

Master Program

Information and Communication Engineering (M.Sc.)



Date: 2021-07-21

Study plan (Annex I)

Key														
Performance category:	FP = Fachprüfung (lecture examination); SL = Studienleistung (examination)	Type of examination			Course				Semester					
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CP:	credit points													
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1. Mandatory									33	27	6	0	0	
18-ho-2010	Advanced Digital Integrated Circuit Design (V3 + Ü1)	FP	St	s	90		4	●		6	6			
18-zo-2060	Digital Signal Processing (V3 + Ü1)	FP	St	s	180		4	●		6	6			
18-dg-2150	Technical Electrodynamics for iCE (VL2+Ü2)	FP	St	s	180		4	●		5	5			
18-pr-1050	Optical Communications – Components (V3 + Ü1) (formerly 18-ku-1060)	FP	St	s	90		4	●		6		6		
18-kl-2010	Communication Technology II (V2 + Ü1)	FP	St	s	90		3	●		4	4			
18-sm-2010	Communication Networks II (V3 + Ü1)	FP	St	s	120		4	●		6	6			
2. Optional Fundamentals (min. 10 CPs); Cancellation of modules compliant to Typ §30, Abs. 5 APB									10	0	6	4	0	
18-pe-2010	Information Theory II (V3 + Ü1)	FP	St	s	120		4	f		6		6		
18-jk-2020	Antennas and Adaptive Beamforming (V3 + Ü1)	FP	St	f			4	f		6			6	
18-kl-2020	Mobile Communications (V3 + Ü1)	FP	St	s	90		4	f		6		6		
20-00-0748	Mobile Networking (IV4)	FP	St	f			4	f		6			6	
18-ho-2190	Circuit Building Blocks for Communication Systems (V2 + Ü1) **	FP	St	s	90		3	f		4			4	
3. Optionals (min. 38 CPs; min. 3 selected subareas with at least 10 CPs per subarea); Cancellation of modules compliant to Typ §30, Abs. 5 APB; from open sub-areas only one module in total									41	0	15	26	0	
(selected modules contain 1 or 2 laboratories and 1 or 2 seminars, but not more than 3 in total)														
3.1 Device Technology and Circuit Design									10					
18-bf-2030	Applied Superconductivity (V2)	FP	St	m	30		2	f		3			3	
18-kn-1050	Electromechanical Systems I (V2 + Ü2) (formerly: 18-wy-1020)	FP	St	f			4	f		5			5	
18-ho-2210	Industrial Electronics (V2 + Ü1)	FP	St	f			3	f		4			4	
18-jk-2090	Microwave Measurement Technologies (V2 + Ü1 + Pr1)	FP	St	m	45		4	f		6		6		
16-17-5110	Printed Electronics (V2)	FP	St	m	30		2	f		4		4		
18-bu-1010	Technology of Micro- and Precision Engineering (V2 + Ü1) (formerly: 18-sl-1010)	FP	St	m	30		3	f		4	4			
18-jk-2060	Project Seminar Advanced μ Wave Components & Antennas (Pj4)	SL	St	m	30		4	f		8		8		
18-ho-2130	Project Seminar Design for Testability (Pj3)	SL	St	f			3	f		6		6		
18-ho-2160	Seminar: Integrated Electronic Systems Design A (S2)	SL	St	m	45		2	f		4		4		
18-ho-2161	Seminar: Integrated Electronic Systems Design B (S3)	SL	St	m	45		3	f		6		6		
18-ho-2120	Advanced Integrated Circuit Design Lab (Pr3)	SL	St	f			3	f		6		6		
18-me-2020	Introduction to Spintronics (V3 + Ü1)	FP	St	m/s	45/120		4	f		6			6	
18-bu-2020	Technology of Microsystems Technology (V2 + Ü1) (formerly: 18-sl-2010) **	FP	St	m	30		3	f		4		4		
18-ho-1100	Seminar Circuit Design for Printable Electronics (S3) **	SL	St	m	30		3	f		4			4	
18-ho-2190	Circuit Building Blocks for Communication Systems (V2 + Ü1) **	FP	St	s	90		3	f		4			4	
18-ku-2210	Technology of Electronic and Optoelectronic Devices (V2) **	FP	St	s	90		2	f		3			3	
18-sw-2030	Advanced Topics in Micro- and Nano Electronics (Pj4) **	SL	St	m	30		2	f		4		4		
18-sw-2010	Ultra-Large Scale Integration Technology (V3 + Ü1) **	FP	St	f			4	f		6			6	

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3.2 Electronic System Design									10					
18-ho-2200	Computer Aided Design for SoCs (V2 + Ü1 + Pr1)	FP	St	s	90	4	f	5		5				
18-hb-2030	Computer Systems II (V3 + Ü1)	FP	St	m	30	4	f	6		6				
18-su-2020	Real-Time Systems (V3 + Ü1)	FP	St	f		4	f	6		6				
18-hb-2010	Low-Level Synthesis (V3 + Ü1)	FP	St	m	30	4	f	6		6				
18-hb-2020	High-Level Synthesis (V3 + Ü1)	FP	St	m	30	4	f	6			6			
18-ho-2040	Microprocessor Systems (V2 + Ü1)	FP	St	s	90	3	f	4		4				
18-hb-2040	Projektseminar Rekonfigurable Systems (Pj3)	SL	St	m	30	3	f	6		6				
18-ho-2130	Project Seminar Design for Testability (Pj3)	SL	St	f		3	f	6		6				
18-ho-2160	Seminar Integrated Electronic Systems Design A (S2)	SL	St	m	45	2	f	4		4				
18-ho-2161	Seminar: Integrated Electronic Systems Design B (S3)	SL	St	m	45	3	f	6			6			
18-su-2080	Seminar Software System Technology (S2)	SL	St	m	30	2	f	4		4				
18-ho-1090	HDL Lab (Pr3)	SL	St	f		3	f	6		6				
20-00-0968	Embedded Systems Hands-On 2: Entwurf von Hardware-Beschleunigern für Systems-on-Chip (Pr4)	SL	St	m/s		4	f	6	6					
20-00-1001	Advanced Topics in Embedded Systems and Applications (PP6)	SL	St	m/s		6	f	9	9					
18-sc-2010	Modellbildung und Simulation von elektrischen Schaltungen (V2 + Ü1)	FP	St	m	20	3	f	4		4				
18-ho-1080	HDL: Verilog & VHDL (V3) **)	FP	St	s	60	2	f	3		3				
18-ho-2020	Computer Aided Design for Integrated Circuits (V2 + Ü1) **)	FP	St	s	90	3	f	4			4			
18-su-2030	Model-Based Software Development Lab (Pj3) **)	SL	St	m	30	3	f	6		6				
3.3 Communication Technology									10					
18-zo-2010	Adaptive Filters (V3 + Ü1)	FP	St	f		4	f	6		6				
18-jk-2020	Antennas and Adaptive Beamforming (V3 + Ü1)	FP	St	f		4	f	6			6			
18-ad-2090	Computer Vision in Engineering (V2 + Ü1)	FP	St	f		3	f	4			4			
18-jk-2130	Microwave Engineering II (V3 + Ü1) (formerly: 18-ku-2040)	FP	St	s	90	4	f	6			6			
18-pe-2070	Matrix Analysis and Computations (V3 + Ü1)	FP	St	f		4	f	6		6				
18-jk-2090	Microwave Measurement Technologies (V2 + Ü1 + Pr1)	FP	St	m	45	4	f	6		6				
18-pe-2030	MIMO - Communication and Space-Time-Coding (V2 + Ü1)	FP	St	s	120	3	f	4			4			
18-zo-2090	Robust Signal Processing With Biomedical Applications (V3 + Ü1)	FP	St	s	180	4	f	6		6				
18-zo-2070	Speech and Audio Signal Processing (V2 + Ü1 + S1)	FP	St	m	20	4	f	6			6			
18-pr-2010	Terahertz Systems and Applications (V2 + Ü1)	FP	St	m	30	3	f	4		4				
18-dg-1030	Computational Electromagnetics and Applications I (V2)	FP	St	m	30	2	f	3		3				
18-zo-2040	Advanced Topics in Statistical Signal Processing (S4)	SL	St	f		4	f	8			8			
18-jk-2060	Project Seminar Advanced μ Wave Components & Antennas (Pj4)	SL	St	m	30	4	f	8			8			
18-pe-2040	Projektseminar Neue Themen in der Sensor-Array und Tensor Signalverarbeitung	SL	St	m	40	4	f	8	8					
18-pe-2050	Projektseminar Neue Themen in MIMO Kommunikationsnetzwerken (Pj4)	SL	St	m	40	4	f	8		8				
18-sc-1020	Projektseminar Elektromagnetisches CAD (Pj4) (vormals: 18-dg-1060)	SL	St	m	20	4	f	8			8			
18-zo-2100	Robust and Biomedical Signal Processing (S4)	SL	St	m	50	4	f	8			8			
18-zo-2050	Signal Detection and Parameter Estimation (S4)	SL	St	f		4	f	8			8			
18-zo-2030	Digital Signal Processing Lab (Pr3)	SL	St	s	120	3	f	6		6				
18-sc-1010	Software Lab Computational Electromagnetics and Applications I (Pr3) (formerly: 18-dg-1041)	SL	St	m	20	3	f	8		8				
18-zo-2110	Data Science I (V2 + Ü2)	FP	St	m/s	45/90	4	f	5		5				
18-ha-2010	Wettbewerb künstliche Intelligenz in der Medizin (Pj4)	SL	St	m/s		4	f	8	8	8				

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18-zo-2090 Robust Signal Processing With Biomedical Applications (V3 + Ü1)		FP	St	s	120		4	f		6					

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									CP					
18-ku-2080	<i>Optical Communications 3 – Seminar WDM Lab (S2) **</i>	SL	St	m	30		2	f		4				4
18-ku-2220	<i>Nonlinear Optics (V2) **</i>	FP	St	s	90		2	f		3				3
18-jk-2070	<i>Microwave Sensors (V2 + Ü2) **</i>	FP	St	m	30		4	f		5		5		
18-ku-2070	<i>Optical Communications 2 – Systems (V2 + Ü1) **</i>	FP	St	s	90		3	f		4	4			
18-zo-2080	<i>Advances in Digital Signal Processing: Imaging and Image Processing (V2 + Ü2) **</i>	FP	St	f			4	f		5		5		
3.4 Communication Systems									10					
18-se-2010	Acoustics I (V2)	FP	St	m	30		2	f		3			3	
18-pe-2020	Convex Optimization in Signal Processing and Communications (V2 + Ü1 + Pr1)	FP	St	m/s	20/120		4	f		6		6		
18-kp-1010	Information Theory I (V3 + Ü1)	FP	St	s	120		4	f		6	6			
18-pe-2010	Information Theory II (V3 + Ü1)	FP	St	s	120		4	f		6		6		
18-kp-2110	Machine Learning in Information and Communication Technology (ICT) (V2 + Ü1 + Pr1)	FP	St	f			4	f		6		6		
18-jk-2090	<i>Microwave Measurement Technologies (V2 + Ü1 + Pr1)</i>	FP	St	m	45		4	f		6		6		
18-pe-2030	MIMO - Communication and Space-Time-Coding (V2 + Ü1)	FP	St	s	120		3	f		4			4	
18-kl-2020	Mobile Communications (V3 + Ü1)	FP	St	s	90		4	f		6		6		
18-jk-2040	Radar Techniques (V2)	FP	St	m	30		2	f		3	3			
18-kl-2040	Project Seminar Wireless Communications (Pj4)	SL	St	m	30		4	f		8		8		
18-kt-2010	Praktikum Kommunikationstechnik und Sensorsysteme (Pr3) (vormals: 18-jk-2050)	SL	St	m/s			3	f		5			5	
18-pe-2060	Sensor Array Processing and Adaptive Beamforming (V2 + Ü1)	FP	St	f			3	f		4		4		
18-pr-2020	International Summer School "Microwaves and Lightwaves" (S2)	SL	St	m	30		2	f		4		4		
18-pe-2080	Graph signal processing, learning and optimization (V3 + Ü1)	FP	St	m/s	20/120		4	f		6	6			
18-ha-2010	Wettbewerb künstliche Intelligenz in der Medizin (Pj4)	SL	St	m/s			4	f		8	8	8		
18-ad-2110	Automatisiertes Fahren (V2)	FP	St	s	90		2	f		3				
18-jk-2080	<i>European Microwave School (S2) **</i>	SL	St	m	30		3	f		3			3	
18-jk-2100	<i>Ausgewählte Themen der Radartechnik (V2) (formerly: 18-da-2020) **</i>	FP	St	m	30		2	f		3		3		
18-jk-2030	<i>Terrestrial and Satellite-based Radio Systems (V3 + Ü1) **</i>	FP	St	m	50		4	f		6		6		
18-kl-2060	<i>Simulation and Modeling Techniques and Tools for Mobile Communication Systems (V2) **</i>	FP	St	m	30		2	f		3		3		
18-ku-2070	<i>Optical Communications 2 – Systems (V2 + Ü1) **</i>	FP	St	s	90		3	f		4	4			
18-ku-2080	<i>Optical Communications 3 – Seminar WDM Lab (S2) **</i>	SL	St	m	30		2	f		4		4		
3.5 Communication Science and Media Technology									10					
18-kp-2110	Machine Learning in Information and Communication Technology (ICT)	FP	St	f			4	f		6			6	
20-00-0056	Network, Traffic and Quality Management for Internet Services (V2)	FP	St	f			2	f		3		3		
20-00-0512	Network Security (iv4)	FP	St	f			4	f		6		6		
20-00-0553	Project on Secure Mobile Networking (Pr6)	SL	St	f			6	f		9		9		
20-00-0366	Serious Games (iv4)	FP	St	f			4	f		6		6		
18-sm-2280	Software Defined Networking (V2 + Ü2) (formerly 18-hh-2050)	FP	St	f			4	f		6			6	
20-00-0120	TK3: Mobile/Ubiquitous Computing (iv4)	FP	St	f			4	f		6		6		
20-00-0121	Ubiquitous computing in business processes (V2)	FP	St	f			2	f		3			3	
18-sm-2090	Multimedia Communications Seminar II (S2)	SL	St	f			2	f		4			4	
18-sm-2070	Multimedia Communications Lab II (Pr3)	SL	St	f			3	f		6			6	

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20-00-0552	Lab Exercise on Secure Mobile Networking (Pr4)	SL	St	f			4	f		6				6		
18-sm-2130	Multimedia Communications Project II (Pr6)	SL	St	f			6	f		9		9				
20-00-0418	Visual Computing Lab (Pr4)	SL	St	f			4	f		6				6		
18-kb-2020	Relativistic Electrodynamics (V2 + Ü2)	FP	St	m	30		4	f		5				5		
18-kl-2070	Fundamentals of Reinforcement Learning (V2 + Ü1)	FP	St	m/s	20/		3	f		4		4				
18-ad-2110	Automatisiertes Fahren (V2)	FP	St	s	90		2	f		3						
18-sa-2020	Mobile Sensing (V2 + Ü2) **)	FP	St	s	120		4	f		6		6				
18-sm-2140	Content Networking (V2) **)	FP	St	m	30		2	f		3		3				
18-hh-2070	Smart Networks Lab (Pr3) **)	SL	St	f			3	f		6				6		
20-00-0066	TK 2: Web Engineering, Web Cooperation and e-Learning (iV2) **)	FP	St	f			2	f		3	3					
18-hh-2010	Peer-to-Peer Systems and Applications (V2 + Ü2) **)	FP	St	f			4	f		6		6				
18-hh-2060	Seminar Software Defined Networking (S2) **)	SL	St	f			2	f		4		4				
18-sm-2100	Algorithms for Mobile Networks (V2) **)	FP	St	s	90		2	f		3				3		
20-00-0354	Wireless Sensor Networks lab (Pr4) **)	SL	St	f			4	f		6				6		
18-sm-2030	Communication Networks IV (V2) **)	FP	St	m	30		2	f		3				3		
3.6 IT in Engineering, Computer Science, Mathematics, and Physics											10					
All modules not already listed above and offered by Dept. (FB) 4-13 or 16-20 ²⁾																
...																
4. Studium Generale (min. 6 CPs) ²⁾; Cancellation of modules compliant to											6	3	3	0	0	
4.1 Business Administration																
01-14-1030	Bookkeeping (V2 + TT1)	FP	St	s			3	f		2	2					
01-10-1028/f	Introduction to Business Management (V2)	FP	St	s			2	f		3		3				
01-60-1042/f	Introduction to Economics (V2)	FP	St	s			2	f		3	3					
4.2 Languages																
	German Language I (V2)	SL	St	s			2	f		3	3					
	German Language II (V2) (mandatory for student without DSH-2 or equ. qualif.)	SL	St	s			2	f		3		3				
	Other Language Course (V2) (mandatory for student with DSH-2 or equ. qualif.)	SL	St	s			2	f		3	3					
4.3 Miscellaneous																
Chosen modules offered by Dept. (FB) 1, 2, 3, and 15																
...																
...																
5. Master-Thesis											o	30	0	0	0	30
Sum											120	30	30	30	30	

Footnote 1: Modules marked with **) and in italics are currently inactive.

Footnote 2: Modules of other departments that should be selectable by the students are dynamically included in certain areas. Our department has no