



Subject-specific study and examination regulations for the English-taught master's programme in Quantum Engineering offered by the Faculty of Natural Sciences at Ulm University of 7 August 2023

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 p. 1 ff), amended by article 1 of the fourth higher education amendment act (*Viertes Hochschulrechtsänderungsgesetz - 4. HRÄG*) of 17 December 2020 (law gazette p. 1204 ff) and under consideration of the latest amendment by article 1 of the act on changes to the Federal State Higher Education Act (*Gesetz zur Änderung des Landeshochschulgesetzes*) and other acts of 26 October 2021 (law gazette p. 941), 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 Quantum Engineering in its meeting on 21 June 2023 .

The President of Ulm University gave his consent on 7 August 2023 in accordance with § 32 (3) sentence 1 of the *LHG*.

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I. General

Scope of application (§ 1 ASPO)

These FSPO for the master's programme in Quantum Engineering supplement and specify the provisions of the General Study and Examination Regulations (ASPO).

Study objectives (§ 2 ASPO)

Graduates have comprehensive physical and engineering knowledge and skills in the fields of quantum mechanics and quantum technologies as well as in sensor technology, microelectronics, microsystems technology and microoptics. They have acquired in-depth knowledge in the interdisciplinary specialisations of quantum sensing, quantum communication, quantum simulation and quantum computing, anchored in the current state of international research. They are able to work independently

in a scientific manner, analyse current specialist literature and actively use it in a particular field, plan research processes and develop solution strategies. They have a high degree of interdisciplinary skills that enable them to take on scientific tasks in peripheral areas of quantum physics and electrical engineering as well as in neighbouring disciplines. In particular, completion of the programme qualifies graduates to pursue doctoral studies.

Start of the programme (§ 3 ASPO)

Studies start in the winter and summer semester.

II. Study organisation

Organisation and content of the master's programme in Quantum Engineering (§ 4 ASPO)

The following compulsory modules as well as other compulsory elective and complementary modules corresponding to the credit points indicated in the last column must be passed:

No.	Area/module	CP
A	Compulsory courses	51
1	Interdisciplinary aspects of quantum technologies	3
2	Advanced seminar quantum technologies	3
3	Research project	15
4	Master's thesis	30
B	Compulsory elective area	min. 63
B1	Adaptation area	min. 12
B2	Quantum physics	min. 18
B3	Electrical engineering	min. 18
B4	Subject-specific specialisation	min. 15
C	Complementary area	min. 6
	Total	min. 120

In the compulsory elective areas B1 - B4, students must complete modules from the relevant module catalogues to the extent of at least the CP specified in para. 1.

For the mobility window, modules from the area of the subject-specific specialisation (B4), in particular an industrial internship, a scientific project at a research institution or studies abroad, are envisaged. The application for recognition of the study and examination achievements in accordance with sentence 1 must be submitted to the examination board before commencement.

Multiple use of modules

Multiple crediting of modules is not possible.

Compulsory attendance at courses (§ 7 ASPO)

Attendance is compulsory for seminars, projects and practical courses. Students who do not attend at least 90% of seminars and 100% of projects and practical courses will not be admitted to the corresponding module examination. If there are reasons for the absences for which the student is not responsible, then

- a) the absence can be compensated by a competency-based substitute performance,

b) parts of the course can be made up for.

The person responsible for the course checks whether parts of the course that have already been completed can be credited and specifies a substitute performance if compensation is possible in accordance with sentence 3.

Deadlines (§ 8 (1) and (2) ASPO)

At least 45 CP must be acquired by two months after the end of the 3rd semester at the latest. The right to examination expires if the specified deadline is exceeded unless the student is not responsible for this.

III. Exams

Thesis (§ 18 ASPO)

(1) Admission requirements for the master's thesis are the successful completion of module 3 and the acquisition of at least 75 CP as well as the approval of the examination board that the topic meets the academic requirements of the degree programme.

The time from the admission to the submission of the master's thesis is six months. The master's thesis also includes a final, ungraded presentation on the subject of the thesis. 1 CP is awarded for this, 29 CP are awarded for the realisation and preparation of the master's thesis.

The topic of the master's thesis is set by an examiner from the Physics department at Ulm University.

The master's thesis can also be prepared outside the areas indicated in paragraph 4 (external master's thesis). The application for admission to the master's thesis must be accompanied by the topic of the external master's thesis.

The master's thesis must be written in English. With the consent of the first examiner it may be written in German.

Final grade (§ 24 (6) ASPO)

The master's thesis (30 CP) and the best module grades from the compulsory area A and the compulsory elective areas B1 to B4 totalling 65 CP count towards the final grade (95 CP in total). The examination that exceeds the total of 95 CP is weighted proportionally.

IV. Final provisions

Effective date

These Study and examination regulations apply with effect from the winter semester 2023/24.

Ulm, 7 August 2023

signed

Prof. Dr.-Ing. Michael Weber
-President-