**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

Ressources en bibliothèque
• Electrical filter / Hasler

Notes/Handbook

Websites
• http://rfic.epfl.ch