HOCHSCHULE HEILBRONN

Bachelor's programme:
Intelligent Mechatronic Systems (IMS-B)

The following study and examination regulations (in German “SPO”) were reviewed and adopted at the 454th meeting of the Senate on 30 April 2025.

Only the German version of this document is binding!

Prof. Dr. Ulrich Brecht
Vice-Rector for Studies and Teaching

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Bachelor's programme
Intelligent Mechatronic Systems (IMS-B)

1 Basics of the programme structure

1.1 Total

The total scope of the compulsory and compulsory elective courses required for successful completion of the programme is **127** semester hours per week and leads to the acquisition of **210** ECTS credits.

1.2 Structure of the programme

The compulsory courses required for successful completion of the programme and the associated examinations and preliminary examination requirements are listed in Table 1 and Table 3. The courses are assigned to individual modules, which are awarded ECTS credits.

1.3 Language of instruction

All compulsory courses are held in English (§3 (5), SPO AT Bachelor 7sem). Elective courses in the main study period (modules *Elective 1 to 6* (609370, 609380, 609390, 609400, 609410, 609420)) may also be offered in German.

2 Foundation studies

2.1 Subjects of the basic study period

The courses of the basic studies are listed in Table 1.

Table 1: Basic studies

Semester	Course					Examination		Examination preliminary		ECTS
	Module	No.	Course title	Type	SWS	Type	Duration	Type	Duration	
1	G1	**609010**	**Mathematics 1**			LK	90			
		609011	Mathematics 1	V/Ü	6	Module examination				5
	G3	**609030**	**Physics**			LKBK	90			
		609031	Physics	V/Ü	4	Module examination				5
	G4	**609040**	**Electrical Engineering and Electronics 1**			LK	90			
		609041	Electrical Engineering and Electronics 1	V/Ü	4	Module examination				5
	G6	**609060**	**Programming 1**			LK	90			
		609061	Programming 1	V/L	4	Module examination				5
	G8	**609080**	**Engineering Mechanics 1**			LK	60			
		609081	Engineering Mechanics 1	V/Ü	4	Module examination				5
	G11	**609110**	**German Language and Academic Skills 1** [1]			LP				
		609111	German Language and Academic Skills 1	V/S	4	Module examination				5
Totals for 1st semester					**26**	**6**		**0**		**30**

2	G2	**609020**	**Mathematics 2**			LK	120			
		609021	Mathematics 2	V/Ü	4	Module examination				5
	G5	**609050**	**Electrical Engineering and Electronics 2**							
		609051	Electrical Engineering and Electronics 2	V/Ü	2	LK	90			2.5
		609052	Lab Electrical Engineering	L/S	2			SL		2.5
	G7	**609070**	**Programming 2**			LK	120			
		609071	Programming 2	V/L	4	Module examination				5
	G9	**609090**	**Engineering Mechanics 2 and 3**			PK	120			
		609091	Engineering Mechanics 2	V/Ü	2	Module examination				2.5
		609092	Engineering Mechanics 3	V/Ü	2	Module examination				2.5
	G10	**609100**	**Materials**			PK	90			
		609101	Materials: Plastics	V/Ü	2	Module examination				2.5
		609102	Materials: Metals	V/Ü	2	Module examination				2.5
	G12	**609120**	**German Language and Academic Skills 2** [2]			LP				
		609121	German Language and Academic Skills 2	V/S	4	Module examination				5
Totals for 2nd semester					**24**	**6**		**1**		**30**

2.2 Module examinations in the basic study period

The module examinations for the basic study period are shown in Table 2.2:

Table 2: Module examinations for the preliminary Bachelor's examination, Weightings of the grades for the individual examination components and module grades

Module grades for undergraduate studies: Intelligent Mechatronic Systems (IMS)					
Module	No.	Module name			Weighting of the module grade for the grade according to § 22
		Examination	No	Preliminary examination	
Mathematics and Physics					
G1	**609010**	**Mathematics 1**			5
	609011	Mathematics 1			
G2	**609020**	**Mathematics 2**			5
	609021	Mathematics 2			
G3	**609030**	**Physics**			5
	609031	Physics			
Electrical Engineering					
G4	**609040**	**Electrical Engineering and Electronics 1**			5
	609041	Electrical Engineering and Electronics 1			
G5	**609050**	**Electrical Engineering and Electronics 2**			5
	609051	Electrical Engineering and Electronics 2			
			609052	Lab Electrical Engineering	
Programming					
G6	**609060**	**Programming 1**			5
	609061	Programming 1			
G7	**609070**	**Programming 2**			5
	609071	Programming 2			
Engineering Mechanics					
G8	**609080**	**Engineering Mechanics 1**			5
	609081	Engineering Mechanics 1			
G9	**609090**	**Engineering Mechanics 2 and 3**			5
	609091	Engineering Mechanics 2			
	609092	Engineering Mechanics 3			
G10	**609100**	**Materials**			5
	609101	Materials: Plastics			
	609102	Materials: Metals			
German and Academic Skills					
G11	**609110**	**German Language and Academic Skills 1**			5
	609111	German Language and Academic Skills 1			
G12	**609120**	**German Language and Academic Skills 2**			5
	609121	German Language and Academic Skills 2			
Total					**60**

2.3 Admission requirements

The following admission requirements apply:

To participate in 609052 *Lab Electrical Engineering,* 609041 *Electrical Engineering and Electronics 1* must have been passed.

2.4 Bachelor's preliminary examination

The preliminary bachelor's examination for the basic study period includes the module grades for all modules listed in Table 2. If several performance assessments take place at course level within a module, the module grade is determined according to an ECTS-weighted arithmetic mean of the individual performances included in the module. The overall grade for the preliminary Bachelor's examination is calculated from the weighted arithmetic mean of the module grades, with the weights for the individual grades being determined on the basis of the ECTS from Table 2.

3 Main study

3.1 Subjects

The courses in the main study period are listed in Table 3.

Table 3: Subjects in the main study period

Semester	Course					Examination		Examination preliminary		ECTS
	Module	No.	Course title	Type	SWS	Type	Duration	Type	Duration	
3	H1	**609210**	**Signals and Systems**			LK	120			
		609211	Signals and Systems	V/Ü	4	Module examination				5
	H3	**609230**	**Metrology and Sensors**			LP				
		609231	Metrology	V/Ü	2	Module examination				2.5
		609232	Sensors	V/Ü	2	Module examination				2.5
	H5	**609250**	**Manufacturing Technology**			LP				
		609251	Manufacturing Technology	V/Ü	4	Module examination				5
	H6	**609260**	**Engineering Design**			LKBK	120			
		609261	Engineering Design	V/Ü	4	Module examination				5
	H7	**609270**	**Microcontroller and Software Engineering**			LP				
		609271	Microcontroller	V/Ü	2	Module examination				2.5
		609272	Software Engineering	V/Ü	2	Module examination				2.5
	H9	**609290**	**Data Science**							
		609291	Data Science	V/Ü	2	LK	60			2.5
		609292	Lab Physics	L/S	2			SL		2.5
Totals 3rd semester					**24**	**6**		**1**		**30**

4	H2	**609220**	**Control Systems**			LK	120				
		609221	Control Systems	V/Ü	4	Module examination					5
	H4	**609240**	**Labs Control and Metrology**								
		609241	Lab Control	L/S	2				SL		2.5
		609242	Lab Metrology	L/S	2	LL					2.5
	H10	**609300**	**Introduction to AI**			LKBK	90				
		609301	Introduction to AI	V/Ü	4	Module examination					5
	H13	**609330**	**Project Lab**			LA					
		609331	Project Lab	L/S	2	Module examination					5
	H17	**609370**	**Elective 1**								
			Electives according to section 3.2		4	Lx					5
	H18	**609380**	**Elective 2**								
			Electives according to section 3.2		4	Lx					5
Totals 4th semester					**22**	**6**			**1**		**30**

5	H15	**609350**	**Internship**								
		609351	Supervised Internship		0				SA		26
		609352	Colloquium accompanying the internship		0				SR		4
Totals 5th semester					**0**	**0**			**2**		**30**

6	H11	**609310**	**Reinforcement Learning**			LA					
		609311	Reinforcement Learning	V/Ü	4	Module examination					5
	H12	**609320**	**Computer Vision**			LA					
		609321	Computer Vision	V/Ü	4	Module examination					5
	H14	**609340**	**Seminar Project**			LE					
		609341	Seminar Project	L/S	1	Module examination					7.5
	H16	**609360**	**General Studies** [1)]								
		609361	General Studies		2				Sx		2.5
	H19	**609390**	**Elective 3**								
			Electives according to section 3.2		4	Lx					5
	H20	**609400**	**Elective 4**								
			Electives according to section 3.2		4	Lx					5
Totals 6th semester					**19**	**5**			**1**		**30**

7	H8	**609280**	**IIoT**			LA					
		609281	IIoT	V/Ü	4	Module examination					5
	H21	**609410**	**Elective 5**								
			Electives according to section 3.2		4	Lx					5
	H22	**609420**	**Elective 6**								
			Electives according to section 3.2		4	Lx					5
	H23	**609430**	**Project Planning, Thesis and Colloquium**								
		609431	Project Planning and Colloquium	S	0	PA					3
		609432	Thesis		0	PB					12
Totals 7th semester					**12**	**5**			**0**		**30**

[1)] In 609360 *General Studies*, a subject from the Studium Generale in the field of "Ethics, Environment and Sustainability" or the subject 612372 *Ethics* from the WF catalogue (see section 3.2) must be selected. The course and examination format correspond to those offered by the Studium Generale.

3.2 Elective subjects

To fulfil the **examination requirements for "Elective 1-2"**, students select technical electives totalling 10 ECTS from the VF catalogue. To fulfil the **examination requirements for "Elective 3-6",** technical electives totalling 20 ECTS are selected from the VF catalogue or the WF catalogue[4] .

The courses from the VF and WF catalogues are designed to enable students to deepen their studies. Students can choose specialisations here by successfully completing the elective courses assigned to the respective specialisation. The assignment of each elective to one or more specialisations is indicated in the VF and WF catalogues and in the module handbook. Selected specialisations can be indicated on the certificate.

The VF and WF catalogues are part of the module handbook and are available on the programme's homepage and the university's official digital learning platform by the end of the previous semester at the latest. Subjects from other programmes outside the faculty of Heilbronn University or another university can be recognised upon request. Participation in compulsory elective subjects may be limited due to capacity reasons.

Changes to the VF and WF catalogues are approved by the examination board upon application by the lecturer responsible for the course in question, after consultation with the faculty council and the study commission. The subjects offered must take into account the competence objectives of the degree programme and these must correspond to at least level 6 of the German Qualifications Framework. Multiple credits for subjects are not permitted.

3.3 Module examinations in the main study period

The module examinations for the Bachelor's examination, the associated examination requirements and preliminary examination requirements, as well as the weightings of the grades for the individual examination requirements and the module grades and the Bachelor's thesis are shown in Table 4.

Table 4: Module examinations for the Bachelor's degree, weightings of the grades for the individual examination components and module grades

Module grades for advanced studies: Intelligent Mechatronic Systems (IMS)					
Module	**No**	**Module name**			**Weighting of the module grade for the grade according to § 29**
		Examination	**No**	**Preliminary examination**	
Control Systems and Metrology					
H1	**609210**	**Signals and Systems**			**5**
	609211	Signals and Systems			
H2	**609220**	**Control Systems**			**5**
	609221	Control Systems			
H3	**609230**	**Metrology and Sensors**			**5**
	609231	Metrology			
	609232	Sensors			
H4	**609240**	**Labs Control and Metrology**			**5**
			609241	Lab Control	
	609242	Lab Metrology			

Mechatronic Engineering					
H5	**609250**	**Manufacturing Technology**			**5**
	609251	Manufacturing Technology			
H6	**609260**	**Engineering Design**			**5**
	609261	Engineering Design			
H7	**609270**	**Microcontroller and Software Engineering**			**5**
	609271	Microcontrollers			
	609272	Software Engineering			
H8	**609280**	**IIoT**			**5**
	609281	IIoT			
Intelligent Systems					
H9	**609290**	**Data Science**			**5**
	609291	Data Science			
	609292	Lab Physics			
H10	**609300**	**Introduction to AI**			**5**
	609301	Introduction to AI			
H11	**609310**	**Reinforcement Learning**			**5**
	609311	Reinforcement Learning			
H12	**609320**	**Computer Vision**			**5**
	609321	Computer Vision			
Projects					
H13	**609330**	**Project Lab**			**5**
	609331	Project Lab			
H14	**609340**	**Seminar Project**			**7.5**
	609341	Seminar Project			
Internship					
H15	**609350**	**Internship**			**0**
			609351	Supervised Internship	
			609352	Colloquium accompanying the internship	
General Studies					
H16	**609360**	**General Studies**			**0**
			609361	General Studies	
Electives					
H17	**609370**	**Elective 1**			**5**
		Electives according to section 3.2			
H18	**609380**	**Elective 2**			**5**
		Electives according to section 3.2			
H19	**609390**	**Elective 3**			**5**
		Electives according to section 3.2			
H20	**609400**	**Elective 4**			**5**
		Electives according to section 3.2			
H21	**609410**	**Elective 5**			**5**
		Electives according to section 3.2			
H22	**609420**	**Elective 6**			**5**
		Electives according to section 3.2			
Bachelor's thesis					

H23	**609430**	**Project Planning, Thesis and Colloquium**			**15**
	609431	Project Planning and Colloquium			
	609432	Thesis			
Total					**117.5**

3.4 Bachelor's examination

The Bachelor's certificate contains the module grades for all modules listed in Table 4 and the Bachelor's thesis. If several performance assessments take place at course level within a module (including compulsory elective modules), the module grade is determined according to an ECTS-weighted arithmetic mean of the individual performances contained in the module. The overall grade on the Bachelor's certificate is calculated as the weighted arithmetic mean of the module grades and the grade for the Bachelor's thesis, with the weights for the individual grades being determined on the basis of the ECTS credits in Table 4.

3.5 Admission requirements

The following admission requirements apply:

To participate in *609241 Lab Control, 609211 Signals and Systems* must have been passed.

To participate in *609242 Lab Metrology, 609230 Sensors and Metrology* must have been passed.

To participate in *609292 Lab Physics, 609031 Physics* must have been passed.

Successful participation in the practical study semester (internship) must be proven at the latest when the Bachelor's thesis is submitted.

All modules of the 3rd and 4th semesters must be passed before the Bachelor's thesis is issued.

3.6 Practical study semester

The requirements for crediting the practical study semester and the office responsible for crediting are regulated in the general section of these study and examination regulations (§§ 4, 7 (2)).

Module 609121 *German Language and Academic Skills 2* must have been successfully completed before the practical study semester begins.

During the practical semester, students should apply the knowledge they have acquired so far in a supervised practical phase. They should carry out engineering and IT-related tasks independently and with shared responsibility.

A practical study semester completed abroad is expressly welcome.

3.7 Special regulations for Studium-PLUS models during the term of the contract between the cooperating company and the student

As part of their studies, Studium-Plus students are required to complete additional practical work at their partner company during lecture-free and exam-free periods that are not used for statutory holiday entitlement. During these periods, the specialist knowledge acquired to date is applied and deepened in practice, and students gain an in-depth understanding of the working conditions and methods of engineers.

Their engineering-related activities include working as independently and autonomously as possible, as well as working on and solving specific problems in the following possible areas:

- Development
- Laboratory, testing and test field
- Design and standardisation
- Production planning and control
- Production and assembly
- Quality assurance
- Project planning
- Technical sales
- or other relevant areas.

The focus is based on the operational possibilities and the content of the degree programme.

The level of the activities must be adapted to the individual's progress in their studies so that the course content can be learned, applied and consolidated through in-depth practical knowledge.

4 Entry into force

These study and examination regulations (SPO 1) shall enter into force on 1 September 2025.

Heilbronn, 30 April 2025

Signed:

Prof. Dr Oliver Lenzen
Rector

Announcement

The examination regulations are hereby publicly announced in accordance with the announcement regulations of Heilbronn University dated 28 June 2017.

Heilbronn, 30 April 2025

On behalf of the Vice-Rectorate for Studies and Teaching

Signed
Prof. Dr Ulrich Brecht