#">Value Management I</a>	1	UE	1.5
371	<a href="#">Value Management II</a>	1	VO	1.5
371	<a href="#">Value Management II</a>	3	UE	4.5
433	<a href="#">Complexity and Dynamics in the Information- and Knowledge-Society</a>	2	SE	2.0
U73	<a href="#">Concepts of Technology Assessments</a>	2	SE	4.0
434	<a href="#">Energy and Environment</a>	2	VO	3.0
940	<a href="#">English for Engineers (Advanced - Professional Meetings)</a>	2	SE	2.0
940	<a href="#">English for Engineers (Advanced Oral Skills)</a>	2	SE	2.0
U73	<a href="#">Gender and Technology I</a>	2	SE	5.0
U73	<a href="#">Gender and Technology II</a>	2	SE	4.0
433	<a href="#">Management of the Environment</a>	2	VO	3.0
U73	<a href="#">Methods of Inter- and Transdisciplinary Research</a>	2	SE	4.0
432	<a href="#">Nuclear Power and Environment</a>	2	VO	3.0
U40	<a href="#">Sustainable Innovation</a>	2	KS	4.0
U73	<a href="#">Technology - Ethics - Politics</a>	2	VO	4.0
373	<a href="#">Civil Law and Law of Business Enterprises</a>	3	VO	4.5
373	<a href="#">Industrial Law (Labor Law)</a>	2	VO	3.0
501	<a href="#">Insurance Law</a>	4	VO	6.0
373	<a href="#">Intensive Studies in Law of Business Enterprises</a>	2	VO	3.0
218	<a href="#">Introduction to the Austrian Constitution</a>	2	VO	3.0
373	<a href="#">Law of Taxation</a>	2	VO	3.0
373	<a href="#">Patent Law</a>	2	VO	3.0
710	<a href="#">Selected Topics Public Law, Informatics, and Data Security</a>	2	VO	3.0
<b>Total ECTS</b>				<b>181.5</b>
Selection of compulsory courses				
For the Minor, students must complete all compulsory courses.				