

Machine Learning Methods for Engineers					AR-232
Rota	Duration	Semester	SWS	Credit Points	Workload
annually SS	1 Semester	2 nd (Semester)	3 SWS	5	150 h
1	Modul Structure				
	Course (Abbreviation)	Type/ SWS	Presence	Self Study	Credit Points
	c) Machine Learning Methods for Engineers	Lecture/ 2 SWS	25 h	50 h	3
	d) Machine Learning Methods for Engineers	Tutorial/ 2 SWS	25 h	50 h	2
2	Language English				
3	Content Element 1 Description of the main challenges that arise when dealing with large data sets and presentations of different possibilities for data management, data cleaning and outlier detection. Basic definitions in artificial intelligence and machine learning: training, validation, backpropagation, loss functions, error metrics. Description of different machine learning-methods (linear and nonlinear regression, gaussian processes, clustering, neural networks, ...) and their classification into different categories such as supervised vs. unsupervised, regression vs. classification. Usage of tools to efficiently implement machine learning-methods. Interpretation and analysis of the results and presentation of the potential of machine learning with examples of the chemical and biochemical engineering field. Literature: The slides of the course and any additional materials such as literature lists and website recommendations will be published in the virtual workrooms in Moodle provided for this purpose. Details will be announced at the beginning of the course.				
4	Competencies The students can analyze the quality of data sets and perform simple operations to clean and prepare the data for the application of different machine learning techniques. The students are able to design and apply several machine learning techniques using efficient software tools and they are able to transfer this knowledge to solve practical problems. The students can recognize reliable results from the application of the presented machine learning techniques and critically evaluate their limitations.				
5	Examination Requirements Oral (max. 30 minutes) or written (90 minutes) + Computer-based project and presentation of 10 minutes				
6	Formality of Examination <input checked="" type="checkbox"/> Module Finals <input type="checkbox"/> Accumulated Grade				
7	Module Requirements (Prerequisites) Basic knowledge of linear algebra. Basic programming knowledge.				
8	Allocation to Curriculum: Program: Automation & Robotics; Field of study: Process Automation , Robotics , Cognitive Systems				
9	Responsibility/ Lecturer <i>Prof. Dr.-Ing. Sergio Lucia/Prof. Dr.-Ing. Sergio Lucia</i>				