EE-539 **Electric filters**

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

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Oral
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

Introduction to approximation and synthesis methods for analog filters. Modern realization technologies are described including their limitations

Content

Analog circuits and systems (reminders)
Definition of the analog filtering problem
Theory of a non-dissipative 2-ports
Analytic approximations
Numerical approximations
Phase shifters
Circuit approximation
Active filters
Introduction to digital filtering
Switched capacitor filters

Keywords

Passive electrical filters.
Active electrical filters.

Learning Prerequisites

Required courses

Nothing specific to mention except what is indicated in "Required courses (recommended)"

Recommended courses

Electronics Circuits and Systems I and II

Important concepts to start the course

Transfer function definition
s-parameters definition
Kirchoff laws

Learning Outcomes

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

- Assess / Evaluate the transfer function of a filter
- Design an electrical filter
- Decide the order of the electrical filter
- Analyze a Tschebcheff transfer function
- Analyze a Butterworth transfer function
- Estimate the phase and modulus of the filter transfer function
- Compose the transfer function of a low-pass, band-pass, low-pass filter
- Elaborate the topology of the electrical filter

Transversal skills

- Assess progress against the plan, and adapt the plan as appropriate.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Manage priorities.
- Use a work methodology appropriate to the task.
- Set objectives and design an action plan to reach those objectives.
- Communicate effectively, being understood, including across different languages and cultures.
- Use both general and domain specific IT resources and tools

Teaching methods

Ex-cathedra courses and exercises

Expected student activities

Attendance to lectures and exercises sessions

Assessment methods

Oral examination after the end of the semester

Supervision

Office hours	Yes
Assistants	Yes
Forum	No

Resources

Bibliography

Electrical filter book by M. Hasler and J. Neirynck. Editor: Artech House.

Ressources en bibliothèque

- Electrical filter / Hasler

Notes/Handbook

Electrical filter book by M. Hasler and J. Neirynck. Editor: Artech House.

Websites

- http://rfic.epfl.ch