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Subject-specific study and examination regulations for the consecutive, English-taught master's programmes in Mathematical Data Science offered by the Faculty of Mathematics and Economics at Ulm University dated 06. February 2025

Based on § 32 (3) sentence 1 of the Federal State Higher Education Act Baden-Württemberg (*Landeshochschulgesetz,* LHG) in the version of 1 January 2005 (law gazette pages 1 ff, amended several times, last amended by article 24 of the ordinance of 17 December 2024 (law gazette p. 114), the Senate of Ulm University, upon the approval of the Faculty of Natural Sciences at Ulm University, adopted the following Subject-specific study and examination regulations (FSPO) for the master's programme in Mathematical Data Science in its meeting on 11 Dezember 2024.

The President of Ulm University gave his consent on 06 February 2025 in accordance with § 32 (3) sentence 1 of the LHG.

Content

I. General

§ 1 Scope of application (§ 1 ASPO)

This FSPO for the consecutive, English-taught master's programme in Mathematical Data Science supplements and specifies the provisions of the General Study and Examination Regulations of Ulm University (Allgemeine Studien- und Prüfungsordnung der Universität Ulm, ASPO).

§ 2 Study objectives (§ 2 ASPO)

1) The master's programme in Mathematical Data Science is an applied mathematics programme that provides in-depth knowledge of mathematics, statistics and computer science and combines these areas with a view to their application in mathematical data science. The programme prepares students for careers in business and industry or in the public sector where this combination of skills is of particular interest. Graduates of the master's programme in Mathematical Data Science are able to implement methods for solving practical problems related to the evaluation of data using mathematical and computer science methods.
2) Graduates are qualified to lead projects involving the analysis of data in scientific, economic or technical contexts, to perform planning, development and research tasks in scientific and public institutions, and to learn independently and autonomously on the basis of in-depth methodological expertise and to pursue doctoral studies.

§ 3 Start of the programme (§ 3 ASPO)

Studies in the master's programme in Mathematical Data Science begin in the winter semester.

II. Study organisation

§ 4 Language of instruction and examinations (§ 4 ASPO)

The language of instruction and examinations is English.

§ 5 Organisation and content of the master's programme in Mathematical Data Science (§ 4 ASPO)

1) The following compulsory, compulsory elective and complementary modules must be completed in the master's programme in Mathematical Data Science:

No.	**Area/**module	**CP**
A	**Compulsory area**[1]	**55**
A1	**Mathematics**	**25**
1	Mathematics of Machine Learning	9
2	Numerical Methods for Data Science	6
3	Practical Foundations of Data Science	5
4	Data Lab	5
A2	**Thesis**[2]	**30**

[1]Corresponds to "Pflichtbereich" in German
[2]Corresponds to "Abschlussarbeit" in German

No.	**Area/**module	CP
5	Master's thesis	30
B	**Compulsory elective area[3]**	**min. 59**
B1	**Mathematical Statistics**	**min. 9**
B2	**Functional Analysis**	**min. 5**
B3	**Mathematical Data Science**	**min. 8**
B4	**Application Sciences**	**min. 8**
B5	**Mathematics**	
B6	**seminar**	**min. 4**
C	**Complementary area[4]**	**min. 6**
C1	**Interdisciplinary competences and language skills**	min. 6
C1a	**Ethics and technology**	min. 3
	Total ECTS	**min. 120**

2) In the compulsory elective area B, at least 59 CP must be earned from areas B1 - B6. In areas B1 – B5, graded modules worth at least 55 CP must be completed from the module catalogues provided for this purpose.

3) Students must complete graded modules worth at least 9 CP in the compulsory elective area Mathematical Statistics (B1), graded modules worth at least 5 CP in the compulsory elective area Functional Analysis (B2) and, in the compulsory elective areas Mathematical Data Science (B3) and Application Sciences (B4), graded modules worth at least 8 CP each in accordance with paragraph 1 from the module catalogues provided for this purpose. In the compulsory elective area Seminars B6, modules worth at least 4 CP must be completed from the module catalogue provided for this purpose.

4) The graded modules worth at least 25 CP that are still required to complete the degree can be taken from areas B1 – B5 from the respective module catalogues provided for this purpose.

5) In complementary areas, students must complete modules of their choice from the courses offered by the Humboldt Study Centre for Philosophy and Humanities and the Centre for Languages and Philology to the extent of at least 6 CP. Of these, modules worth at least 3 CP must be chosen from the Ethics and technology (C1a) area. Language courses in the students' respective native languages may not be selected.

6) In the Functional Analysis (B2) area, no more than one of the modules "Functional Analysis" and "Functional Analysis for Data Science" may be completed.

7) The compulsory elective areas and the complementary area are recommended for a mobility window.

§ 6 Multiple use of modules

If modules are assigned to several areas, these modules can only be completed in one of the areas.

[3]Corresponds to "Wahlpflichtbereich" in German

[4]Corresponds to "Ergänzungsbereich" in German

§ 7 Types of courses (§6 (2) ASPO)

Lectures and exercises can be supplemented by tutorials; case studies, project courses and business simulation games can also be included.

III. Exams

§ 8 Further examiner (§ 11 (3) ASPO)

Oral module examinations are conducted in the presence of a further examiner.

§ 9 Thesis (§ 18 ASPO)

1) The master's thesis corresponds to 30 CP. The time from the admission to the submission of the master's thesis is six months.
2) The master's thesis can be completed at an external institution with the consent (prior approval) of the subject examination board.
3) The master's thesis is written in German or English in consultation with the examiners.
4) Only students who have completed compulsory and compulsory elective modules worth at least 70 CP can be admitted to the master's thesis.

§ 10 Final grade (§ 24 (6) ASPO)

The overall grade for the master's programme in Mathematical Data Science is based on the graded compulsory modules and the highest-rated modules from the compulsory elective area (B) up to a total of 55 CP. The module that exceeds the limit of 55 CP in the compulsory elective area (B) is weighted proportionally with the credit points missing from 55 CP.

§ 11 Repetition of module examinations (§ 25 ASPO)

In the master's programme in Mathematical Data Science, up to two passed compulsory written module examinations may be repeated once for the purpose of improving grades in the next written examination. In each case, the better, passed examination is counted.

IV. Final provisions

§ 12 Effective date

1) These study and examination regulations apply with effect from the winter semester 2025/2026. The subject-specific study and examination regulations for the and master's programme in Mathematical Data Science dated 15 July 2021, published in the Official Bulletin of Ulm University No. 21 dated 21 July 2021, pages 213 - 217, shall expire at the same time, subject to paragraph 2.
2) For students who are enrolled in their master's programme in Mathematical Data Science in the summer semester of 2025 in a semester higher than the first semester, the subject-specific study and examination regulations for the master's programme in Mathematical Data Science dated 15 July 2021 shall continue to apply on a transitional basis. At the end of the second examination period of the summer semester 2028 (deadline: 1 December 2028), the subject-specific study and examination regulations for the master's programme in Mathematical Data Science dated 15 July 2021, published in the Official Bulletin of Ulm University No. 21 dated 21 July 2021, pages 213–217, will finally cease to apply. The students referred to in sentence 1 will then continue the

programme pursuant to paragraph 1 sentence 1 of the study and examination regulations. The subject examination board shall decide on the recognition of achievements already completed by then.

Ulm, this 19 February 2025

Prof. Dr.-Ing. Michael Weber
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