
Wireless Communications Engineering (MSc, Tech) 2021-2022 - IMP2021WCE

Code

IMP2021WCE

Validity

1.8.2021 -

Educational level

Master's Programmes (2 years)

ECTS credits

120

Duration (years)

2

Language

Specifications

Degree

Degree title

-

Programme

-

Major subject

-

Classification code

-

Type

-

Group

-

Tags

-

Person in charge

Matti Isohookana

Organization unit

Faculty of Information Technology and Electrical Engineering

Description**Description**

The International Master's Degree Programme in Wireless Communications Engineering (WCE) is a two-year programme focusing on wireless communications network technology. The programme will equip you with core knowledge and skills on the latest methods, tools and technologies related to:

- steerable Intelligent antennas for 5G MIMO and SDMA systems
- communication networks
- computer engineering
- electronics
- 5G and 6G wireless communication systems
- information theory
- stochastic and digital signal processing
- radio channels, and
- radio engineering.

The two-year programme has two specialisation options:

- Radio Access and Networks, and
- RF Engineering.

Radio Access and Networks concentrates on designing and applying radio access technologies both at physical layer and at network layer for 5G, IoT, and future mobile system generations.

RF Engineering focuses on essential radio system components and provides knowledge on the design of integrated RF and DSP circuits for mobile handsets, base stations, 5G devices, IoT applications, and smart and energy efficient sensors.

Further information**Curriculum development and working life cooperation****Objectives**

This programme offers you relevant skills and core knowledge of the latest methods, tools and technologies related to the design on wireless communications networks systems.

Courses cover the subjects on advanced wireless communications systems, communications networks, stochastic signal processing methods, radio channel modeling, radio and antenna engineering, information theory, coding methods, advanced mathematics, as well as several electronics design, digital signal & video processing, computer engineering and Finnish language courses depending on student's selection.

As a graduate of the programme you will get foundational background in a growing, dynamic field of wireless communications including networking, systems, algorithms and technologies. The skills gained in the programme offer a solid academic training that answers to the demands of wireless communications industry. After graduating you can apply study rights for doctoral training in

University of Oulu Graduate School (UniOGS).

Structure

Code	Name	Credits
IMP2021WCE	Wireless Communications Engineering (MSc, Tech) 2021-2022	120
IMP2021WCE-1001	Orientation	120
IMP2021WCE-1002	1) Radio access networks	120
IMP2021WCE-1003	Radio access networks study option, basic module 42 ECTS	42
031051S	Numerical Matrix Analysis	5
521348S	Statistical Signal Processing 1	5
521395S	Wireless Communications I	5
031025A	Introduction to Optimization	5
521340S	Communications Networks I	5
521324S	Statistical Signal Processing II	5
521349S	Wireless Communications II	5
521326S	Radio Engineering 1	5
900017Y	Survival Finnish	2
IMP2021WCE-1004	Radio access networks study option, advanced module	33
IMP2021WCE-1005	Compulsory studies at least 33 ECTS	33
521016A	Advanced Practical Training	3
521386S	Radio Channels	5
521328A	Simulations and Tools for Telecommunications	5
521327S	Radio Engineering II	6
521377S	Communications Networks II	7
521388S	Antennas	5
521279S	Signal Processing Systems	5
521322S	Telecommunication Engineering Project	5
521300S	Electronics Design and Construction Exercise	6
IMP2021WCE-1014	Modern Topics in Telecommunications and Radio Engineering	0
521191S	Modern Topics in Telecommunications and Radio Engineering 1– An Introduction to URLLC, 3 ECTS cr	3
521192S	Modern Topics in Telecommunications and Radio Engineering 2	5
521193S	Modern Topics in Telecommunications and Radio 3 - Wireless system design and theory with reconfigurable intelligent surface (RIS) technology	3
521194S	Modern Topics in Telecommunications and Radio Engineering 4 - Coding for Information Networks	3
521195S	Modern Topics in Telecommunications and Radio Engineering 5	3-7
521196S	Modern Topics in Telecommunications and Radio Engineering 6	3-7
521389S	Wireless Body Area Networks	5

521325S	Communication Signal Processing	5
521390S	Information Theory	5
521391S	Channel Coding and Modulation	5
521392S	Convex Optimization	7
521393S	Statistical Communication Theory	7
521394S	Multiantenna Communications	5
IMP2021WCE-1006 Optional courses, maximum 15 ECTS		15
900013Y	Beginners' Finnish Course 1	3
900053Y	Beginners' Finnish Course 2	5
521225S	RF Components and Measurements	5
521097S	Wireless Measurements	5
813621S	Research Methods	5
521273S	Biosignal Processing I	5
521282S	Biosignal Processing II	5
521467A	Digital Image Processing	5
521145A	Human-Computer Interaction	5
521043S	Internet of Things	5
521140S	Computer Graphics	5
521290S	Distributed Systems	5
521466S	Machine Vision	5
521156S	Towards Data Mining	5
521260S	Programmable Web Project	5
521479S	Software Project	7
521283S	Big Data Processing and Applications	5
521158S	Natural Language Processing and Text Mining	5
521289S	Machine Learning	5
521161S	Multi-Modal Data Fusion	5
521285S	Affective Computing	5
521153S	Deep Learning	5
521155S	Computer Security	5
521042S	Creative Design	5
521288S	Multiprocessor Programming	5
521281S	Application Specific Signal Processors	5
521423S	Embedded System Project	5
IMP2021WCE-1007 Common compulsory studies		30
521975S	Master's Thesis / Master's Degree Programme in Wireless Communications Engineering	30
521362S	Electronics and Communications Engineering Seminar	0
521011S	Maturity Test for Master's Degree, Electronics and Communications Engineering	0

IMP2021WCE-1008
120
IMP2021WCE-1009 Radio engineering, study option module, 36 ECTS
38

521401S	Electronics Design II	6
521348S	Statistical Signal Processing 1	5
521395S	Wireless Communications I	5
521326S	Radio Engineering 1	5
521324S	Statistical Signal Processing II	5
521225S	RF Components and Measurements	5
521405A	Electronic System Design	5
900017Y	Survival Finnish	2

IMP2021WCE-1010 Radio engineering, Advanced module
52
IMP2021WCE-1011 Compulsory studies, at least 36-37 ECTS
36-37

521435S	Electronics Design III	6
521327S	Radio Engineering II	6
521075S	Microelectronics Packaging Technologies	5
521388S	Antennas	5
521402S	Telecommunications Circuit Design	6
521322S	Telecommunication Engineering Project	5
521300S	Electronics Design and Construction Exercise	6
521016A	Advanced Practical Training	3

IMP2021WCE-1012 Optional courses
15-16

521386S	Radio Channels	5
521328A	Simulations and Tools for Telecommunications	5
521340S	Communications Networks I	5
521349S	Wireless Communications II	5

IMP2021WCE-1015 Modern Topics in Telecommunications and Radio Engineering
0

521191S	Modern Topics in Telecommunications and Radio Engineering 1– An Introduction to URLLC, 3 ECTS cr	3
521192S	Modern Topics in Telecommunications and Radio Engineering 2	5
521193S	Modern Topics in Telecommunications and Radio 3 - Wireless system design and theory with reconfigurable intelligent surface (RIS) technology	3
521194S	Modern Topics in Telecommunications and Radio Engineering 4 - Coding for Information Networks	3
521195S	Modern Topics in Telecommunications and Radio Engineering 5	3-7
521196S	Modern Topics in Telecommunications and Radio Engineering 6	3-7
521325S	Communication Signal Processing	5
900013Y	Beginners' Finnish Course 1	3
900053Y	Beginners' Finnish Course 2	5
521097S	Wireless Measurements	5
521389S	Wireless Body Area Networks	5

813621S	Research Methods	5
521273S	Biosignal Processing I	5
521282S	Biosignal Processing II	5
521467A	Digital Image Processing	5
521145A	Human-Computer Interaction	5
521043S	Internet of Things	5
521140S	Computer Graphics	5
521290S	Distributed Systems	5
521466S	Machine Vision	5
521156S	Towards Data Mining	5
521260S	Programmable Web Project	5
521479S	Software Project	7
521283S	Big Data Processing and Applications	5
521158S	Natural Language Processing and Text Mining	5
521289S	Machine Learning	5
521161S	Multi-Modal Data Fusion	5
521285S	Affective Computing	5
521153S	Deep Learning	5
521155S	Computer Security	5
521042S	Creative Design	5
521288S	Multiprocessor Programming	5
521281S	Application Specific Signal Processors	5
521423S	Embedded System Project	5
521206A	Electronic Circuit Design Theory, Methods and Tools	5
IMP2021WCE-1013 Common compulsory studies		30
521975S	Master's Thesis / Master's Degree Programme in Wireless Communications Engineering	30
521362S	Electronics and Communications Engineering Seminar	0
521011S	Maturity Test for Master's Degree, Electronics and Communications Engineering	0