§ 45
Bachelor's Degree Program
Engineering and Management in Electrical Engineering and Information Technology (EIW)

(1) Pre-Degree Internship

No pre-degree internship is required.

(2) Intended Learning Outcomes

Graduates of the bachelor's degree program *Engineering and Management in Electrical Engineering and Information Technology* (EIW) are highly qualified to work successfully in the professional field of industrial engineering at the interface of electrical engineering and information technology and management. Due to the broad and practice-oriented specialist knowledge acquired during their studies in these areas, they are ideally suited to analyze, model, and solve interdisciplinary problems at the interface of these two disciplines. At the center is the ability to understand electrical engineering and information technology systems and to responsibly take economic, social, and ecological requirements into account in an increasingly internationalized and digitalized environment in the interest of sustainable development.

(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 areas of specialization begin in the fifth semester, see para. 5. 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

At the beginning of the fifth semester, students choose one of the following areas of specialization. Depending on the selected area of specialization, the corresponding module exams and proofs of performance must be completed.

- Electrical and Electronic Systems (EES)
- Information Technologies and AI (ITAI)
- Sustainable Energy Systems and Management (SESM)
- Sustainable Global Value Networks (SGVN)

For each area of specialization, three of the four modules listed in the Study Program and Exam Plan must be completed. A change of choice is only possible until the beginning of the exam. A module for which the exam has been started must also be completed successfully.

(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 formal 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

Modules 26, 27, 28, and 29 are elective modules (total scope: 20 ECTS points). They are divided into the areas Engineering, Economics, and Integration. Subjects from the Integration area form the interface between engineering and business-related topics.
The following requirements must be met:

- Elective module: Engineering / Elective Engineering five ECTS points
- Elective module: Economics / Elective Economics five ECTS points
- Elective module: Integration / Elective Integration five ECTS points
- Elective module: Engineering / Economics / Integration five ECTS points.

When choosing the area of specialization “Electrical and Electronic Systems (EES)” or the area of specialization “Information Technologies and AI (ITAI),” only courses from the Economics area may be chosen in the elective module “Engineering / Economics / Integration.”

The courses of the elective modules are to be selected from a catalog announced at the beginning of each semester. The Program Development Committee decides on the composition of the catalog. The courses in the catalog are assigned to the respective areas.
Courses from other degree programs at the university may be approved as elective courses in the individual areas upon written application to the dean of degree program.
Graded submodule exams are included in the module grade of the elective module in accordance with para. 13.
Registration for the submodule exams of the elective modules is carried out in accordance with § 14 para. 1 SPOBa 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 subjects, 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

Industrial Engineering Project

The module “Industrial 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 Industrial 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 25, 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. 5 (valid from winter semester 2020/21) 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. 5 and the bachelor's examination under SPO version no. 6 (valid from winter semester 2026/27).

(21) Study Program and Exam Plan

	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
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 Nachhaltigkeit / Engineering and Sustainability	PM	1	4	5			
		Nachhaltige elektrische Energiesysteme / Sustainable Electrial Energy 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	Markets	PM	2	4	5			
		Marketing (DE/EN)			2	3		S/PR/R/ M10	
		Economics (EN)			2	2			K60
	12	Rechnungswesen / Accounting	PM	2	4	5			K90
		Internes Rechnungswesen / Managerial Accounting (DE/EN)			2	3			
		Externes Rechnungswesen / Financial Accounting (DE/EN)			2	2			
Sum		**Foundational Studies**			48	60			

	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
Main study period semester 3-7	13	Statistik und Operations Research / Statistics and Operations Research	PM	3	4	5			K90
		Statistik und Wahrscheinlichkeitsrechnung / Statistics and Probability Calculus (DE/EN)			2	3			
		Operations Research (DE/EN)			2	2			
	14	Seminar Wirtschaftsingenieurwesen und Recht / Seminar in Engineering and Management and Law	PM	3	4	5			
		Seminar Wirtschaftsingenieurwesen / Seminar in Engineering and Management (DE/EN)			2	3		R/R+S	
		Wirtschaftsrecht / Business Law (DE/EN)			2	2			K60
	15	Signale und Systeme / Signals and Systems (DE/EN)	PM	3	4	5			K90
		Signale und Systeme / Signals and Systems			4	5	SP		
	16	Project Management (EN)	PM	3	4	5			K90/R
		Project Management			4	5	SP		
	17	General Management	PM	3	4	5			
		Personalmanagement / Human Resource Management (DE/EN)			2	2			K60
		Investition & Finanzierung / Investment & Financing (DE/EN)			2	3			K60
	18	Planung & Organisation / Planning & Organization (DE/EN)	PM	3	4	5			K90
		Planung & Organisation / Planning & Organization			4	5			
	19	Integriertes praktisches Studiensemester / Internship	PM	4	1	30			
		Praxistätigkeit / Industrial Work			0	28		SP	
		Seminar (DE)			1	2		R	
	20	Lab Project (DE)	PM	5	0	5		SP	
		Lab Project				5			
	21	Nachhaltigkeit und Energiesysteme / Sustainability and Energy Systems (DE/EN)	PM	5	4	5			K90
		Nachhaltigkeit und Energiesysteme / Sustainability and Energy Systems			4	5			
	22	Wahlpflichtmodul Engineering Methods und Systemtechnik / Elective Engineering Methods and Systems	WPM	5	4	5			
		Introduction to Machine Learning (EN)			4	5			K90,SP[3)]
		Mikroprozessorsysteme / Microprocessor Systems (DE/EN)			4	5			K90/SP
		Technical Mechanics (EN)			4	5			K90
		Regelungstechnik / Control Systems (DE/EN)			4	5	SP		K90
	23	Quality Management and Digital Transformation	PM	6	4	5			K90
		Quality Management (EN)			2	3			
		Digital Transformation (EN)			2	2			
	24	Industrial Engineering Project (DE/EN)	WPM	6/7	0	10			SP
		Industrial Engineering Project				10			
	25	Social Skills and Cross-Curricular Learning	WPM	3-7	0	8			
		Social Skills				3		X	
		Cross-Curricular Learning				5		(X)	(X)
	26	Wahlpflichtmodul Technik / Elective Engineering	WPM	5-7	4	5			
		Courses from elective courses catalog					(X)		X
	27	Wahlpflichtmodul Wirtschaft / Elective Economics	WPM	5-7	4	5			
		Courses from elective courses catalog					(X)		X
	28	Wahlpflichtmodul Integration / Elective Integration	WPM	5-7	4	5			
		Courses from elective courses catalog					(X)		X
	29	WPF Technik / Wirtschaft / Integration / Elective Engineering / Economics / Integration	WPM	5-7	4	5			
		Courses from elective courses catalog					(X)		X
	30	WPF HTWG / Elective HTWG	WPM	5-7	4	5			
		Courses from the HTWG module offerings					(X)		X

	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
Main study period semester 3-7	**Area of specialization** 1 "Electrical and Electronic Systems"[2]			5-7	12	15			
	EES1	Automatisierungstechnik (DE)	WPM		4	5	SP		K90
	EES2	Elektrodynamik (DE)	WPM		4	5	SP		K90
	EES3	Digitale Signalübertragung / Digital Signal Transmission (DE/EN)	WPM		4	5	SP		K90
	EES4	Digital Control Systems (EN)	WPM		4	5	SP		K90
	Area of specialization 2 "Information Technologies and AI"[2]			5-7	12	15			
	ITAI1	System Architecture (EN)	WPM		4	5	SP		K90
	ITAI2	Digitale Signalübertragung Digital Signal Transmission (DE/EN)	WPM		4	5	SP		K90
	ITAI3	Advanced Methods of Machine Learning and Deep Learning (EN)	WPM		4	5	SP		K90
	ITAI4	Digital Control Systems (EN)	WPM		4	5	SP		K90
	Area of specialization 3 "Sustainable Energy Systems and Management"[2]			5-7	12	15			
	SESM1	Leistungselektronik / Power Electronics (DE/EN)	WPM		4	5	SP		K90
	SESM2	Electric Drives (EN)	WPM		4	5	SP		K90
	SESM3	Regenerative Energiewirtschaft (DE)	WPM		4	5	SP		K90/R
	SESM4	Sustainability Economics & Circular Economy (DE)	WPM		4	5	SP		K90/SP/R
	Area of specialization 4 „Sustainable Global Value Networks“[2]			5-7	12	15			
	SGVN1	International Procurement Management (EN)	WPM		4	5	SP		K90/R
	SGVN2	Smart Productions Systems (EN)	WPM		4	5			K90
	SGVN3	Marketing of Capital Goods (EN)	WPM		4	5			K90
	SGVN4	Circular Economy in Engineering and Management (EN)	WPM		4	5	SP		K90/R
		Bachelor`s **Thesis**		7		12			
Sum		**Main study period**			>69	150			
Sum		**Total course of study**			>117	210			

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

[2] See para. (5): When choosing an area of specialization, three of the four modules must be selected at the beginning of the fifth semester.

[3] 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