

## Industrial Electrical Measurements (E032320)

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

Credits	3.0	Study time	90 h	Contact hrs	30.0 h
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Course offerings and teaching methods in academic year 2017-2018

A (semester 2)	Dutch	project	15.0 h
		guided self-study	15.0 h
B (semester 2)	English	project	15.0 h
		lecture	15.0 h

Lecturers in academic year 2017-2018

De Smet, Herbert	TW06	lecturer-in-charge
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Offered in the following programmes in 2017-2018

	crdts	offering
<a href="#">Bridging Programme Master of Science in Electromechanical Engineering (main subject Electrical Power Engineering)</a>	3	B
<a href="#">Bridging Programme Master of Science in Electromechanical Engineering (main subject Mechanical Construction)</a>	3	B
<a href="#">Bridging Programme Master of Science in Electromechanical Engineering (main subject Mechanical Energy Engineering)</a>	3	B
<a href="#">Master of Science in Electromechanical Engineering (main subject Control Engineering and Automation)</a>	3	A
<a href="#">Master of Science in Electromechanical Engineering (main subject Electrical Power Engineering)</a>	3	B
<a href="#">Master of Science in Electromechanical Engineering (main subject Electrical Power Engineering)</a>	3	A
<a href="#">Master of Science in Electromechanical Engineering (main subject Maritime Engineering)</a>	3	A
<a href="#">Master of Science in Electromechanical Engineering (main subject Mechanical Construction)</a>	3	B
<a href="#">Master of Science in Electromechanical Engineering (main subject Mechanical Construction)</a>	3	A
<a href="#">Master of Science in Electromechanical Engineering (main subject Mechanical Energy Engineering)</a>	3	B
<a href="#">Master of Science in Electromechanical Engineering (main subject Mechanical Energy Engineering)</a>	3	A

Teaching languages

Dutch, English

Keywords

Sensors, measurements, data-acquisition, microcontrollers

Position of the course

This course covers the electronic measurement of several physical quantities, using sensors, data acquisition and signal processing. This course is divided into two parts. Part 1 describes the general characteristics of a measurement system: principles of signal conditioning (sensor principles, data transmission, data acquisition and signal processing) and characterisation (static and dynamic). Part 2 describes examples for measuring strain, pressure, gasses, temperature, humidity, displacement, power consumption, acceleration,... Attention is paid to sensors made by MEMS technology.

Contents

- Part 1: signal conditioning, characterisation
- Part 2: analogue sensors, digital sensors

- Part 3: introduction of the lab projects

#### Initial competences

Electronic systems and instrumentation (or equivalent)

#### Final competences

- 1 Understand and describe the operation of sensors and signal conditioners
- 2 Dealing with inaccurate measurement data in a judicious way; eliminate or take into account interferences and digitizing artifacts.
- 3 Programming of microcontrollers for data acquisition and programming in LabView or Python to process measurement data.
- 4 Collaborate in a small group on a project to design and realize a practical sensor based measurement system.

#### 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

Guided self-study, lecture, project

#### Extra information on the teaching methods

Classroom lectures; Lab sessions

#### Learning materials and price

Complete syllabus and slide set in English, available via Minerva

#### References

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

#### Course content-related study coaching

4 researchers

#### Evaluation methods

end-of-term evaluation and continuous assessment

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

Oral examination

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

Oral examination

#### Examination methods in case of permanent evaluation

Assignment, report

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

examination during the second examination period is not possible

#### Extra information on the examination methods

During examination period: oral closed-book exam with written preparation; interrogation about lab work. If the number of students is more than 65, the option of a written exam with closed book will be considered. This decision will be announced well in advance of the exam.

Year work: assessment of group work (possibly including peer assessment), deliverables (including hard and software), final report.

#### Calculation of the examination mark

50% exam + 50% year work