

Microwave Engineering

Basic information

Sivuaine suomeksi: Mikroaaltotekniikka

Biämne på svenska: Microvågsteknik

Code: ELEC30xx

Credits: 25 ECTS

Responsible professors: Ari Sihvola, Ville Viikari, Sergei Tretyakov, Antti Räisänen, Konstantin Simovski, Keijo Nikoskinen, and Katsuyuki Haneda.

Content and structure of the minor

Radio science and engineering is the basis of everything that transmits or receives electromagnetic waves, such as wireless communications devices, radars, or wireless sensors.

This minor provides you with the ability to perform scientific research on new electromagnetic phenomena and to develop components and systems, or to invent new wireless gadgets for the present and future wireless world.

Upon successfully finalizing the microwave engineering minor you will possess knowledge of fundamental and applied electromagnetics, wireless devices and systems, and the related mathematical tools. This includes understanding of radiowave propagation and interactions of electromagnetic fields and matter.

Furthermore, you will gain the ability to use this understanding for creating new components and systems for future wireless sensing and communications applications. So, you will have the proficiency to translate your expertise into new technological solutions for environmental, well-being, and communications challenges in the industry and academia.

There is one compulsory course: ELEC-E4420 Microwave Engineering 1 (5 ECTS). At least two elective courses are to be chosen from Radio Science and Engineering related courses, see list below (10 ECTS), and two elective courses can be chosen from any ELEC-E4xyz courses (10 ECTS). Total credits required: 25 ECTS.

While making your study plan, you should verify that you have the pre-requisites (i.e. the understanding of electromagnetic fields, of electronic circuit design, and of relevant mathematical methods) needed for the compulsory course (Microwave Engineering I). If you do not feel confident, it is strongly recommended that you choose relevant basic courses, i.e. ELEC-E3120, ELEC-E4130 and/or ELEC-E3150, from the course list below to attend before the compulsory course.

Code	Course	ECTS	Teaching period
Compulsory course; 5ECTS			
ELEC-E4420	Microwave engineering I	5	III-IV
Elective courses; 20 ECTS			
ELEC-E4410	Electromagnetic and circuit simulations	5	III
ELEC-E9111	Mathematical Computing	5	I-II
ELEC-E4130	Electromagnetic fields	5	I-II
ELEC-E3120	Analysis and Design of Electronic Circuits	5	I-II
ELEC-E4430	Microwave engineering II	5	IV-V
ELEC-E4440	Microwave engineering workshop	5	I-III
ELEC-E4450	Antennas	5	IV-V

ELEC-E4710	Computational electromagnetics	5	IV-V (offered odd years, next time in 2019)
ELEC-E4720	Advanced circuit theory	5	IV-V (offered even years, next time in 2020)
ELEC-E4730	Advanced field theory	5	IV-V (offered odd years, next time in 2019)
ELEC-E4740	Antennas workshop	5	I-II
ELEC-E4750	Radiowave scattering and propagation	5	I-II (offered even years, next time in 2018)
ELEC-E4760	Terahertz techniques	5	V (offered even years, next time in 2020)

Two of the four elective courses can be chosen from any ELEC-E4xyz course; 10 ECTS.
