ME-323

Chemical process control

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Cursus	Sem.	Type
Chemical Engineering	BA5	Obl.
HES - CGC	H	Obl.

Language of teaching	English
Credits	3
Session	Winter
Semester	Fall
Exam	Written
Workload	90h
Weeks	14
Hours	**3 weekly**
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

Provide the students with basic notions and tools for the modeling and analysis of dynamic systems. Show them how to design controllers and analyze the performance of controlled systems.

Content

- Principles of automatic control
- Modeling of chemical and biological processes
- Concept of transfer function
- Basic control: on/off, PID
- Stability of control systems
- Advanced control
- Elements of digital control
- Sensors and actuators

Keywords

Mathematical modeling, transfer function, time analysis, PID control, advanced control

Learning Prerequisites

Required courses

- Analysis
- Physics

Important concepts to start the course

- Master the basics of mathematical analysis
- Master basic concepts of general physics
- Master the concepts of material and energy balances

Learning Outcomes

By the end of the course, the student must be able to:

- Analyze a linear dynamic system (temporal and frequency approaches), A4
- Construct and analyze a discrete model for a dynamic system, A7
- Design a PID controller, A9
- Dimension a simple controller for a dynamic system, A10
- Work out / Determine the stability, performance and robustness of a closed-loop system, A14

- Define (specifications) control performances adapted to dynamic systems, A15
- Design and select control solutions, formulate trade-offs, choose options, A16

Transversal skills

- Manage priorities.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.

Teaching methods

Lessons and exercises

Expected student activities

- Attendance at classes and exercises
- Personal work of about 2 hours per week

Assessment methods

Written exam with optional assessment during the semester

Supervision

Assistant.e.s	Yes
Forum	Yes

Resources

Bibliography

- Process Dynamics and Control D.E. Seborg, T.F. Edgar, D.A. Mellichamp, John Wiley, 2nd edition (2004)

Ressources en bibliothèque

- Retrouver la référence à la Bibliothèque

Notes/Handbook

Cours polycopié "Commande de procédés", février 2015

Moodle Link

- https://go.epfl.ch/ME-323

Prerequisite for

Modeling and optimization of energy systems