

EE-426

**Radio frequency circuits design techniques**

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Cursus	Sem.	Type
Electrical and Electronical Engineering	MA1, MA3	Opt.
MNIS	MA3	Opt.
Microtechnics	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Written
Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Lecture	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**Summary**

RF has changed our daily life in our ever connected wireless world (guess how many radios you have in your smartphone?). The goal of this course is to get familiar with RF design techniques in view of understanding the basics behind wireless communication.

**Content**

This course will teach you basic concepts of RF circuit design.

We will investigate the following items:

Passives and resonant circuits

Impedance matching

HF filters

Noise and Distorsion

S-Parameters

LNA and mixers

Oscillators

Power amplifiers

Transceiver Architectures

**Keywords**

Radio-Frequency, Wireless communication, IoT, Bluetooth, WIFI, Radar, Receiver, Transmitter

**Learning Prerequisites****Required courses**

Electronics

**Learning Outcomes**

By the end of the course, the student must be able to:

- Analyze the building blocks of RF transceivers
- Categorize RF applications
- Design basic RF building blocks
- Sketch a system overview of any wireless TRX

**Teaching methods**

ex cathedra, hands-on and exercise depending on the subject

### Expected student activities

Students could run examples on their own PC using LTSpice  
Analyse and present a scientific paper to the course audience

### Assessment methods

written exam

### Supervision

Office hours	No
Assistants	No
Forum	No

### Resources

#### Virtual desktop infrastructure (VDI)

No

#### Notes/Handbook

Lecture notes will be available in PDF on Moodle.

You might be interested in:

#### **RF Microelectronics from Behzad Razavi (Second Edition), Pearson**

This is an excellent reference textbook with many examples and it will be available in .pdf at the library.

Alternatively:

The Design of CMOS Radio Frequency Integrated Circuits from Thomas Lee, Cambridge Uni Press

#### Moodle Link

- <https://go.epfl.ch/EE-426>