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New announcement of the subject-specific annex 6.3 Master Management & Data Science to the framework examination regulations for the Master programs at the Graduate School of Leuphana University of Lüneburg

The Presidential Board of Leuphana University of Lüneburg hereby publishes the wording of the subject-specific annex no. 6.3 Master Management & Data Science of December 3, 2014 (Leuphana Gazette no. 6/15 of April 23, 2015) In the version now in force, taking into account the

- first amendment dated February 12, 2020 (Leuphana Gazette 74/2020 dated June 25, 2020)
- second amendment dated April 13, 2022 (Leuphana Gazette 46/2022 dated May 09, 2022)
- third amendment of November 09, 2022 (Leuphana Gazette 119/2022 of December 21, 2022)
- fourth amendment of November 06, 2024 (Leuphana Gazette 08/2025 of 27 . January 2025)

known.

SECTION I

The regulations of the Framework Examination Regulations for the Master's programs at the Graduate School of Leuphana University of Lüneburg are supplemented as follows:

to § 3 Para. 6, Details on the structure and content of the subject-specific area of the Master's degree:

Module overview Master Management & Data Science

(see also subject-specific Annex 6.1 Management Studies and subject-specific Annex 8 Complementary Studies)

4.	Master Forum (5 CP) (Ma-DS-12)	Master thesis (25 CP) (Ma-DS-13)				
3.	Management Studies (5 CP) (Ma-MS-3)	Elective module (5 CP)	Elective module (5 CP)	Research Project (5 CP) (Ma-DS-10)	Data Privacy and Ethics (5 CP) (Ma-DS-9)	Complementary study (5 CP) (Ma-K-3)
2.	Management Studies (5 CP) (Ma-MS-2)	Deep learning (5 CP) (Ma-DS-5)	Probabilistic Modeling (5 CP) (Ma-DS-6)	Networks (5 CP) (Ma-DS-7)	Forecasting and Prediction (5 CP) (Ma-DS-8)	Complementary study (5 CP) (Ma-K-2)
1.	Management Studies (5 CP) (Ma-MS-1)	Learning from data (5 CP) (Ma-DS-2)	Mathematical Foundation (5 CP) (Ma-DS-1)	Applied Statistical Data Analysis (5 CP) (Ma-DS-3)	Data Economy (5 CP) (Ma-DS-4)	Complementary study (5 CP) (Ma-K-1)

The following four compulsory modules must be completed in the first semester:

- Learning from Data (5 CP) (Ma-DS-2)
- Mathematical Foundation (5 CP) (Ma-DS-1)
- Applied Statistical Data Analysis (5 CP) (Ma-DS-3)
- Data Economy (5 CP) (Ma-DS-4)

The following four compulsory modules must be completed in the 2nd semester:
- Deep Learning (5 CP) (Ma-DS-5)
- Probabilistic Modeling (5 CP) (Ma-DS-6)
- Analyzing Networks (5 CP) (Ma-DS-7)
- Forecasting and Prediction (5 CP) (Ma-DS-8).

The following two compulsory modules must be completed in the 3rd semester:
- Data Privacy and Ethics (5 CP) (Ma-DS-9)
- Research Project (5 CP) (Ma-DS-10).

In the 3rd semester, students must also complete a total of 2 elective modules. Subject-specific modules from the following catalog are offered:
- Data Science Seminar (5 CP) (Ma-DS-11a)
- Special Topics in Data Science (5 CP) (Ma-DS-11b)

Alternatively, a maximum of two elective modules from other Master's programs in Management (Management & Engineering, Management & Sustainable Accounting and Finance and Management & Entrepreneurship; see subject-specific Annex 6.4, 6.9 and 6.10) can be completed.

Re § 2, Aim of the study program, purpose of the examination

The Master's degree program in Management & Data Science is aimed at students who want to expand their skills in data analysis of real phenomena. Graduates are able to analyze massive and complex data sets, develop and implement statistical models based on modern information technology and derive suitable measures. In addition, the degree program offers interdisciplinary teaching and research, which enables students to acquire application-oriented knowledge for practice-oriented management solutions. By integrating management, data analysis and information systems knowledge, graduates are able to develop the latest innovative solutions for the management of information-driven companies. This prepares graduates to take on tasks in the areas of analysis, design, consulting and strategic work.

Re § 5, Determination of the academic degree

Master of

to § 6 para. 3, language of instruction and examination

The Master's in Management & Data Science is offered in English. The teaching and examination language of the Master's program is English.

on § 7 para. 1, examination performance in the Master's forum (colloquium)

The examination in the Master Forum (Colloquium) (5 CP) (Ma-DS-12) of the Master Data Science is ungraded and must therefore be assessed as "passed" or "failed".

on § 8 para. 1, completion time of the Master's thesis

The processing time for the Master's thesis (25 CP) (Ma-DS-13) is twenty weeks.

to § 8 para. 8, Oral examination

An examination is held in addition to the Master's thesis (5 CP) (Ma-DS-13). The grade for the oral examination is to be included in the overall grade for the Master's thesis (5 CP) (Ma-DS-13) with a proportion of one fifth.

Module table of the 1st semester in the Master Management & Data Science

Module	Contents	Types of courses (number, type and SWS)	Type and number of Examination services (according to § 7 RPO)	CP	Comment
Compulsory modules					
Mathematical Foundation (Ma-DS-1)	This module teaches students fundamental mathematics in the following fields: theory of probability and statistics (descriptive statistics, parameter estimation, statistical test procedures, distributions, regression), linear algebra (vector spaces, orthogonality, determinants, eigenvalues and eigenvectors) and stochastic processes (Markov chains).	1 Lecture (2 CH) and 1 Exercise (2 CH)	1 written scientific work under supervision (90 min)	5	
Learning from data (Ma-DS-2)	This module teaches basic theory and skills for statistical learning. These include linear models (regression and classification), regularization and feature selection, model assessment and advanced concepts (e.g. neural networks and support vector machines).	1 Lecture (2 CH) and 1 Exercise (2 CH)	1 written scientific work under supervision (90 min)	5	

Continuation of the module table of the 1st semester in the Master Management & Data Science

Module	Contents	Types of courses (number, type and SWS)	Type and number of Examination services (according to § 7 RPO)	CP	Comment
Applied Statistical Data Analysis (Ma-DS-3)	Students will gain an overview of analytical and statistical tools. The module also introduces students to the programming language Python and the basics of analysis with Python, tying this in with several essential concepts of data science. Students acquire an overview of available analytical and statistical tools.	1 Lecture (2 CH) and 1 Exercise (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	
Data Economy (Ma-DS-4)	This module explores the following topics: the fundamentals of the data economy, structured versus unstructured data, stakeholder-specific evaluation of data, data quality management, e-business and digital business models, cloud computing, data-centric marketing intelligence, open data initiatives and knowledge co-creation.	1 Lecture (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	

Module table of the 2nd semester in the Master Management & Data Science

Module	Contents	Types of courses (number, type and SWS)	Type and number of Examination services (according to § 7 RPO)	CP	Comment
Compulsory modules					
Deep learning (Ma-DS-5)	This course deals with deep neural networks, perceptrons, multi-layer perceptrons, backpropagation, autoencoder, GANs, LSTMs, deep reinforcement learning, etc.	1 Lecture (2 CH) and 1 Exercise (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	
Probabilistic Modeling (Ma-DS-6)	This module covers the following topics: graphical models and belief systems, the fundamentals of Bayesian statistics, the Markov chain Monte Carlo approach, regression models, non-linear models and classification, hierarchical models, model selection, specific application packages (e.g. JAGS, Stan) and current trends.	1 Lecture (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	

Continuation of the module table of the 2nd semester in the Master Management & Data Science

Module	Contents	Types of courses (number, type and SWS)	Type and number of Examination services (according to § 7 RPO)	CP	Comment
Analyzing Networks (Ma-DS-7)	Students will learn the fundamentals of graph theory and network analysis and explore the following topics in more depth: networking dimensions, random graph models, community detection, hypothesis testing in the context of network data and tools for network analysis (e.g. Pajek, UCInet and Rsiena).	1 Lecture (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	
Forecasting and Prediction (Ma-DS-8)	The module deals with machine learning methods for structured and interdependent output data (sequences, trees, graphs,...). The involved interactions and correlations need to be estimated to build accurate prediction and forecasting models. An example is predicting part-of-speech (POS) tags for sentences in natural language: POS-tags are not uniformly present in sentences but follow certain rules (e.g., two verbs cannot appear next to one another in a sentence) which need to be learned from data to solve the task. Univariate prediction models often ignore these dependencies and are prone to fail in an application. We will derive, discuss and analyze different approaches including hidden Markov models (HMMs), structured SVMs, conditional random fields (CRFs), etc.	1 Lecture (2 CH) and 1 Exercise (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	

Modules of the 3rd semester in the Master Management & Data Science

Module	Contents	Types of courses (number, type and SWS)	Type and number of Examination services (according to § 7 RPO)	CP	Comment
Compulsory module					
Data Privacy and Ethics (Ma-DS-9)	The module covers the challenges and limits of data as a public good,regulatory approaches to data protection in the context of big data, constructive data protection mechanisms and a possible framework for the institutional control of data protection.	1 Lecture (2 CH)	1 written scientific work under supervision (90 min) or 1 Combined scientific work	5	
Research Project (Ma-DS-10)	With assistance from staff, students will investigate a research question or question from practice.	1 seminar (2 CH)	1 Combined assessment	5	
Elective module					
Data Science Seminar (Ma-DS-11a)	Seminar on the latest methods / applications from the field of data science.	1 seminar (2 CH)	1 Combined scientific work		
Special Topics in Data Science (Ma-DS-11b)	This module explores the use of data science methods in a selected application context (e.g. geodata, the Semantic Web, social media platforms, recommender systems or search engine marketing).	1 Lecture (2 CH)	1 Combined scientific work	5	

Modules of the 4th semester in the Master Management & Data Science

Module	Contents	Types of courses (number, type and SWS)	Type and number of Examination services (according to § 7 RPO)	CP	Comment
Compulsory modules					
Masters Forum (Ma-DS-12)	Students will report on the progress of their Masters dissertation and present it for discussion.	1 Colloquium (1CH)	1 Written paper (passed/ not passed)	5	
Masters dissertation (Ma-DS-13)	Masters dissertation: a dissertation is completed by each student, working on his or her own. The dissertation topic must be related to Data science.	none	1 Master's thesis and 1 Oral examination	25	

SECTION II

Entry into force

This subject-specific annex shall enter into force after its approval by the Executive Board of Leuphana University of Lüneburg following its publication in the official bulletin of Leuphana University of Lüneburg for the winter semester 2025/26.

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