

## Electronic Systems and Instrumentation (E032010)

Course size (nominal values; actual values may depend on programme)

|         |     |            |       |             |        |
|---------|-----|------------|-------|-------------|--------|
| Credits | 6.0 | Study time | 180 h | Contact hrs | 60.0 h |
|---------|-----|------------|-------|-------------|--------|

Course offerings and teaching methods in academic year 2018-2019

|                |       |           |        |
|----------------|-------|-----------|--------|
| A (semester 2) | Dutch | lecture   | 30.0 h |
|                |       | practicum | 30.0 h |

Lecturers in academic year 2018-2019

|                   |      |                    |
|-------------------|------|--------------------|
| Doutrelaigne, Jan | TW06 | lecturer-in-charge |
|-------------------|------|--------------------|

Offered in the following programmes in 2018-2019

|  | crdts | offering |
|--|-------|----------|
| <a href="#">Bachelor of Science in Engineering Physics</a>           | 6     | A        |
| <a href="#">Bachelor of Science in Electromechanical Engineering</a> | 6     | A        |

Teaching languages

Dutch

Keywords

Electronic instrumentation, analog and digital circuits, sensors and actuators, control systems, data-acquisition, system analysis

Position of the course

This course gives an introduction to electronic instrumentation. The course describes the analysis of electronic circuits (digital and analog), principles of electronic measurement, sensors, data-acquisition and signal processing of measurement data.

Contents

- Survey of electronic components and building blocks: active and passive components, analog building blocks, digital building blocks
- Analysis of analog and digital electronic circuits: transistor circuits, op-amp circuits, combinational and sequential digital circuits
- Analysis of complete open-loop and closed-loop electronic instrumentation systems

Initial competences

Electrical networks

Final competences

- 1 Understand the operation of the basic electronic components
- 2 Analyse basic analog and digital electronic circuits and think in a conceptual, analytical, system-oriented way about them.
- 3 Have the skills to perform numerical simulations of electronic circuits by means of standard models and methods, in particular PSpice.
- 4 Being able to build and experimentally evaluate analog and digital electronic circuits at breadboard level with sufficient accuracy, perseverance and critical reflection.
- 5 Have the skill to communicate about own design of electronic systems in writing and in graphics.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, practicum

#### Extra information on the teaching methods

Classroom lectures; Lab sessions

#### Learning materials and price

course notes can be downloaded from Minerva for free.

#### References

- Referenties: E.O. Doebelin, "Measurement Systems", Mc. Graw-Hill, 4th Ed., New York (1990)

#### Course content-related study coaching

6 scientific coworkers are responsible for the guidance/support during the lab sessions.

#### Evaluation methods

end-of-term evaluation and continuous assessment

#### Examination methods in case of periodic evaluation during the first examination period

Written examination

#### Examination methods in case of periodic evaluation during the second examination period

Written examination

#### Examination methods in case of permanent evaluation

Skills test

#### Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible

#### Extra information on the examination methods

During examination period: written exam, partly closed-book theory, and partly closed-book exercises.

Permanent evaluation: individual closed-book lab exam at the end of the semester (calculations + circuit building + measurements on the circuit).

#### Calculation of the examination mark

During examination period: written exam that represents 2/3 of the total mark.

Permanent evaluation: lab exam that represents 1/3 of the total mark.