

Regulation Technique (E755009)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size (nominal values; actual values may depend on programme)
Credits 6.0 Study time 170 h Contact hrs 48.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	Dutch	Gent	lecture	48.0 h
----------------	-------	------	---------	--------

Lecturers in academic year 2020-2021

Beyens, Jan	TW05	lecturer-in-charge
-------------	------	--------------------

Offered in the following programmes in 2020-2021

	crdts	offering
Master of Science in Electrical Engineering Technology (main subject Automation)	6	A
Master of Science in Electrical Engineering Technology (main subject Electrical Engineering)	6	A

Teaching languages

Dutch

Keywords

Control, Processes, PID, compensators, root-locus, state-space, non-linear systems

Position of the course

The course is situated in the "drive and automation" learning path and includes an advanced knowledge on analysis and design of analogue and digital control systems

Contents

Design of linear stationary control systems based on classical and modern design methods, both in the continuous and discrete time domain, both for siso and mimo-systems. This is followed by a short introduction to nonlinear control systems analysis.

1. Root Locus design of PID-controllers and dynamic compensators
2. Frequency Domain design of PID-controllers and dynamic compensators
3. Digital Control Systems (modelling of sampled signals and systems, z-transform analysis, practical considerations about direct digital control, implementation of algorithms for digital control)
4. State Space techniques (analysis, multivariable systems, controllability and observability, state-feedback and output-feedback design, introduction to optimal control design, poleplacement and linearisation of non-linear systems)

Initial competences

Signals and Systems, Control Theory

Final competences

- 1 To be able to design analogue dynamic compensators by means of root locus techniques
- 2 To be able to design analogue dynamic compensators by means of frequency domain techniques
- 3 To be able to analyze and design systems in discrete time
- 4 To be able to describe and analyze systems in state space

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

Extra information on the teaching methods

Lectures (a combination of theory, blackboard exercises and demonstrations through CACSD-software). 48h.

Learning materials and price

Syllabus "Regeltechniek" through the electronic learning environment

References

Nise, Control Systems Engineering (6th ed), John Wiley & Sons.
B.C. Kuo, "Automatic Control Systems" (7th ed), John Wiley & Sons.
Dorf and Bishop, "Modern Control Systems" (11th ed), Pearson Prentice Hall.

Course content-related study coaching

The lecturer is available during or in between lectures. Individual assistance is provided on demand (by appointment)

Evaluation methods

end-of-term evaluation

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

Written examination with open questions, open book examination

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

Written examination with open questions, open book examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Written examination (open book, exercises only) in 2 sessions. Session 1 = CH1, CH2, start of CH3. Session 2 = end of CH3 + CH4. Each session has equal weights (50%).

Calculation of the examination mark

Written exam part 1 = 50%

Written exam part 2 = 50%