

**Study and Examination Regulations  
For the Bachelor's Programme in Robotics  
At the University of Applied Sciences  
Würzburg-Schweinfurt  
(SPO BIRO – English)**

**16 June 2020**

The Bavarian Higher Education Act (BayHschG) forms the framework for the following regulations decreed by the University of Applied Sciences Würzburg-Schweinfurt (FHWS).

**Contents**

- 1 General Information
  - § 1 Purpose of the study and examination regulations
  - § 2 Objective of the programme
  - § 3 Conditions for admission to the programme
- 2 Programme Structure
  - § 4 Standard time to degree and start of the programme
  - § 5 Programme structure and modules
  - § 6 Internship Module
- 3 Examinations and Deadlines
  - § 7 Supplementary regulation for other types of assessments
  - § 8 Bachelor's thesis
  - § 9 Standard deadlines
- 4 Organisational Matters
  - § 10 Examination Committee (*Prüfungskommission*)
- 5 Academic Degree, Concluding Provisions
  - § 11 Academic degree
  - § 12 Coming into effect, expiration
  - § 13 Transitional provisions

## 1

**General Information**

## § 1

**Purpose of the study and examination regulations**

<sup>1</sup>These study and examination regulations govern the course of the bachelor's programme Robotics. <sup>2</sup>They serve to complete and supplement the General Examination Regulations for Universities of Applied Sciences (RaPO) of 17 October 2001 (GVBl p. 686), as amended by the amending regulation of 6 August 2010 (GVBl p. 688) and the General Examination Regulations of the University of Applied Sciences Würzburg-Schweinfurt (APO) of 28 January 2019 in their current version.

## § 2

**Programme Objective and Profile**

- (1) <sup>1</sup>The objective of the English-language degree programme is to develop the students' ability to independently apply scientific findings and methods in robotics through practice-oriented teaching. <sup>2</sup>Graduates are to work independently and with scientific methods as robotics engineers. <sup>3</sup>Due to the range and diversity of robotics, which makes a comprehensive fundamental training necessary, the programme wants to develop professional, methodological and social competences so graduates will be able to familiarise themselves quickly with one of the many areas of application and so to exercise the profession of engineers.
- (2) By offering optional modules, students can choose courses according to their preferences and career expectations; this, however, does not lead to specialisation.
- (3) <sup>1</sup>To support personality formation, students not only acquire professional expertise, but also social skills and foreign language proficiency. In addition, they are made aware of the potential for conflict in the area of interaction between ethics, technology and economic efficiency and learn to critically reflect on technical developments, especially in the field of artificial intelligence (AI), from an ethical perspective. <sup>2</sup>This ensures their practical problem-solving skills also in an international context and students are being prepared to take over management tasks themselves.

## § 3

**Conditions for admission to the programme**

- (1) <sup>1</sup>Admission to the bachelor's programme Robotics is conditional upon evidence of
- a) a general higher education entrance qualification,
  - b) an entrance qualification for a university of applied sciences (*Fachhochschulreife*) or
  - c) a higher education entrance qualification in terms of Article 45 of the Bavarian Higher Education Act of 23 May 2006 (GVBl, p. 245, BayRS 2210-1-1-WFK) in its current version.
- (2) <sup>2</sup>Evidence of the existence of the condition under Sentence 1 a) to c) is provided in accordance with the Regulation Concerning Eligibility for Studying at the Universities of the Free State of Bavaria and the State-recognised Private Universities of 2 November 2007 (GVBl p. 767) in its current version.
- (3) Other conditions for admission to the programme (in particular with regard to the student's linguistic aptitude for the programme) and for enrolment arise out of the Regulations for the Procedure of Enrolment, Leave of Absence, and Termination of Enrolment at the University of Applied Sciences Würzburg-Schweinfurt (FHWS Enrolment Regulations) in its current version.

## 2

### Programme Structure

#### § 4

##### Standard Time to Degree and Start of Studies

- (1) The standard time to degree is seven semesters with a total of 210 credit points in accordance with the European Credit Transfer and Accumulation System (ECTS, hereinafter referred to as ECTS credits).
- (2) Studies start in the winter semester.

#### § 5

##### Programme Structure and Modules

- (1) <sup>1</sup>The programme structure is determined by the appendix to these study and examination regulations.
- (2) <sup>1</sup>Core Electives (FWPM) in accordance with § 7 (3) APO serve the development of advanced competencies; therefore, they have an immediate thematic relation to other modules of the bachelor's programme Robotics. <sup>2</sup>Each student has to select Core Electives with a total of 20 ECTS credits (four Core Electives with the 5 ECTS credits each). <sup>3</sup>The modules with the best grades up to the total of ECTS credits mentioned above are included in the calculation of the degree grade, unless the student makes a different binding selection to the Department of Student Affairs (HSST) before the degree certificate is issued. <sup>4</sup>The catalogue of Core Electives is determined by the Faculty of Electrical Engineering. <sup>5</sup>Offered modules include courses from disciplines related to robotics, such as electrical engineering, mechanical engineering, computer science, and mathematics. <sup>6</sup>Choice is made by taking a Core Elective's exam for the first time.
- (3) <sup>1</sup>The Faculty of Electrical Engineering can assign Core Modules and Elective Modules to individual areas of specialisation. <sup>2</sup>An area of specialisation serves to set a key focus within the bachelor's programme Robotics. <sup>3</sup>In accordance with the appendix to these study and examination regulations, each area of specialisation consists of three specialisation modules with 5 ECTS credits each. <sup>4</sup>Choice is made by taking a specialisation module's exam for the first time. <sup>5</sup>After this, a change of the area of specialisation can be made after approval of a written request by the examination committee.

#### § 6

##### Internship Module

- (1) The Internship Module consists of a continuous, supervised internship lasting at least 20 weeks, but no more than 26 weeks.
- (2) Only students who have gained 90 ECTS credits at the start of the Internship Module are entitled to enter this part of studies.
- (3) The Internship Module is assessed at 25 ECTS credits and the grade "passed successfully" or "failed".

**3****Examinations, deadlines, academic degree****§ 7****Supplementary Regulation for Other Types of Assessments (sonstige Prüfungsleistungen)**

- (1) <sup>1</sup>The topic set for the Robotics Project should be such that the essential content of the assignment can be described in a documentation report of 15 to 20 pages. <sup>2</sup>After the Robotics Project is submitted, the work is presented by the student in person in accordance with § 26 (4) APO.
- (2) To substantiate § 27 (1) Sentence 6 APO, a portfolio assignment is a written summary in the range of 10 to 15 pages or a summary delivered orally in 10 to 20 minutes.

**§ 8****Bachelor's Thesis**

- (1) <sup>1</sup>Students may start work on their bachelor's thesis not before
  - a) the Internship Module has been passed successfully as well as
  - b) at least 150 ECTS credits have been earned.<sup>2</sup>Exceptions may be approved by the examination committee.
- (2) The topic set should be such that the thesis can generally be completed within a period of ten weeks if it is worked on continuously to the exclusion of everything else.

**§ 9****Standard deadlines**

- (1) The following examinations are considered to be for foundation modules in the meaning of § 39 (1) Sentence 1 APO
  - Engineering Mathematics 1 as well as
  - Robot Mechanics 1and must be taken for the first time no later than by the end of the second programme semester.
- (2) <sup>1</sup>Any examination for modules scheduled for the first two semesters (according to the appendix of these Study and Examination Regulations) with the exception of the foundation modules' examinations as per (1) must be taken for the first time within the first three programme semesters. <sup>2</sup>Any examination for modules scheduled for the third and fourth semester must be taken within the first six programme semesters. <sup>3</sup>Any examination for modules scheduled for the fifth to seventh semester must be taken within the first six programme semesters. <sup>4</sup>If students have exceeded one of these deadlines for reasons for which they are responsible, any examination that has not been taken on-time is regarded as having been taken for the first time and is awarded the grade "non-sufficient" (*Fristfünf*).

**4**

**Organisational Matters**

**§ 10**

**Examination Committee (*Prüfungskommission*)**

In accordance with § 20 (1) Sentence 3 APO for the bachelor's programme in Robotics, the number of additional members of the examination committee is three.

**5**

**Academic Degree, Concluding Provisions**

**§ 11**

**Academic Degree**

After successful completion of the bachelor's examination, graduates are awarded the academic degree Bachelor of Engineering (abbrev. "B.Eng.").

**§ 12**

**Coming into Effect, Expiration**

These study and examination regulations shall come into effect on 1 October 2020.

**§ 13**

**Transitional Provisions**

These study and examination regulations in connection with the APO of 28 January 2019 in the versions currently valid apply to all students in the bachelor's programme Robotics.

Drawn up on the basis of the resolution of the Senate of the University of Applied Sciences Würzburg-Schweinfurt of 15 June 2020 and the legal approval of the President of the University of Applied Sciences Würzburg-Schweinfurt as of 16 June 2020.

Würzburg, 16 June 2020

Professor Dr. Robert Grebner  
President

These study and examination regulations for the bachelor's programme Robotics were set down on 16 June 2020 at the University of Applied Sciences Würzburg-Schweinfurt. This was announced on 16 June 2020 in a poster. The date of publication is 16 June 2020.

**Abbreviations:**

APO	General Examination Regulations
AWPF	General Elective Course
AWPM	General Elective Module
BA	Bachelor's thesis
BayHSchG	Bavarian Higher Education Act
BayHSchPG	Bavarian Higher Education Personnel Act
BEEG	Federal Parental Benefit Act
BGBI	Federal Law Gazette
bZv	Particular conditions for admission (to an examination)
D	German (as language of examination)
E	English (as language of examination)
ECTS	European Credit Transfer and Accumulation System
Ex	Field trip
FHWS	University of Applied Sciences Würzburg-Schweinfurt
FWPM	Core Elective Module
GVBI	Bavarian Law Gazette
HSST	Department of Student Affairs
LP	Lab course
m.E./o.E.	passed successfully/failed
mP	Oral examination
MuSchG	Maternity Protection Act
PflegeZG	Family Caregiver Leave Act
P	Internship
Pro	Project
RaPO	State Examination Regulations
S	Seminar
SGB XI	German Social Security Code Volume 11
soP	Other type of assessments; The actual type of assessment is laid down in the study plan and announced <b>at the start of the semester</b> by the responsible lecturers. Only one type of assessment per module is to be completed.
sP	Written examination
SPO	Study and examination regulations
SU	Seminar-like lecture
SWS	Credit hours
Tpf	In accordance with § 22 (1) APO, attendance is mandatory. Attendance is documented by signing the attendance list. The module manager is responsible for the attendance list.
Ü	Practical course/exercise course
V	Lecture

**Abbreviations for assessment types:**

A	Research project
B	Presentation
C	Presentation
D	Documentation report
E	Colloquium
F	Written assignment / term paper
G	Portfolio assignment
H	Practical assignment

Appendix to the study and examination regulations for the bachelor's programme Robotics at the University of Applied Sciences Würzburg-Schweinfurt, valid from 1 October 2020. This appendix shall apply to all students who commence their studies in the bachelor's programme on 1 October 2020 or later.

[1] No.	[2] Exam no. / Module ID	[3] Module name	[4] Semester	[5] Credit hours	[6] ECTS credits	[7] Course type	[8] Condition	[9] type	[10] duration / format	[11] Exam language	[12] bzV	[13] final grade	[14] Weight Factor	[15] Actual
		<b>Semester 1</b>												
1		Engineering Mathematics 1	1	6	5	SU,U		sP	90 min	e		yes	1	5
2		Basics of Electrical Engineering	1	6	5	SU,U		sP	90 min	e		yes	1	5
3		Robot Mechanics 1	1	4	5	SU,U		sP	90 min	e		yes	1	5
4		Basics of Computer Engineering and Operating Systems	1	4	5	SU,U		sP	90 min	e		yes	1	5
5		Programming 1	1	4	5	SU,U		sP	90 min	e		yes	1	5
6		Robotics Lab 1	1	4	5	S,LP		soP	H(m,E,Jo,E.)	e		no	0	0
		<b>Semester 2</b>												
7		Engineering Mathematics 2	2	6	5	SU,U		sP	90 min	e		yes	1	5
8		Basics of Electronics and Components	2	6	5	SU,U		sP	90 min	e		yes	1	5
9		Robot Mechanics 2	2	4	5	SU,U		sP	90 min	e		yes	1	5
10		Sensors and Metrology	2	4	5	SU,U		sP	90 min	e		yes	1	5
11		Programming 2	2	4	5	SU,U		sP	90 min	e		yes	1	5
12		Robotics Lab 2	2	4	5	S,LP		soP	H(m,E,Jo,E.)	e		no	0	0
		<b>Semester 3</b>												
13		Statistics and Sensor Data Fusion	3	4	5	SU,U		sP	90 min	e		yes	1	5
14		Systems Theory	3	4	5	SU,U		sP	90 min	e		yes	1	5
15		Software Engineering and Cyber Security	3	4	5	SU,U		sP	90 min	e		yes	1	5
16		Image Processing	3	4	5	SU,U		sP	90 min	e		yes	1	5
17		Embedded Systems and Field Buses	3	4	5	SU,U		sP	90 min	e		yes	1	5
18		Robotics Lab 3	3	4	5	S,LP		soP	H(m,E,Jo,E.)	e		no	0	0
		<b>Semester 4</b>												
19		Core Elective 1a	4	4	5	SU,U		sP	90 min	e		yes	1	5
20		Core Elective 1b	4	4	5	SU,U		sP	90 min	e		yes	1	5
21		Control Systems	4	4	5	SU,U		sP	90 min	e		yes	1	5
22		Distributed Systems and Network Communication	4	4	5	SU,U		sP	90 min	e		yes	1	5
23		Machine Learning	4	4	5	SU,U		sP	90 min	e		yes	1	5
24		Robotics Lab 4	4	4	5	S,LP		soP	H(m,E,Jo,E.)	e		no	0	0
		<b>Semester 5</b>												
25		Internship	5	0	25	P	90 ECTS credits		(m,E,Jo,E.)	e		no	0	0
26		General Elective	5	4	5	*		*	*	*		yes 1)	1	5
		<b>Semester 6 u. 7</b>												
27		Core Elective 2a	6	4	5	SU,U		sP	90 min	e		yes	1	5
28		Core Elective 2b	6	4	5	SU,U		sP	90 min	e		yes	1	5
29		Actuators	6	4	5	SU,U		sP	90 min	e		yes	1	5
30		Robotics Specialisation Module 1	6	4	5	SU,U		sP	90 min	e		yes	1	5
31		Robotics Specialisation Module 2	6	4	5	SU,U		sP	90 min	e		yes	1	5
32		Robotics Specialisation Module 3	7	4	5	SU,U		sP	90 min	e		yes	1	5
33		Robotics Project	6 & 7	10	10	S,Pro		soP	A	e		no	0	0
34		Values Seminar	7	2	3	S		soP	C(m,E,Jo,E.)	e		no	0	0
35		Business Development and Entrepreneurship	7	4	5	S		soP	G	e		yes	1	5
36		Bachelor's Thesis	7	0	12	-	150 ECTS credits + Module 25	BA		e		yes	1	12
		<b>Total:</b>		<b>148</b>	<b>210</b>									<b>152</b>

\* 1) Depends on the selection from the AWP/M catalogue. Details are regulated by the Faculty of Applied Natural Sciences and Humanities (FANG). The final grade can possibly be calculated from two equally weighted partial grades (depends on selected AWP/Ms)