Module Description, available in: EN

Advanced Electronic Design

General Information

Number of ECTS Credits

3

Module code

TSM_AdvElDes

Valid for academic year

2026-27

Last modification

2021-05-12

Coordinator of the module

Hanspeter Schmid (FHNW, hanspeter.schmid@fhnw.ch)

Explanations regarding the language definitions for each location:

- Instruction is given in the language specified for each location and module execution.
- Documentation is available in the language(s) listed for each location and module execution. If the documentation is in multiple languages, the percentage distributed is indicated (100% = all documentation provided).
- The examination, including both questions and answers, is provided entirely (100%) in the language(s) specified for each location and module execution. The exams are on-site.

	Lausanne			Lugano	Zurich		
Instruction					**X** E 100%		
Documentation					**X** E 100%		
Examination					**X** E 100%		

Module Category

TSM Technical scientific module

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

The student must have knowledge and experience in the following areas:

- Circuit analysis, Laplace transfer functions, Bode diagrams
- Active and passive electronic components, operational amplifiers
- AD and DA conversion principle
- Digital circuits

Brief course description of module objectives and content

This Advanced Electronic Design module gives to the students the key elements for the development of high performance electronic systems. These systems are characterized by:

- the presence of sensitive analogue circuits and signals

- the presence of complex and high-speed digital ICs (Integrated Circuits)

Aims, content, methods

Learning objectives and competencies to be acquired

- The student is able to design a high-performance electronic system composed of sensitive analogue, mixed signal and high speed digital circuits.
- The student is able to implement high-speed and high-resolution signal processing chains based on A/D and D/A converters, analogue functions blocks, and complex digital ICs.

Module content with weighting of different components

Course	Title	Weeks	Emphasis
1	High-speed digital electronic design: High-speed digital fundamentals, signal coding/decoding, medium attachment, clock management, power analysis	5	1/3
2	Advanced analogue electronic design: • Advanced operational amplifier applications: low level and sensor signal conditioning, electronic noise, high-speed and low-power amplifiers, frequency response analysis • ADC and DAC applications; signal routing	9	2/3

Teaching and learning methods

- Lectures
- Exercises

Literature

Recommended: Sergio Franco, *Design with Operational Amplifiers and Analog Integrated Circuits*, 4th ed., McGraw-Hill 2016.

Assessment

Additional performance assessment during the semester

The module does not contain an additional performance assessment during the semester

Basic principle for exams

As a rule, all standard final exams are conducted in written form. For resit exams, lecturers will communicate the exam format (written/oral) together with the exam schedule.

Standard final exam for a module and written resit exam

Kind of exam

Written exam

Duration of exam

120 minutes

Permissible aids

Aids permitted as specified below:

Permissible electronic aids

Open book: All course material either on paper or on computer; pocket calculator; tools on computer.

Computer and phones must be offline (WiFi, Bluetooth, ..., switched off)

Other permissible aids

No other aids permitted

Exception: In case of an electronic Moodle exam, adjustments to the permissible aids may occur. Lecturers will announce the final permissible aids prior to the exam session.

Special case: Resit exam as oral exam

Kind of exam

Oral exam

Duration of exam

30 minutes

Permissible aids

No aids permitted