Multivariable Control					AR-313
Rota annually WS	**Duration** 1 Term	**Semester** 3rd (Semester)	**SWS** 2 SWS	**Credit Points** 3	**Workload** 90 h

1 Modul structure

Course (Abbreviation)	Type/ SWS	Presence	Self study	Credits
a) Multivariable Control (MVC)	Lecture / 1 SWS	15 h	30 h	2
b) Multivariable Control (MVC)	Tutorial / 1 SWS	15 h	30 h	1

2 Language
English

3 Content

- Specification of controller design tasks, design using frequency response approximation performance limitations in SISO control loops.
- I/O-system description of multivariable systems, poles, zeros, zero directions, stability criteria.
- Classical Design Techniques: Decoupling, sequential loop closure, approximate decoupling, multivariable frequency response approximation, robustness.
- Control Structure Selection: Static and dynamic controllability analysis, plant directionality, relative gain array, computation of the attainable performance.

The course takes place in the first half of the semester.

Literature:

- Skogestad, S.; Postlethwaite, I.: Multivariable Feedback Control. John Wiley & Sons, 1996.

4 Goals

After this course, the students will be able to design multivariable controllers for chemical and biochemical processes based on input-output descriptions. They are aware of the limitations of controller performance in the scalar and in the multivariable case and of the influence of plant-model mismatch on controller performance. They can apply modern tools to the selection of control structures.

5 Examination Requirements

The final exam will be an oral (20 minutes) or written and computer-based (1.5 hours) exam, depending on the number of participants (form will be announced in the second week of the course).
Active participation and collaboration in 75% of computer exercises is mandatory.

6 Formality of Examination

☒ Module Finals ☐ Accumulated Grade

7 Module Requirements (Prerequisites)

Basic knowledge of dynamic systems and control, as e.g. provided by the course Control Theory and Applications.

8 Allocation to Curriculum:

Program: Automation & Robotics, Field of study: Process Automation , Robotics, Cognitive Systems

9 Responsibility/ Lecturer

Prof. Dr. S. Engell/ Prof. Dr. S. Engell