Process Performance Optimization					AR-312
Rota annually WS	**Duration** 1 Semester	**Semester** 3rd (Semester)	**SWS** 4 SWS	**Credit Points** 5	**Workload** 150 h

1	**Modul Structure**				
	Course (Abbreviation)	**Type/ SWS**	**Presence**	**Self Study**	**Credit Points**
	a) Process Performance Optimization (PPO)	Lecture / 2 SWS	25 h	65h	3
	b) Process Performance Optimization (PPO)	Tutorial / 1 SWS	15 h	15 h	1
	c) Process Performance Optimization (PPO)	Lab / 1 SWS	15 h	15 h	1
2	**Language:** English				
3	**Content** The course gives an overview of state-of-the-art techniques and of their applications to optimize the performance of chemical and biochemical production processes. The following topics are dealt with: 1. Selection of controllers and control structures 2. Tuning of standard controllers 3. Optimization of the operating conditions by linear programming and nonlinear optimization 4. Model predictive control 5. Batch trajectory optimization 6. Model-based estimation of process variables for monitoring and control 7. Process performance monitoring 8. Dynamic simulation and operator training systems 9. Manufacturing Execution Systems 10. Statistical Process Control, Six Sigma 11. Operation of regulated life science processes **Literature:** • Handouts • Slides				
4	**Competencies** The students acquire an in-depth knowledge of methods and technologies for the improvement of chemical and biochemical production processes by advanced control, model-based methods, data analysis and optimization and continuous improvement. The students acquire a comprehensive overview of the industrial practice in this area.				
5	**Examination Requirements** The final exam will be an oral (30 minutes) or written (2 hours) exam, depending on the number of participants (form will be announced in the second week of the course). In addition, the successful completion of the lab experiments (including report and final discussion) is required.				
6	**Formality of Examination** ☒ Module Finals ☐ Accumulated Grade				
7	**Module Requirements (Prerequisites)** This module is mutually exclusive with the module “Process Optimization” By receiving credit points for the module “Process Optimization” you cannot receive credit points the module “Process Performance Optimization”.Basic knowledge of dynamic systems and control is required, as e.g. provided by the course Control Theory and Applications.				
8	**Allocation to Curriculum:** Program: Automation & Robotics, Field of study: Process Automation				
9	**Responsibility/ Lecturer** *Prof. Dr. S. Lucia /* Prof. Dr. S. Lucia / Dr. G. Dünnebier (Bayer Technology Services GmbH)				