

§ 68 **Smart Mobility Systems (SMS)**

(1) Pre-Degree Internship

No pre-degree internship is required.

(2) Intended Learning Outcomes

Graduates of the bachelor's degree program Smart Mobility Systems (SMS) are highly qualified to work successfully in the professional fields of electrical engineering and computer science. In particular, the degree program qualifies them to solve interdisciplinary problems at the interface of the two disciplines. The focus of the degree program is on information technology in smart mobility applications. Comparable tasks can also be found in other application areas, for example in communications engineering or automation engineering.

Core competencies are acquired in the areas of autonomous vehicles and connected vehicles. In addition, graduates also learn the appropriate use of AI-based methods.

(3) Curriculum Outline

The bachelor's degree program comprises seven semesters (two semesters of foundational studies and five semesters of main studies) as a full-time program. The integrated internship semester usually takes place in the fourth semester, see para. 7. The modules of semesters 5 to 7 may be completed in any order.

(4) Required Coursework

The workload including the bachelor's thesis amounts to 210 ECTS points. The regular period of study for the full-time program is seven semesters.

The modules and courses in the compulsory and elective areas, as well as exams, can be found in the Study Program and Exam Plan (para. 21).

(5) Areas of Specialization

Not applicable.

(6) Assessment Semester

There are no regulations that go beyond the rules laid out in § 2 para. 3 in the General Part of the Study and Examination Regulations for the Bachelor's Degree Programs (SPOBa).

(7) Integrated Internship Semester (PSS)

In accordance with the regulations in § 8 of the General Part of the SPOBa, training in the integrated internship semester takes place in a suitable institution of professional practice. Students are to work on projects relating to tasks from the professional field of the degree program. In addition, block courses will be held in Module 19 on a separate schedule to prepare and follow up on the integrated internship semester. The PSS is planned for the fourth semester. Upon application, the PSS may be postponed to the fifth or sixth semester.

Admission to the PSS is possible once admission to main studies has been granted.

(8) Other Written and Practical Exams or Assignments

Exams of type SP (other written or practical exams or assignments in accordance with § 15 para. 1 no. 4 SPOBa in conjunction with § 39) may be conducted as follows:

- B = other written report
- L = lab work, lab report, practical work
- P = presentation
- T = test(s).

In accordance with § 18 para. 3 SPOBa, the examiner determines the exam modalities, in particular the exam dates, at the beginning of the semester.

(9) Teaching and Exam Languages

Compulsory modules and the corresponding exams are generally offered in German and English in accordance with § 5 SPOBa "(DE/EN)". Students may choose the exam language for these modules. Modules and courses marked "EN" are generally offered only in English. Modules and courses marked "DE" are generally offered only in German. The bachelor's thesis may be written in German or English.

(10) Admission Requirements for the Module and Submodule Exams

In addition to the regulations laid down in the General Part of the SPOBa, the following supplement applies: Admission to the module and submodule exams and to the pass/fail coursework of the main studies may also be granted upon application in justified exceptional cases if, in total, no more than four module and/or submodule exams or pass/fail coursework from the foundational studies have not yet been completed. The written application with specified reasons must be submitted to the responsible Examination Board within 14 days of the announcement of the exam results. The decision of the Examination Board is forwarded to the Office of Student Affairs for official notification.

(11) Scheduled Module and Submodule Exams

There are no regulations that supersede the regulations laid down in the General Part of the SPOBa, in particular §§ 3, 18, 21, and 22.

(12) Oral Supplementary Exam

If a second repeat exam is graded fail (5.0), an oral supplementary exam (M30) shall take place in close connection with this second repeat exam in accordance with § 21 para. 4 sentence 4 of the General Part of the SPOBa. The regulations of § 17 SPOBa for oral examinations apply accordingly. The date of the oral supplementary exam will be announced in an appropriate manner. This applies only to graded module and/or submodule exams of the main studies.

(13) Weighting of Module and Submodule Exams

There are no regulations that go beyond the provisions of § 19, § 26 para. 2 sentence 6, and § 33 para. 2 sentence 4 of the General Part of the SPOBa.

(14) Elective Modules

In the module group "Elective Course / Elective," students may freely choose courses from a catalog of elective courses. The Elective Course allows students to supplement their competence profile through their own free choice. A total of courses amounting to 20 ECTS points must be completed.

The catalog of elective courses is announced at the beginning of each semester. The Program Development Committee decides on the composition of the catalog.

Courses from other degree programs at the university may be approved as elective courses upon written application to the dean of degree program.

Graded submodule exams are included in the module grade of the elective course in accordance with para. 13. Registration for the submodule exams of the elective course is carried out in accordance with § 14 para. 1 at the Central Examination Office.

In the module "WPF HTWG / Elective HTWG," students take freely chosen courses from the offerings of all degree programs at HTWG amounting to five ECTS points. Excluded are courses whose content essentially corresponds to other courses of the degree program. The dean of degree program decides on recognition. For each course selected within the elective courses, at least one graded submodule exam must be completed.

(15) Study Trips

Study trips may be offered as part of the degree program.

(16) Bachelor's Thesis

In addition to the regulations in the General Part of the SPOBa, the following applies:

The topic of the bachelor's thesis may only be issued once the integrated internship semester has been completed and a total of 90 ECTS points from the modules of the main studies have been successfully completed. The Examination Board decides on exceptions, in particular in connection with periods spent abroad.

The bachelor's thesis comprises practical and/or theoretical work in conjunction with a written thesis and a final presentation.

(17) Oral Bachelor's Exam

Not applicable.

(18) Bachelor Degree

The Bachelor of Engineering degree (abbreviated B.Eng.) will be awarded. A bachelor's degree in engineering, applied technologies, or natural sciences entitles the holder to use the professional title of "engineer" alone or in combination with other words according to the Engineers Act of the state of Baden-Württemberg.

(19) Other

Provisions

Engineering Project

The module Engineering Project offers the opportunity to work on a project over two semesters that is suitable for deepening the competencies of the degree program. The Engineering Project is generally carried out in teams. Each team member is assigned a distinct task and must submit documentation for it.

Alternatively, it is possible to choose additional subjects from the catalog of elective modules amounting to 10 ECTS points.

Social Skills

For the Social Skills submodule, coursework totaling three ECTS points must be completed. Options for completing the coursework will be announced at the beginning of the semester. Examples may include: work as a tutor, supervision of groups of school pupils, buddy program for international students, organization of specialist lectures. The dean of degree program decides on recognition.

Cross-Curricular Learning

In Module 29, five ECTS points must be selected from the offerings of the Center of Cross-Curricular Learning, and the corresponding proofs of performance and module and/or submodule exams must be completed.

(20) Transitional Regulation

Students who began their studies under the regulations of SPO version no. 1 (valid from winter semester 2022/23) and who have still not been admitted to main studies in winter semester 2027/2028 shall take the bachelor's intermediate examination under SPO version no. 1 and the bachelor's examination under SPO version no. 2 (valid from winter semester 2026/27).

(21) Study Program and Exam Plan

	Modul-no.	Module/ Course	Type of module	Semester	Contact hours/ ECTS credits		Pass/fail coursework	Module or submodule exam	
					Contact hours	ECTS Credits		pass/ fail	graded
Foundational studies semester 1-2	1	Mathematik I / Mathematics I (DE/EN)	PM	1	4	5		SP	
		Mathematik I / Mathematics I			4	5			
	2	Betriebswirtschaftslehre / Business Administration (DE/EN)	PM	1	4	5			K90
		Betriebswirtschaftslehre Business Administration			4	5			
	3	Elektrotechnik / Electrical Engineering (DE/EN)	PM	1	4	5			K90
		Elektrotechnik / Electrical Engineering			4	5	SP		
	4	Programmieren / Programming (DE/EN)	PM	1	4	5		SP	
		Programmieren / Programming			4	5			
	5	Hands on Experience	PM	1	4	5			
		Grundlagen der Elektro- und Informationstechnik / Basic Electrical Engineering (DE/EN)			2	3		SP	
		Hands on Labor (DE/EN)			2	2		SP	
	6	Engineering und nachhaltige Mobilität / Engineering and Sustainable Mobility	PM	1	4	5			
	Nachhaltige und intelligente Mobilität / Sustainable and intelligent mobility systems (DE/EN)			2	3		SP		
	Engineering Fundamentals (DE/EN)			2	2		SP		
7	Mathematik II / Mathematics II (DE/EN)	PM	2	4	5			K90	
	Mathematik II / Mathematics II			4	5				
8	Physik - Konzepte und Methoden / Physics - Concepts and Methods (DE/EN)	PM	2	4	5			K90	
	Physik - Konzepte und Methoden / Physics - Concepts and Methods			4	5				
9	Elektrotechnik und Elektronik / Electrical Engineering and Electronics (DE/EN)	PM	2	4	5		SP		
	Elektrotechnik und Elektronik / Electrical Engineering and Electronics			4	5				
10	Software Engineering and Object Oriented Programming (EN)	PM	2	4	5			K90	
	Software Engineering and Object Oriented Programming			4	5	SP			
11	Sensor Technology (EN)	PM	2	4	5			K90	
	Sensor Technology			4	5	SP			
12	Interdisziplinäres Labor Elektrotechnik – Physik / Interdisciplinary Lab Electrical Engineering - Physics (DE/EN)	PM	2	4	5		SP/R		
	Interdisciplinary Lab			4	5				
Sum		Foundational Studies			48	60			

	Module no.	Module/ Course	Type of module	Semester	Contact hours/ ECTS credits		Pass/ fail coursework	Module or submodule exam	
					Contact hours	ECTS credits		pass/ fail	graded
	13	Mathematik III / Mathematics III	PM	3	4	5			K90
		Statistik und Wahrscheinlichkeitsrechnung / Statistics and Probability Calculus (DE/EN)			2	3			
		Mehrdimensionale Analysis / Multivariable Calculus (DE/EN)			2	2			
	14	Digitaltechnik / Digital Systems (DE/EN)	PM	3	4	5			K90
		Digitaltechnik / Digital Systems			4	5			
	15	Signale und Systeme / Signals and Systems (DE/EN)	PM	3	4	5			K90
		Signale und Systeme / Signals and Systems			4	5	SP		
	16	Algorithmen und Datenstrukturen / Algorithm and Data Structures (DE/EN)	PM	3	4	5			K90
		Algorithmen und Datenstrukturen / Algorithm and Data Structures			4	5			
	17	Mikroprozessorsysteme / Microprocessor Systems (DE/EN)	PM	3	4	5		SP	
		Mikroprozessorsysteme / Microprocessor Systems			4	5			
	18	Introduction to Machine Learning (EN)	PM	3	4	5			K90, SP ²⁾
		Introduction to Machine Learning			4	5			
	19	Integriertes praktisches Studiensemester / Internship	PM	4	1	30			
		Praxistätigkeit / Industrial Internship			0	28		SP	
		Seminar (DE)			1	2		R	
	20	Regelungstechnik / Control Systems (DE/EN)	PM	5	4	5			K90
		Regelungstechnik / Control Systems			4	5	SP		
	21	Kommunikationssysteme / Communication Systems (DE/EN)	PM	5	4	5			K90
		Kommunikationssysteme / Communication Systems			4	5	SP		
	22	3D Computer Vision (EN)	PM	5	4	5			M30
		3D Computer Vision			4	5			
	23	Wahlpflichtbereich / Elective	PM	5-6	x	20			
		Courses from elective courses catalog					(X)		X
	24	Lab Project (DE)	PM	5		5		SP	
		Lab Project				5			
	25	Autonomous Mobility (EN)	PM	6	4	5			K90
		Autonomous Mobility			4	5	SP		
	26	Networked Vehicles	PM	6	4	5			K90
		Vehicle to X Communication (EN)			2	3	SP		
		Embedded Security (DE)			2	2	SP		
	27	Electric Drives (EN)	PM	6	4	5			K90
		Electric Drives			4	5	SP		
	28	Engineering Project (DE/EN)	WPM	6/7		10			SP
		Engineering Project				10			
	29	Social Skills and Cross-Curricular Learning	WPM	3-7		8			
		Social Skills				3		X	
		Cross-Curricular Learning				5		(X)	(X)
	30	WPF HTWG / Elective HTWG	WPM	5-7	X	5			
		Courses from the HTWG module offerings					(X)		X
		Bachelor's thesis		7		12			
Sum		Main study period			> 49	150			
Sum		Total course of study			> 97	210			

¹ The minimum number of ECTS credits and contact hours is indicated.

² In the case of the combination K90, SP, the weighting is determined by the lecturer at the beginning of the semester. **Abbreviations:** SWS = credit hours per semester; ECTS = European Credit Transfer System; PM = Compulsory module; WPM = Elective module; EN = English-language course; DE = German-language course
Types of exams: Kx = Written exam (x = duration in minutes); Mx = Oral exam (x = duration in minutes); R = class presentation; SP = other written or practical exam / assignment; X = type of examination depends on the selected course
(X) optional, depending on the selected course