Die Modulbeschreibung sollte direkt über diesen Link in HISinOne eingepflegt werden.

Module code	Module title		Category
MAIE2030	Advanced Analytics		MA
	Degree program	MA Software Engineering	
	Faculty	Building Services Engineering and Computer Science	

Module coordinator	Prof. Dr. Marcel Spehr
Module type	Mandatory module
Frequency	1x annually in WiSe
Recommended semester	2. semester
Credit (ECTS-Points)	5
Academic Assessment Method	Coursework requirement PrP = Project / Assignment with presentation Seminar paper with practical component on a concrete analytics use case, including semester-long group presentations.
Teaching language	English
Admission requirements for this Module	none
Module duration	1 Semester
Required Registration	Students enrolled in the above-mentioned degree program/standard semester will be registered automatically upon re-enrollment; all other participants, please refer to the information below. none

	Course	Lecturer	Type	Group Size (max.)	Number of Groups	Contact hours per week (SWS)	Workload (in h)	
							Face-to-face	Self-study
1	Advanced Analytics	Spehr	Seminar	30	1	4	60	65
2	Titel der Lehrveranstaltung.	Dozent*in	Wählen Sie ein Element aus.		Wählen Sie ein Element aus.			
3	Titel der Lehrveranstaltung.	Dozent*in	Wählen Sie ein Element aus.		Wählen Sie ein Element aus.			
4			Wählen Sie ein Element aus.					

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5	Titel der Lehrveranstaltung.	Dozent*in	Wählen Sie ein Element aus.		Wählen Sie ein Element aus.			
						Sum	**4,0**	**60**	**65**
						Total Workload for Module		**125**	

Learning Objectives / Learning outcomes	**Students are able to…** • Identify and apply modern analytics methods • Formulate and implement compute-intensive tasks appropriately in modern distributed systems (e.g., clusters, cloud environments) • Work with application-oriented, integrated systems with a central AI component • Independently select suitable tools and methods based on a given analytical problem, acquire the necessary knowledge, and apply them in a goal-oriented manner • Independently follow current developments in the field and apply modern methods in everyday project work • Assess the interplay between prediction domain, data characteristics, evaluation metrics, and business decisions • Describe the background and value chain of analytical data • Classify analytical problems and apply methods and tools in a solution-oriented way • Use the tools of the Python Data Science stack correctly to solve problems • Recognize the societal impact of data collection and analysis systems and critically reflect on their own activities in a broader social context
Contents	• Modern AI algorithms are methodically applied to solve clustering, regression, and classification problems • The implementation tool is the Python programming language using the dedicated Data Science stack • Use of Python libraries for data analysis and implementation of AI architectures in distributed systems (e.g., Spark) • Specific characteristics of streaming systems in the context of AI training • Current methods and tools for the analytics pipeline, including descriptive, diagnostic, predictive, and prescriptive processing • Approach for defining evaluation metrics and algorithms for problem-solving, based on specific data characteristics and a concrete prediction goal • Methods for data anonymization and bias-free model training
Literature	• Jake VanderPlas, Python Data Science Handbook: Essential Tools for working with Data • Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython • Joel Grus, Data Science from Scratch: First Principles with Python • Peter Bruce et. Al., Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python • Alex Reinhard, Statistics Done Wrong: The Woefully Complete Guide, 2015 • Sandy Ryza et al, Advanced Analytics with Spark, 2017

	• Mahmoud Parsian, Data Algorithms: Recipes for Scaling Up with Hadoop and Spark, 2015