

**Module Description, available in: EN**

## *Advanced Electronic Design*

**General Information****Number of ECTS Credits**

3

**Module code**

TSM\_AdvEIDes

**Valid for academic year**

2025-26

**Last modification**

2021-05-12

**Coordinator of the module**

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**Explanations regarding the language definitions for each location:**

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

	Lausanne			Lugano	Zurich		
<b>Instruction</b>					X E 100%		
<b>Documentation</b>					X E 100%		
<b>Examination</b>					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: <ul style="list-style-type: none"><li>• Advanced operational amplifier applications: low level and sensor signal conditioning, electronic noise, high-speed and low-power amplifiers, frequency response analysis</li><li>• ADC and DAC applications; signal routing</li></ul>	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