University of Oulu
Degree structure diagram 2019 - 2020
Master's Programme in Electronics and Communications Engineering, 120 ECTS credits
Study option: Electronics design

Code and link to the WebOodi	Name of the course		Recommended timing								Online courses
			1. study year				2. study year				
			autumn		spring		autumn		spring		
			1P	2P	3P	4P	1P	2P	3P	4P	
	Electronics design - basic module 33 ECTS - all obligatory										
521401S	Electronics design II	6	6								
521405A	Electronic system design	5	5								
521326S	Radio engineering I	5		5							
521088S	Optoelectronics	5	5								
521423S	Embedded system project	5			5						
521406S	Digital techniques III	7			0	7					x
	Electronics design - advanced module 18 ECTS - choose at least 15 ECTS + advanced practical training										
521348S	Statistical signal processing I	5	0								x
521435S	Electronics design III	6		0							
521453A	Operating systems	5				0					
521457A	Software engineering	5			5						
521025S	Power electronics	5			5						
521225S	RF components and measurements	5				0					
521300S	Electronics design and construction exercise	6					0	0			
521402S	Telecommunications circuit design	6					0				
521448S	Physical Design of Digital Integrated Circuits	5				5					x
521016A	Advanced practical training	3					0	3			
	Optional courses 39 ECTS			10		2	15	12			
521327S	Radio Engineering II	6			0.0				0.0		
521388S	Antennas	5				0.0				0.0	
521089S	Printed Electronics	5			0.0				0.0		
521124S	Sensors and Measuring Techniques	5		0.0				0.0			
521098S	Testing techniques of Electronics	5				0.0				0.0	
521328A	Simulations and Tools for Telecommunications	5		0.0				0.0			
477624S	Control System Methods	5					0.0				
521279S	Signal Processing Systems	5		0.0				0.0			
521281S	Application Specific Signal Processors	5	0.0				0.0				
812341A	Object-Oriented Programming	5									
	Common Obligatory Courses (30 ECTS)										
523991S	Diploma thesis	30							15	15	

521362S	Seminar	0								0	
521011S	Maturity essay	0								0	
	Number of ECTS / period		**16**	**15**	**15**	**14**	**15**	**15**	**15**	**15**	
	Number of ECTS / semester		**31**		**29**		**30**		**30**		
	Number of ECTS / study year		**60**				**60**				
	Number of ECTS / degree		**120**								

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Degree structure diagram 2019 - 2020
Master's Programme in Electronics and Communications Engineering, 120 ECTS credits
Study option: Electronics materials and components

Code and link to the WebOodi	**Name of the course**		**Recommended timing**								**Online courses**
			1. study year				**2. study year**				
			autumn		**spring**		**autumn**		**spring**		
			1P	**2P**	**3P**	**4P**	**1P**	**2P**	**3P**	**4P**	
	Electronics materials and components - basic module 41 ECTS - all obligatory										
521401S	Electronics design II	6	6								
521124S	Sensors and measuring techniques	5		5							
521326S	Radio engineering I	5		5							
521028S	Small/medium power energy harvesting and storage devices *)	5		5							x
521075S	Microelectronics packaging technologies	5			5						
521074S	Microelectronics and micromechanics	5			5						
521225S	RF components and measurements	5				5					
521215S	Microelectronics project	5			0	5					
	*) will be lectured in odd years (-19, -21,…)										
	Electronics materials and components - advanced module 23 ECTS - all obligatory										
521080S	X-ray diffraction	5		5							
521072S	Microsensors	5						5			x
521079S	Introduction to nanotechnology	5				5					
521089S	Printed electronics	5							5		
521016A	Advanced practical training	3			0	3					
	Optional courses 26 ECTS		5		0		15	6			
	Electronics design										
512435S	Electronics Design III	6		0.0				0.0			
521405A	Electronics System Design	5	0.0				0.0				
521406S	Digital Techniques 3	7			0.0	0.0			0.0	0.0	
521423S	Embedded System Project	5			0.0	0.0			0.0	0.0	
521300S	Electronics Design and Construction Exercise	6	0.0	0.0			0.0	0.0			

	Measurement techniques										
521096S	Measuring Systems	5		0.0				0.0			
521088S	Optoelectronics	5	0.0				0.0				
521094S	Optoelectronic Measurements	5			0.0				0.0		
521098S	Testing Techniques on Electronics	5				0.0				0.0	
521115S	EMC Design	5				0.0				0.0	
	Telecommunication										
521388S	Antennas	5				0.0				0.0	
521386S	Radio Channels	5		0.0				0.0			
521327S	Radio Engineering II	6			0.0				0.0		
521435S	Electronics Design III	6		0.0				0.0			
521410S	Special Course on Electronics Design	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Common Obligatory Courses (30 ECTS cr)										
523992S	Diploma thesis	30							15	15	
521362S	Seminar	0								0	
521011S	Maturity essay	0								0	
	Number of ECTS / period		**11**	**20**	**10**	**18**	**15**	**11**	**20**	**15**	
	Number of ECTS / semester		**31**		**28**		**26**		**35**		
	Number of ECTS / study year		**59**				**61**				
	Number of ECTS / degree		**120**								

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Degree structure diagram 2019 - 2020

Master's Programme in Electronics and Communications

Engineering, 120 ECTS credits

Study option: Telecommunications

Code and link to the WebOodi	**Name of the course**		**Recommended timing**								**Online courses**
			1. study year				**2. study year**				
			autumn		**spring**		**autumn**		**spring**		
			1P	**2P**	**3P**	**4P**	**1P**	**2P**	**3P**	**4P**	
	Telecommunications - basic module 40 ECTS - all obligatory										
031051S	Numerical matrix analysis	5	5								
521348S	Statistical signal processing I	5	5								x
521395S	Wireless communications I	5	5								x
031025A	Introduction to optimization	5		5							
521340S	Communications networks I	5		5							
521324S	Statistical signal processing II	5			5						
521349S	Wireless communications II	5			5						
521326S	Radio engineering I	5						5			
	Telecommunications - advanced module 33 ECTS - choose at least 30 ECTS + advanced practical training										

521386S	Radio channels	5		5							
521369A	Simulations and tools for telecommunications	5		5							
521327S	Radio engineering II	6							0		
521377S	Communications networks II	7			0	0					
521388S	Antennas	5				5					
521279S	Signal processing systems	5						5			
521322S	Telecommunication engineering project **or**	5					0	5			
521300S	Electronics design and construction exercise	6					0	0			
521318S	Modern topics in telecommunications and radio engineering	3-7					0	0	0	0	
521016A	Advanced practical training	3			0	3					
521389S	Wireless body area networks *)	5				5					
521325S	Communications signal processing**)	5								0	
521390S	Information theory *)	5					0				
521391S	Channel coding and modulation **)	5					0				
521392S	Convex optimization *)	7					0	0			
521393S	Statistical communication theory *)	7					0	0			
521394S	Multiantenna communicatioons **)	5					0				
	*) will be lectured in even years (-20, -22,…)										
	**) will be lectured in odd years (-21, -23,…)										
	Optional courses 17 ECTS					3	10	4			
555285A	Project management			0				0			
555391S	Advanced Course in Project Management			0				0			
	Common Obligatory Courses (30 ECTS)										
521998S	Diploma thesis	30							15	15	
521362S	Seminar	0								0	
521011S	Maturity essay	0								0	
	Number of ECTS / period		**15**	**20**	**10**	**16**	**10**	**19**	**15**	**15**	
	Number of ECTS / semester		**35**		**26**		**29**		**30**		
	Number of ECTS / study year		**61**				**59**				
	Number of ECTS / degree		**120**								

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Degree structure diagram 2019 - 2020

Master's Programme in Electronics and Communications Engineering, 120 ECTS credits

Study option: Radio engineering

Code and link to the WebOodi	**Name of the course**	**Recommended timing**								**Online courses**
		1. study year				**2. study year**				
		autumn		**spring**		**autumn**		**spring**		
		1P	**2P**	**3P**	**4P**	**1P**	**2P**	**3P**	**4P**	
	Radio engineering - basic module 36 ECTS - all obligatory									

521401S	Electronics design II	6	6								
521348S	Statistical signal processing I	5	5								x
521395S	Wireless communications I	5	5								x
521326S	Radio engineering I	5		5							
521324S	Statistical signal processing II	5			5						
521225S	RF components and measurements	5				5					
521405A	Electronic system design	5					5				
	Radio engineering - advanced module 41/42 ECTS										
	Obligatory (36/37 ECTS)										
521435S	Elecrtronics design III	6		6							
521327S	Radio engineering II	6			6						
521075S	Microelectronics packaging technologies	5			5						
521388S	Antennas	5				5					
521402S	Telecommunications circuit design	6					6				
521322S	Telecommunication engineering project **or**	5					0	5			
521300S	Electronics design and construction exercise	6					0	0			
521016A	Advanced practical training	3			0	3					
	Optional (5 ECTS)										
521386S	Radio channels	5		5							
521328A	Simulations and tools for telecommunications	5		0							
521340S	Communications networks I	5		0							
521349S	Wireless communications II	5			0						
521289S	Machine learning	5			0						
521279S	Signal processing systems	5						0			
521318S	Modern topics in telecommunications and radio engineering	3-7					0	0	0	0	
521325S	Communications signal processing **)	5								0	
	**) will be lectured in odd years (-21, -23,…)										
	Optional courses 12/13 ECTS						3	10			
	Common Obligatory Courses (30 ECTS cr)										
522991S	Diploma thesis	30							15	15	
521362S	Seminar	0								0	
521011S	Maturity essay	0								0	
	Number of ECTS / period		**16**	**16**	**16**	**13**	**14**	**15**	**15**	**15**	
	Number of ECTS / semester		**32**		**29**		**29**		**30**		
	Number of ECTS / study year		**61**				**59**				
	Number of ECTS / degree		**120**								

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Degree structure diagram 2019 - 2020

Master's Programme in Electronics and Communications Engineering, 120 ECTS credits

Study option: Photonics and measurement techniques:

A: Optical and electronic measuring techniques

Code and link to the WebOodi	Name of the course		Recommended timing								Online courses
			1. study year				2. study year				
			autumn		spring		autumn		spring		
			1P	2P	3P	4P	1P	2P	3P	4P	
	Photonics and measurement techniques - basic module 31 ECTS - all obligatory										
521089S	Printed electronics	5			5						
521096S	Measuring systems	5		5							
521401S	Electronics design II	6	6								
521088S	Optoelectronics	5	5								
521124S	Sensors and measuring techniques	5		5							
521097S	Wireless measurements	5			5						
	Photonics and measurement techniques - advanced module A: Optical and electronic measuring techniques 18 ECTS - choose at least 15 ECTS + advanced practical training										
521242A	Introduction to biomedical engineering	5	5								
521240S	Biophotonics and biomedical optics	5		5							
521093S	Biomedical instrumentation	5				5					
521094S	Futuristic optoelectronic sensors	5			0						
521016A	Advanced practical training	3	0	0	0	3					
	Optional courses 41 ECTS				5	6	15	15			
	Common Obligatory Courses (30 ECTS cr)										
523993S	Diploma thesis								15	15	
521362S	Seminar	0								0	
521011S	Maturity essay									0	
	Number of ECTS / period		**16**	**15**	**15**	**14**	**15**	**15**	**15**	**15**	
	Number of ECTS / semester		**31**		**29**		**30**		**30**		
	Number of ECTS / study year		**60**				**60**				
	Number of ECTS / degree		**120**								

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Master's Programme in Electronics and Communications Engineering, 120 ECTS credits

Study option: Photonics and measurement techniques:

B: Testing techniques and printed electronics

Code and link to the WebOodi	Name of the course		Recommended timing								Online courses
			1. study year				2. study year				
			autumn		spring		autumn		spring		
			1P	2P	3P	4P	1P	2P	3P	4P	
	Photonics and measurement techniques - basic module 31 ECTS - all obligatory										
521089S	Printed electronics	5			5						
521096S	Measuring systems	5		5							
521401S	Electronics design II	6	6								
521088S	Optoelectronics	5	5								
521124S	Sensors and measuring techniques	5		5							
521097S	Wireless measurements	5			5						
	Photonics and measurement techniques - advanced module B: Testing techniques and printed electronics 18 op - all obligatory										
521115S	EMC design	5				5					
521098S	Testing techniques of electronics	5				5					
521079S	Introduction to nanotechnology	5				5					
521016A	Advanced practical training	3	0	0	0	3					
	Optional courses 41 ECTS			6	5		15	15			
	Common Obligatory Courses (30 ECTS cr)										
523993S	Diploma thesis	30							15	15	
521362S	Seminar	0								0	
521011S	Maturity essay	0								0	
	Number of ECTS / period		**11**	**16**	**15**	**18**	**15**	**15**	**15**	**15**	
	Number of ECTS / semester		**27**		**33**		**30**		**30**		
	Number of ECTS / study year		**60**				**60**				
	Number of ECTS / degree		**120**								