HOCHSCHULE HEILBRONN

Bachelor's degree programme: Automotive Systems Engineering (ASE-B)

The following study and examination regulations (in German “SPO”) were verified and approved by the Senate at its 454th meeting on 30 April 2025.

Only the German version of this document is legally binding!

Prof. Dr. Ulrich Brecht
Prorector for Learning and Teaching

§ 46

Bachelor's degree programme
Automotive Systems Engineering (ASE-B)

1 Basics of the programme structure

1.1 Total scope

The total number of compulsory and compulsory elective courses required for the successful completion of the degree programme is **130** semester hours per week and leads to the acquisition of **210** ECTS credits.

1.2 Structure of the degree programme

The courses required for the successful completion of the degree programme in the compulsory area and the associated examinations and preliminary examinations are shown in Tables 2.1 and 2.3 as well as Table 3. The courses are assigned to individual modules, which are allocated ECTS credits.

1.3 Language of instruction

All courses are held in either German or English (§3 Para. 5, SPO AT Bachelor 7sem).

1.4 Basic study programme in German or in English

Depending on admission, the basic studies must be completed either in German or in English.

2 Basic studies

2.1 Basic studies in German

2.1.1 Subjects in German

The courses of the basic study programme are listed in Table 2.1.

Table 2.1: Basic study programme in German[1]

Semester	Course					Examination		Prerequisite		ECTS
	Module	No.	Course title	Type	SWS	Type	Duration	Type	Duration	
1	G1	**610010**	**Mathematics 1**			LK	90			
		610011	Mathematics 1	V/Ü	6	Module examination				5
	G3	**610030**	**Physics and engineering fundamentals**			PK	120			
		610031	Technical Physics	V/Ü	2	Module examination				2,5
		610032	Fundamentals of construction	V/Ü	2	Module examination				2,5
	G5	**610050**	**Computer science and digital technology**			LK	90			
		610051	Computer Science and Digital Technology	V/Ü	4	Module examination				5
	G7	**610070**	**Electrical Engineering 1**			LK	90			
		610071	Electrical Engineering 1	V/Ü	4	Module examination				5
	G10	**610100**	**Technical Mechanics 1**			LK	90			
		610101	Engineering Mechanics 1	V/Ü	4	Module examination				5
	G12	**610120**	**Automotive Engineering**			LKBK	120			
		610121	Automotive engineering 1+2	V/Ü	4	Module examination				5
Totals 1st semester					**26**	**6**		**0**		**30**
2	G2	**610020**	**Mathematics 2**			LK	120			
		610021	Mathematics 2	V/Ü	4	Module examination				5
	G4	**610040**	**Measurement technology**							
		610041	Fundamentals of measurement technology	V/Ü	2	LK	60			2,5
		610042	Laboratory physical measurement technology	L/S	2			SL		2,5
	G6	**610060**	**Computer Science 2**			LK	120			
		610061	Computer Science 2	V/Ü	4	Module examination				5
	G8	**610080**	**Electrical Engineering 2**			LK	90			
		610081	Electrical Engineering 2	V/Ü	4	Module examination				5
	G9	**610090**	**Automotive electronics and electronic circuit technology**							
		610091	Automotive electronics and electronic circuit technology	V/Ü	2	LK	90			2,5
		610092	Electrical engineering laboratory	L/S	2			SL		2,5
	G11	**610110**	**Engineering Mechanics 2+3**			PK	120			
		610111	Engineering Mechanics 2	V/Ü	2	Module examination				2,5
		610112	Technical Mechanics 3	V/Ü	2	Module examination				2,5
Totals 2nd semester					**24**	**6**		**2**		**30**

[1] See https://cdn.hs-heilbronn.de/ff7396326d75e064/21b0725bd705/2014-05-04-SPO-AT-Bachelor_ENGLISCH.pdf page 26 for abbreviations

2.1.2 Module examinations of the German foundation course

The module examinations of the basic study programme are shown in Table 2.2:

Table 2.2: Module examinations of the Bachelor's preliminary examination, Weighting of the grades of the individual examinations and module grades

Module grades for the basic studies: Automotive Systems Engineering (ASE)					
Module	**No.**	**Module name**			**Weight of the module grade for the grade in accordance with § 22**
		Examination	**No.**	**Prerequisite**	
Mathematical and scientific basics					
G1	**610010**	**Mathematics 1**			**5**
	610011	Mathematics 1			
G2	**610020**	**Mathematics 2**			**5**
	610021	Mathematics 2			
G3	**610030**	**Physics and engineering fundamentals**			**5**
	610031	Technical physics			
	610032	Fundamentals of construction			
G4	**610040**	**Metrology**			**5**
	610041	Basics of measurement technology			
			610042	Laboratory physical measurement technology	
Computer science					
G5	**610050**	**Computer science and digital technology**			**5**
	610051	Computer science and digital technology			
G6	**610060**	**Computer science 2**			**5**
	610061	Computer Science 2			
Electrical Engineering					
G7	**610070**	**Electrical Engineering 1**			**5**
	610071	Electrical engineering 1			
G8	**610080**	**Electrical engineering 2**			**5**
	610081	Electrical Engineering 2			
G9	**610090**	**Automotive electronics and electronic circuit technology**			**5**
	610091	Automotive electronics and electronic circuit technology			
			610092	Electrical engineering laboratory	
Mechanics					
G10	**610100**	**Technical Mechanics 1**			**5**
	610101	Technical Mechanics 1			
G11	**610110**	**Engineering Mechanics 2+ 3**			**5**
	610111	Technical Mechanics 2			
	610112	Engineering Mechanics 3			
G12	**610120**	**Automotive engineering**			**5**
	610121	Automotive engineering 1+2			
total					**60**

2.1.3 Admission requirements

To participate in *610092 Electrical Engineering Laboratory*, *610070 Electrical Engineering 1* must have been passed.

Module *610030 Physics and Engineering Fundamentals* must have been passed in order to participate in *610042 Physical Measurement Technology Laboratory*.

2.2 Basic studies in English

2.2.1 Subjects taught in English

The courses of the basic study programme in English are listed in Table 2.3.

Table 2.3: Basic studies in English

Semester	Course					Examination		Prerequisite		ECTS
	Module	No.	Course title	Type	SWS	Type	Duration	Type	Duration	
1	G1	**610510**	**Mathematics 1**			LK	90			
		610511	Mathematics 1	V/Ü	6	Module examination				5
	G3	**610530**	**Physics**			LKBK	90			
		610531	Physics	V/Ü	4	Module examination				5
	G4	**610540**	**Electrical Engineering and Electronics 1**			LK	90			
		610541	Electrical Engineering and Electronics 1	V/Ü	4	Module examination				5
	G6	**610560**	**Programming 1**			LK	90			
		610561	Programming 1	V/L	4	Module examination				5
	G8	**610580**	**Engineering Mechanics 1**			LK	60			
		610581	Engineering Mechanics 1	V/Ü	4	Module examination				5
	G11	**610610**	**German Language and Academic Skills 1** [1]			LP				
		610611	German Language and Academic Skills 1	V/S	4	Module examination				5
Total 1st semester					**26**	**6**		**0**		**30**
2	G2	**610520**	**Mathematics 2**			LK	120			
		610521	Mathematics 2	V/Ü	4	Module examination				5
	G5	**610550**	**Electrical Engineering and Electronics 2**							
		610551	Electrical Engineering and Electronics 2	V/Ü	2	LK	90			2,5
		610552	Lab Electrical Engineering	L/S	2			SL		2,5
	G7	**610570**	**Programming 2**			LK	120			
		610571	Programming 2	V/L	4	Module examination				5
	G9	**610590**	**Engineering Mechanics 2 and 3**			PK	120			
		610591	Engineering Mechanics 2	V/Ü	2	Module examination				2,5
		610592	Engineering Mechanics 3	V/Ü	2	Module examination				2,5
	G10	**610600**	**Circuit Design**			LK	60			
		610601	Circuit Design	V/Ü	4	Module examination				5
	G12	**610620**	**German Language and Academic Skills 2** [2]			LP				
		610621	German Language and Academic Skills 2	V/S	4	Module examination				5
Total 2nd semester					**24**	**6**		**1**		**30**

[1)] *610610 German Language and Academic Skills 1*: Written and oral knowledge of the German language at level B1, proven by a written examination (with oral part if applicable), e.g. telc B1, Goethe Zertifikat B1, DSD I or equivalent

[2)] *610620 German Language and Academic Skills 2*: Written and oral knowledge of the German language at level B2, proven by a written examination (with oral part if applicable), e.g. telc B2, Goethe Zertifikat B2, DSD II, TestDaF 3, DSH 1 or equivalent; see also point 3.5

2.2.2 Module examinations of the basic English course

The module examinations of the basic studies are shown in Table 2.4:

Table 2.4: Module examinations of the Bachelor's preliminary examination, Weighting of the grades of the individual examinations and module grades

Module grades for the foundation course in English: Automotive Systems Engineering (ASE)					
Module	**No.**	**Module name**			**Weight of the module grade for the grade according to § 22**
		Examination	**No.**	**Prerequisite**	
Mathematics and Physics					
G1	**610510**	**Mathematics 1**			**5**
	610511	Mathematics 1			
G2	**610520**	**Mathematics 2**			**5**
	610521	Mathematics 2			
G3	**610530**	**Physics**			**5**
	610531	Physics			
Electrical Engineering					
G4	**610540**	**Electrical Engineering and Electronics 1**			**5**
	610541	Electrical Engineering and Electronics 1			
G5	**610550**	**Electrical Engineering and Electronics 2**			**5**
	610551	Electrical Engineering and Electronics 2			
			610552	Lab Electrical Engineering	
Programming					
G6	**610560**	**Programming 1**			**5**
	610561	Programming 1			
G7	**610570**	**Programming 2**			**5**
	610571	Programming 2			
Engineering Mehanics					
G8	**610580**	**Engineering Mechanics 1**			**5**
	610581	Engineering Mechanics 1			
G9	**610590**	**Engineering Mechanics 2 and 3**			**5**
	610591	Engineering Mechanics 2			
	610592	Engineering Mechanics 3			
G10	**610600**	**Circuit Design**			**5**
	610601	Circuit Design			
German and Academic Skills					
G11	**610610**	**German Language and Academic Skills 1**			**5**
	610611	German Language and Academic Skills 1			
	610620	**German Language and Academic Skills 2**			

G12	610621	German Language and Academic Skills 2			5
Total					60

2.2.3 Admission requirements

To participate in *610550 Electrical Engineering and Electronics 2*, *610540 Electrical Engineering and Electronics 1* must have been passed.

2.3 Bachelor's preliminary examination

The Bachelor's preliminary examination for the German and English foundation courses contains the module grades for all modules listed in Table 2.2 (German) and Table 2.4 (English). If several assessments take place at course level within a module, the module grade is determined according to an arithmetic mean of the individual assessments contained in the module weighted according to the ECTS. The overall grade for the Bachelor's preliminary examination is calculated from the weighted arithmetic mean of the module grades, whereby the weights for the individual grades are determined on the basis of the ECTS from Table 2.2 (German) or Table 2.4 (English).

3 Main studies

3.1 Subjects

The courses in the main study programme are listed **in Table 3.**

Table 3: Subjects in the main study period

Semester	Course					Examination		Prerequisite		ECTS
	Module	No.	Course title	Type	SWS	Type	Duration	Type	Duration	
3	H1	**610210**	**Mathematics 3**			LK	120			
		610211	Mathematics 3	V/Ü	4	Module examination				5
	H3	**610230**	**Simulation Technology**			LK	120			
		610231	Simulation Technology	V/Ü	4	Module examination				5
	H4	**610240**	**Signals and Systems**			LK	120			
		610241	Signals and Systems	V/Ü	4	Module examination				5
	H5	**610250**	**Dynamics of Systems**			LK	120			
		610251	Dynamics of Systems	V/Ü	4	Module examination				5
	H6	**610260**	**Measurement technology and sensor technology** [1)]			LK	120			
		610261	Measurement and sensor technology	V/Ü	4	Module examination				5
	H10	**610300**	**Microcontrollers & Networks**			LKBK	120			
		610301	Microcontrollers & Networks	V/Ü	4	Module examination				5
Total 3rd semester					**24**	**6**		**0**		**30**
4	H2	**610220**	**Modelling and Thermodynamics**			PK	120			
		610221	Modelling	V/Ü	2	Module examination				2,5
		610222	Thermo- and Fluid Dynamics	V/Ü	2	Module examination				2,5
	H7	**610270**	**Control Engineering**			LK	120			
		610271	Control Engineering	V/Ü	4	Module examination				5
		610280	**Laboratory Control Engineering**					SL		

	H8	610281	Control engineering laboratory	L/S	4			Module examination			5
	H9	**610290**	**Modelling and Simulation Laboratory & Measurement Technology Laboratory**								
		610291	Modelling and simulation laboratory	L/S	2			SL			2,5
		610292	Laboratory Measurement Technology	L/S	2			SL			2,5
	H11	**610310**	**Software Engineering**			LK	120				
		610311	Software Engineering	V/Ü	4	Module examination					5
	H17	**610370**	**Specialisation 1**								
			Elective subject/subjects according to section 3.2		4	Lx					5
Totals 4th semester					**24**	**4**		**3**			**30**

5	H15	**610350**	**Practical semester**								
		610351	Supervised practical phase		0			SA			26
		610352	Colloquia accompanying the practical semester	S	1			SR			4
Totals 5th semester					**1**	**0**		**2**			**30**

6	H12	**610320**	**Introduction to AI**			LKBK	90				
		610321	Introduction to AI	V/Ü	4	Module examination					5
	H13	**610330**	**Systems Engineering - Management and Accounting**			LP					
		610331	Systems Engineering and Management	V/Ü	2	Module examination					2,5
		610332	Accounting	V/Ü	2	Module examination					2,5
	H14	**610340**	**Studium Generale** [2]								
		610341	General Studies		2						2,5
	H16	**610360**	**Seminar paper and project management**								
		610361	Seminar paper	L/S	1	LE					7,5
		610362	Project Management	V/Ü	2	LA					2,5
	H18	**610380**	**Specialisation 2**								
			Elective subject according to section 3.2		2	Lx					2,5
	H19	**610390**	**Specialisation 3**								
			Elective subject/subjects according to section 3.2		4	Lx					5
Totals 6th semester					**19**	**6**		**0**			**30**

7	H20	**610400**	**Specialisation 4**								
			Elective subject/subjects according to section 3.2		4	Lx					5
	H21	**610410**	**Specialisation 5**								
			Elective subject/subjects according to section 3.2		4	Lx					5
	H22	**610420**	**Specialisation 6**								
			Elective subject/subjects according to section 3.2		4	Lx					5
	H23	**610430**	**Bachelor Thesis / Project**								
		610431	Bachelor Thesis / Project		0	PB					12
		610432	Project planning and colloquium	S	0	PA					3
Totals 7th semester					**12**	**5**		**0**			**30**

[1] Students on the English foundation course take examination 609230 *Metrology and Sensors* from the WF catalogue in the 3rd semester instead of 610261 *Metrology and Sensors*.

[2] In 610340 *General Studies, students* must choose a subject from the General Studies programme from the area of "Ethics, Environment and Sustainability". The type of course and examination correspond to the Studium Generale programme.

3.2 Electives

Students choose technical electives totalling 27.5 ECTS from the WF catalogue in the fourth, sixth and seventh semesters to fulfil the **"Specialisation 1-6" examination requirements**.

The courses from this catalogue should enable students to deepen their studies with up to two specialisations. Students must choose at least one and a maximum of two specialisations by successfully completing the elective courses of at least 20 ECTS assigned to the respective specialisation. The assignment of each elective subject to one or more specialisations is indicated in the WF catalogue and in the module handbook. If a subject is assigned to several specialisations and is to be used for two specialisations, it is sufficient to complete the subject once. Selected specialisations can be indicated on the certificate.

The WF catalogue is part of the module handbook and is available on the homepage of the degree programme and on the university's official digital learning platform by the end of lectures in the previous semester at the latest. Subjects from another degree programme outside the faculty of Heilbronn University or another university can be recognised on application. Participation in compulsory elective subjects may be limited for capacity reasons.

Changes to the WF catalogue are approved by the Examination Board at the request of 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 crediting of subjects is not permitted.

3.3 Module examinations of the main study period

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

Table 4: Module examinations of the Bachelor's examination, weights of the grades of the individual examinations and module grades

Module grades in the main study programme: Automotive Systems Engineering (ASE)					
Module	**No.**	**Module name**			**Weight of the module grade for the grade according to § 29**
		Examination	**No.**	**Prerequisites**	
Mathematical and scientific basics					
H1	**610210**	**Mathematics 3**			**5**
	610211	Mathematics 3			
H2	**610220**	**Modelling and thermodynamics**			**5**
	610221	Modelling			
	610222	Thermodynamics and fluid dynamics			
Systems engineering and dynamics					
H3	**610230**	**Simulation technology**			**5**
	610231	Simulation technology			
H4	**610240**	**Signals and Systems**			**5**
	610241	Signalling and systems			
H5	**610250**	**Dynamics of systems**			**5**
	610251	Dynamics of systems			
Measurement and control engineering					

H6	**610260**	**Measurement and sensor technology**			**5**
	610261	Measurement and sensor technology			
H7	**610270**	**Control engineering**			**10**
	610271	Control engineering			
H8	**610280**	**Control engineering laboratory**			**0**
			610281	Control engineering laboratory	
H9	**610290**	**Modelling and simulation laboratory & measurement technology laboratory**			**0**
			610291	Modelling and simulation laboratory	
			610292	Measurement technology lab	
Information technology					
H10	**610300**	**Microcontrollers & Networks**			**5**
	610301	Microcontrollers & Networks			
H11	**610310**	**Software Engineering**			**5**
	610311	Software engineering			
H12	**610320**	**Introduction to AI**			**5**
	610321	Introduction to AI			
System design and technical management					
H13	**610330**	**Systems Engineering - Management and Accounting**			**5**
	610331	Systems Engineering and Management			
	610332	Accounting			
H14	**610340**	**General Studies**			**0**
			610341	General studies	
Practical semester					
H15	**610350**	**Practical semester**			**0**
	610351	Supervised practical phase			
	610352	Colloquia accompanying the practical semester			
Student research project					
H16	**610360**	**Seminar paper and project management**			**10**
	610361	Seminar paper			
	610362	Project Management			
Elective and specialisation subjects					
H17	**610370**	**Specialised specialisation 1**			**5**
		Elective subject/subjects in accordance with section 3.2			
H18	**610380**	**Specialised specialisation 2**			**2,5**
		Elective subject according to section 3.2			
H19	**610390**	**Specialist specialisation 3**			**5**
		Elective subject/subjects according to section 3.2			

H20	**610400**	**Specialised specialisation 4**		**5**
		Elective subject/subjects in accordance with section 3.2		
H21	**610410**	**Specialised specialisation 5**		**5**
		Elective subject/subjects in accordance with section 3.2		
H22	**610420**	**Specialised specialisation 6**		**5**
		Elective subject/subjects in accordance with section 3.2		
Bachelor Thesis				
H23	**610430**	**Bachelor Thesis / Project**		**15**
	610431	Bachelor Thesis / Project		
	610432	Project planning and colloquium		
Total				**112,5**

3.4 Bachelor's examination

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

3.5 Admission requirements

The following admission requirements apply:

A prerequisite for admission to the German-language main degree programme in a degree programme with an English foundation course is that module *610620 German language and Academic Skills 2* has been passed at a minimum language level of B2 or equivalent. Proof is provided by submitting one of the following certificates: DSH-1, Goethe B2, telc B2 (or comparable tests in accordance with the framework regulations for German language examinations for study at German universities. In particular, passing the corresponding CEFR course level of a DaF course at the Centre for Studies and Teaching at Heilbronn University is also accepted as equivalent proof.

To participate in *610280 Control Engineering Laboratory*, students must have passed *610240 Signals and Systems* must be passed

To participate in *610291 Modelling and Simulation Laboratory*, students must have passed *610230 Simulation Technology*
must be passed.

Before the Bachelor's thesis is issued, the practical semester must be completed and the compulsory subject examinations of the 3rd and 4th semesters must be passed.

3.6 Practical study semester

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

In the practical semester, students should apply their previously acquired knowledge in a supervised practical phase. In doing so, engineering and information technology activities should be carried out independently and with shared responsibility.

The practical semester must be completed in a company in the automotive industry. Justified exceptions can only be authorised by the Head of the Internship Office before the practical semester is completed.

A practical semester abroad is expressly desired.

3.7 Special regulations for Studium PLUS models during the contract period between the co-operation company and the student

As part of their degree programme, Studium Plus students are obliged to complete additional practical work at their cooperation company during the lecture-free and examination-free periods that are not used for the statutory holiday entitlement. During these periods, the specialised knowledge acquired so far is applied and deepened in practice, and the students become intensively familiar with the working conditions and methods of engineers.

Their engineering-related activities include working as independently and autonomously as possible and 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 depends on the operational possibilities and the content of the degree programme.

The level of the activities must be adapted to the individual progress of the degree programme so that the course content is familiarised with, applied and consolidated through in-depth practical knowledge.

4 Entry into force

These study and examination regulations (SPO 4) come into force on 1 September 2025. Students who have already started their studies at the time these study and examination regulations come into force will take the missing examinations and preliminary examinations in accordance with the previous study and examination regulations (SPO 3).

Heilbronn, 30 April 2025

Signed:

Prof. Dr.-Ing. Oliver Lenzen
Rector

Announcement

The examination regulations are hereby made public in accordance with Heilbronn University's announcement statutes dated 28 June 2017.

Heilbronn, 30 April 2025

For the Prorectorate for Learning and Teaching

Signed:
Prof. Dr. Ulrich Brecht