EE-477 **Multivariable control and coordination systems**

Gillet Denis

Cursus	Sem.	Type
Electrical and Electronical Engineering	MA1, MA3	Obl.

Language of teaching	English
Credits	4
Session	Winter
Semester	Fall
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Lecture	2 weekly
Practical work	2 weekly
Number of positions	

Summary

The objective is to enable students to design advanced solutions for the control and the coordination of distributed dynamic systems, such as production or distribution energy systems, as well as intelligent transportation systems.

Content

Selected chapters in dynamic coordination:

- Modeling of complex dynamic systems using state-space representation
- Analysis of dynamic properties of complex systems
- Optimal control with and without actuator constraints
- State estimation
- Dynamic coordination

Keywords

Multivariable systems, complex systems, state-space methods, optimal control, LQR, dynamic programming, state-space observer, state estimation, coordination, navigation functions

Learning Prerequisites

Important concepts to start the course

Linear Algebra
Dynamic Systems

Learning Outcomes

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

- Choose analysis, control or estimation approaches
- Design state-space controllers or estimators
- Justify selected approaches
- Argue on their pros and cons

Transversal skills

- Use a work methodology appropriate to the task.
- Take responsibility for environmental impacts of her/ his actions and decisions.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Manage priorities.
- Use both general and domain specific IT resources and tools
- Write a scientific or technical report.

Teaching methods

Lectures and case studies carried out in teams

Assessment methods

Written exam and case study reports

Resources

Notes/Handbook

Dynamic Coordination, Denis Gillet, September 2014