Published in the Official Bulletin of Ulm University No.17 , dated 12 June 2025, pages 187 - 192

Subject-specific study and examination regulations for the bachelor's and bilingual master's programme in Biomedical Engineering offered by the Faculty of Engineering, Computer Science and Psychology at Ulm University of 10 June 2025

On the basis of § 32 (3) sentence 1 of the Federal State Higher Education Act Baden-Württemberg (Landeshochschulgesetz - LHG) in the version dated 1 January 2005 (Law Gazette p. 1 ff), amended several times and most recently by Article 24 of the Law dated 17 December 2024 (Law Gazette p. 114), the Senate of Ulm University, with the approval of the Faculty of Engineering, Computer Science and Psychology, adopted the following subject-specific study and examination regulations (FSPO) for the bachelor's and bilingual master's degree programme in Biomedical Engineering at the Faculty of Engineering, Computer Science and Psychology at its meeting on 21 May 2025.

The President of Ulm University gave his consent on 10 June 2025 in accordance with § 32 (3) sentence 1 of the *LHG*.

Content

I. General

§ 1 Scope of application (§ 1 ASPO)

This FSPO for the bachelor's and master's degree programmes in Biomedical Engineering at the Faculty of Engineering, Computer Science and Psychology supplements and specifies the provisions of the General Study and Examination Regulations (ASPO).

§ 2 Study objectives (§ 2 ASPO)

(1) [1]Bachelor in Biomedical Engineering: The aim of the programme is to provide students with a broad education in the fundamentals of engineering and medical skills, enabling them to solve biomedical engineering problems, culminating in a professionally qualifying and research-related degree. [2]The modules in the first semesters teach the fundamentals of electrical engineering and information technology, medical technology, human biology, mathematics and physics. [3]From the fourth semester onwards, the content of the main research areas of biomedical engineering at the University of Ulm is taught. [4]In addition, key skills such as programming and key qualifications for acquiring interdisciplinary skills and language skills are taught.

(2) [1]Master in Biomedical Engineering: The aim of the programme is to provide qualified training at the interface between electrical engineering, computer science and health sciences, enabling students to make independent contributions to research and development in biomedical engineering. [2]The programme provides students with in-depth knowledge of medical technology, electrical engineering and computer science, as well as medicine, psychology and biology, with a focus on the main areas of research in the relevant disciplines. [3]Students set their own individual priorities by choosing modules from the various subject areas.

§ 3 Start of the programme (§ 3 ASPO)

[1]Studies in the bachelor's programme in Biomedical Engineering start in the winter semester. [2]The master's programme starts in the winter and summer semesters.

II. Study organisation

§ 4 Organisation and content of the bachelor's programme in Biomedical Engineering (§ 4 ASPO)

(1) The following compulsory, compulsory elective and complementary modules must be completed:

No.	**Area/**module	**CP**
A	**Compulsory area**	**147**
A1	**Mathematics**	**20**
1	Higher mathematics I	10
2	Higher mathematics II	10
A2	**Physics**	**6**
3	Physics I for engineers	6
A3	**Fundamentals in Engineering**	**46**
4	Fundamentals in Electrical Engineering I	7
5	Fundamentals in Electrical Engineering II	6
6	Scientific software tools	3
7	Digital circuits	4
8	Signals and systems	8
9	Analogous circuits	5
10	Introduction to measurement technology	4
11	Introduction to control engineering	6

No.	**Area/**module	CP
12	Application-oriented software development	3
A4	**Computer Science**	**6**
13	Fundamentals of practical computer science	6
A5	**Biology/Medicine/Health**	**16**
14	Physiology for engineers	4
15	Anatomy for engineers	4
16	Medical statistics and biometrics	3
17	Imaging techniques in medicine	5
A6	**Biomedical Engineering**	**29**
18	Introduction to Biomedical Engineering	7
19	Biomedical Engineering II	7
20	Biomedical Engineering III	5
21	Biomedical high-frequency technology	6
22	Introduction to biomedical signal processing	4
A7	**Practical experience**	**12**
23	Focus project or 2 mini projects	12
A8	**Thesis**	**12**
24	Bachelor's thesis	12
B	**Compulsory elective area**	**min. 27**
B1	Compulsory elective area Biomedical Engineering	min. 9
B2	Compulsory elective area specialisation in Biomedical Engineering	min. 12
B2a	Sensors and systems	min. 12
B2b	Data and signals	min. 12
B2c	Health Sciences	min. 12
B3	Compulsory elective area computer science	min. 6
C	**Complementary area**	**min. 6**
Total		min. 180

(2) In the compulsory elective area (B), students must complete modules amounting to a minimum of 27 CP.

(3) [1]In the compulsory elective area Biomedical Engineering (B1) students must complete modules from the module catalogue provided for this purpose worth at least 9 CP. [2]In the compulsory elective area specialisation in Biomedical Engineering (B2), at least one of the areas (B2a – B2c) must be selected. [3]In the selected area, modules from the module catalogue provided for this purpose must be completed amounting to at least 12 CP. [4]In the compulsory elective area Computer Science B3, students must complete modules from the module catalogue provided for this purpose amounting to at least 6 CP.

(4) In the the complementary area, 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.

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

(1) The following compulsory, compulsory elective and complementary modules must be completed:

No.	Area/module	CP
A	**Compulsory area**	**30**
A1	Master's thesis	30
B	**Compulsory elective area**	**min. 84**
B1	Core area Engineering	min. 16
B2	Core area Biomedical Engineering	min. 18
B3	Core area Health Sciences	min. 9
B4	Specialisation area	min. 15
B5	Seminar area	min. 5
B6	Practical area	min. 10
C	**Complementary area**	**min. 6**
Total		**min. 120**

(2) In the compulsory elective area B, students must complete modules amounting to a minimum of 84 CP.

(3) Students must complete modules worth at least 16 CP in the core area of Engineering (B1), modules worth at least 18 CP in the core area of Biomedical Engineering (B2) and modules worth at least 9 CP in the core area of Health Sciences (B3) from the respective module catalogues provided for this purpose.

(4) [1]In the specialisation area (B4), seminar area (B5) and practical area (B6), students have the option of choosing a rigorous specialisation in one focus area in accordance with paragraph 7. [2]In the specialisation area (B4), students must complete at least 15 CP, in the seminar area (B5) at least 5 CP and in the practical area (B6) at least 10 CP from the respective module catalogues provided for this purpose.

(5) The 11 CP missing for elective area B can be selected from areas B1 – B4.

(6) In the supplementary area C, modules worth at least 6 CP must be completed from the module catalogue provided for this purpose.

(7) [1]Modules can be assigned to specialisations. A specialisation is aligned with the research foci in Biomedical Engineering. [3]The modules assigned to a specialisation are specified in the study curriculum and module catalogue. [4]Upon successful completion of the modules assigned to a specialisation, the student will receive, upon request, a confirmation issued by the *Studiensekretariat* (student administration and examinations office) together with the degree documents.

§ 6 Multiple use of modules

(8) If identical modules have been completed in the bachelor's programme in accordance with § 4 (9) sentence 1 of the General Framework and cannot be recognised, other modules from the compulsory elective or complementary area must be completed in the master's programme with at least the same number of credit points as the identical modules that cannot be recognised.

(9) [1]If modules are assigned to several areas, these modules can only be completed in one of the areas. [2]Multiple use of the modules within or between the bachelor's and master's levels is not permitted.

§ 7 Compulsory attendance at courses (§ 7 ASPO)

[1]For all courses, especially those with practical components, compulsory attendance may be required as part of the coursework. [2]At the beginning of the respective course, the person responsible for teaching will announce publicly within the faculty (learning platform) on which dates compulsory attendance is essential to achieve learning success. [3]Students who are not 100% present on these dates will not be admitted to the corresponding module examination or will not have completed the module prerequisite. [3]If there are reasons for absences for which the student is not responsible, then

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

b) individual classes can be made up for,

c) parts already completed from previous courses can be credited.

[4]The course responsible will check whether compensation is possible in accordance with sentence 3. [5]If no substitute achievement is delivered/individual class made up for, or if crediting is excluded, then the coursework is deemed not to have been completed.

§ 8 Deadlines (§ 8 (1) and (2) ASPO)

(1) Students enrolled in the bachelor's programme in Biomedical Engineering who have not passed the module examination in Fundamentals in Electrical Engineering I and the module examination in Higher mathematics I by the end of the second examination period of the third semester will lose their right to examination, unless the student is not responsible for exceeding the deadline.

(2) Students enrolled in the bachelor's programme in Biomedical Engineering who have not earned at least 98 CP by the end of the second examination period of the sixth semester will lose their right to examination unless the student is not responsible for exceeding the deadline.

III. Exams

§ 9 Thesis (§ 18 ASPO)

(1) Students may only be admitted to the bachelor's thesis if they have earned at least 140 CP from the modules listed in § 4 (1).

(2) Students may only be admitted to the master's thesis if they have earned at least 75 CP from the modules listed in § 5.

(3) [1]The bachelor’s thesis corresponds to 12 CP. [2]This includes a graded presentation (1 CP) including a discussion on the topic of the bachelor’s thesis. [3]The presentation is in the presence of the examiner of the bachelor’s thesis. [4]The bachelor's thesis is completed alongside the degree programme. [5]The time from admission to submission of the bachelor’s thesis is six months.

(4) [1]The master’s thesis corresponds to 30 CP. [2]This includes a graded presentation (2 CP) including a discussion on the topic of the master’s thesis. [3]The presentation is in the presence of the examiners of the master’s thesis. [4]The time from admission to submission of the master’s thesis is six months.

(5) [1]The topic of the bachelor's and master's thesis is set by an examiner from the Department of Engineering. [2]Only in justified individual cases may the thesis be written in an interdisciplinary field or at an external institution with the approval (prior consent) of the subject examination board. [3]In this case, one of the two examiners of the master's thesis must belong to the Department of Engineering at Ulm University.

(6) The bachelor's or master's thesis may be written in English or German with the consent of the first examiner.

§ 10 Final grade (§ 24 (6) ASPO)

(1) [1]The overall grade of the bachelor's programme includes the bachelor's thesis (12 CP) and the best examination grades from the compulsory, compulsory elective and complementary areas totalling 115 CP (127 CP in total). [2]The examination with which the threshold is exceeded is weighted proportionately with the credit points that are missing for 127 CP.

(2) [1]The overall grade for the master's programme is based on the master's thesis module and the highest-graded modules from the compulsory elective areas B1 – B6, amounting to 78 credit points. [2]The module that exceeds the total of 78 CP is weighted proportionally.

IV. Final provisions

§ 11 Effective date

[1]These study and examination regulations apply with effect from the winter semester 2024/25. At the same time, the Subject-specific study and examination regulations of Ulm University for the bachelor's and master's programme in Biomedical Engineering offered by the Faculty of Engineering, Computer Science and Psychology at Ulm University of 7 August 2023, published in the Official Bulletin of Ulm University No. 22 of 15 August 2023, pages 493 -498 cease to have effect.

Ulm, this 10 June 2025

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