

§ 38 Bachelor Study Program Physical Engineering

(1) Structure of the Study Program

The study program has a modular structure. Content and structure are described in Table 1 and Table 2. The study program comprises two study stages.

The first stage is the basic study period and includes the midterm examinations pursuant to § 7(2). The courses of the first three semesters are taught in English for students beginning the program in the summer semester and in German for students beginning the program in the winter semester. The second study stage is the main study period. Apart from compulsory and elective subjects, it includes the compulsory practical semester as well as the Bachelor's examination. All courses of the main study period are offered in German.

The standard period of study is 7 semesters. 210 ECTS credits are required for a successful graduation. The study program concludes with the Bachelor's examination. It is also possible to acquire a double degree at a partner university provided a cooperation agreement with this university exists.

(2) Courses and Accredited Examinations

The courses of the two study stages as well as the related examinations to be passed for successful graduation are shown in Tables 1 to 3 below. The following abbreviations are generally used:

Type of course	Type of exam	Scope of exam
V Lecture	B Bachelor's Thesis	SWS Semester hours
PRO Project work in combination with a written report and/or presentation	PB Report on practical semester	ECTS Number of credit points required (§3)
S Seminar	PF Portfolio	
P Practical, exercises	K(xx) Written examination duration of xx minutes	
VP Lecture with integrated exercises	D Documentation	
	MBK (xx) Written examination accompanying the module, total duration in xx minutes	
	PA Practical work in combination with tests	

The lecturer can, at his/her own discretion determine voluntary examinations, which students can take during the course as partial module examination, in addition to the accredited examinations as stated in Tables 1 to 4. Students must be informed of the decision as well as the type, extent and weighting of the partial module examinations at the beginning of the course, and the faculty shall announce it by display on the notice board. The results of the partial module examinations shall be considered for the module examination in proportion to their weighting.

If a double degree is acquired at a partner university, the required courses will be recognized by the head of the study program in the framework of the recognition process as set forth in the Lisbon Convention.

Compulsory attendance of a course is determined on a case-by-case basis and for the respective semester by the Faculty Council. Attendance can only be made compulsory if this is an indispensable prerequisite for the acquisition of the competence. Irrespective of the foregoing regulations, attendance is compulsory at the opening classes of seminars, when the topics are assigned. Failure to appear at the opening class for the assignment of topics will lead to the student being excluded from participation in the seminar. Also, attendance of laboratory courses is generally compulsory.

(3) Elective Modules

A number of compulsory elective modules as well as individual elective modules is available for the students to determine their profile.

a) Compulsory elective modules

The range of compulsory elective modules (specialization) offered consists of modules from the fields of "Imaging Technology" and "Mechatronics" (see Table 3). Students choose one of the two study focuses by the end of the third semester.

In addition to the three modules of the specialization chosen, students must enroll in one module of the other specialization. Whether a compulsory elective module takes place may be subject to a minimum number of participants.

b) Individual elective modules

To determine their individual profile, students must take accredited examinations or perform course work in subjects from the further course offer at Hochschule Ravensburg-Weingarten or another university to the extent of 10 ECTS credits. 5 of these ECTS credits must be earned in the field of natural sciences/engineering and a further 5 credits in a non-technical field.

Prior approval by the Examination Committee will be required if students wish to choose elective modules from the offer of a university other than Hochschule Ravensburg-Weingarten.

Only elective modules, whose content is not identical or where there is only a slight overlap with compulsory subjects may be chosen.

In addition, upon the student's request, the Examination Committee of the study program can, in individual cases, recognize other achievements (e.g. tutorials held, voluntary work ect.), whereby the maximum number of ECTS credits which can be recognized is five.

(4) Compulsory Practical Semester

Students having begun their studies in the summer semester must complete their practical semester in the sixth and those who have started in the winter semester in the fourth curricular semester.

A prerequisite for beginning the practical semester is that the midterm examination according to § 7(2) has been passed.

The practical semester comprises hands-on activities in a company. These activities must correspond to the occupational profile of the study program. The competencies acquired during the study shall be applied and extended by working on suitable projects in the company. The students shall become acquainted with the professional requirements, work methods and the operational environment and shall work as independently and responsibly as possible in consideration of the specific situation of the company.

During the practical semester, the students are supported by the Interns Office. For the practical semester to be recognized, students are required to provide various achievements. The Interns Office will determine what kind of work must be provided (e.g. preparation of an intermediate or a final report) and also when and in what form. The students are informed accordingly via intranet and at an information session.

At the end of the practical semester, Interns Days are organized to follow up the practical semester and to make the final presentations. Attendance at the Interns Days is compulsory. In exceptional cases and

subject to a special permission by the head of the Interns Office, a soundtrack can be added to the final presentation and played instead of participation on the Interns Days. The student must ensure approval of the final presentation by his/her company.

After completion of the internship in the company, the student must submit an activity report on his/her in-company training to the Interns Office. On the basis of the student's performance and the activity report, the head of the Interns Office will decide if the student has successfully completed the practical semester.

(5) Bachelor's Thesis

Prior to beginning the Bachelor's Thesis, all examinations and course achievements of the first four subject-related semesters as well as the practical semester must have been successfully completed. The professor assigning the Bachelor's Thesis must limit the topic, the task and the extent of the Thesis in such way that it can be completed in approx. 360 hours of work corresponding to 12 ECTS credits. The Thesis must be handed in to the Examination Office of Hochschule Ravensburg-Weingarten no later than six months from the date of issue.

**Table 1: Bachelor Study Program Physical Engineering
1st study stage**

Module	Course	Curricular semester assigned				Graded examination
			1	2	3	
		Type	ECTS/ SWS	ECTS/ SWS	ECTS/ SWS	
Analysis 1	Differential and Integral Calculus	VP	5/4			K90
Linear Algebra	Linear Algebra	VP	5/4			K90
Analysis 2	Differential Equations and Vector Analysis	VP		5/4		K90
Analysis 3	Series Expansions and Transformations	VP			5/4	K90
Physics 1	Mechanics	VP	5/4			MBK 120
Physics 2	Electrodynamics	VP		5/4		MBK 120
Physics 3	Optics and Waves	VP			5/4	MBK 120
Physics 4	Quantum Physics	VP			5/4	MBK 120 ¹
	Practical Physics	P				
Chemistry	Chemistry	VP	5/4			K90
Foreign Languages	Professional English or German ²	VP		5/4		PF
Materials Science	Materials	VP			5/4	K90
Design 1	CAD	P		5/4		D
	Technical Mechanics	VP				
Design 2	Machine Design	VP			5/4	K90
Electrical Engineering TE	Electrical Engineering	VP	5/4			MBK 120
Electronics TE 1	Electronics TE 1	VP		5/4		MBK 120
	Practical Electrical Engineering/ Electronics	P				
Electronics TE 2	Electronics TE 2	VP			5/4	K90
Computer Science	Basic Principles of Computer Science	VP	5/4			K90
	Practical Computer Science	P				
Software Development	Software Development	VP		5/4		PA
	Practical Software Development	P				
summary ECTS / SWS			30/24	30/24	30/24	

1) Examination together with "Optics and Waves"

2) German-speaking students choose Professional English, English-speaking students choose German

3) For the compulsory practical semester, see paragraph 3

**Table 2: Bachelor Study Program Physical Engineering
2nd study stage**

Module	Course	Curricular semester assigned					Graded examination
			4	5	6	7	
		Typ	ECTS/ SWS	ECTS/ SWS	ECTS/ SWS	ECTS/ SWS	
Physical Measurement Techniques	Physical Measurement Techniques	VP	5/4				K90
Control Engineering	Control Engineering	VP	5/4				K90
Digital Technologies	Digital Technologies	VP	5/4				K90
Development 1	Technical Documentation	VP	5/4				D
	Scientific Working Methods	VP					
Development 2	Patents	VP		5/4			K90
	Techn. Project Management	VP					
Business Administration	Business Administration	VP		5/4			K90
Modelling and Simulation	Modelling and Simulation	VP		5/4			K90
Microcontrollers	Microcontrollers	VP/3		5/4			PA
	Practical Electronics	P/1					
Spezicalization	2 subjects from Table 3	V	10/0	10/0			
	2 subjects from Table 3	P					
Elective Module Technology						5/4	
Elective Module Non-Tech.						5/4	
Project	Project	PRO				5/4	MPA
Practical Semester	Interns Seminar	PRO			30/1		PB
Bachelor's Thesis and Seminar for Bachelor Degree Candidates	Seminar for Bachelor Degree Candidates	S				15/2	B
	Bachelor's Thesis	B					
summary ECTS / SWS			30/24	30/24		30/1	

**Table 3: Bachelor Study Program Physical Engineering
Compulsory electives of the 4th or 6th curricular semester, respectively**

Module block	Module / Course	Type	ECTS/ SWS	Ungraded examination	Graded examination
Specialization Imaging Technology	Imaging and Spectroscopy	VP	5/4		PA
	Imaging Technology	VP	5/4		K90
	3D and Image Processing	VP	5/4		K90
	Course from the Mechatronics specialization	VP	5/4		
Specialization Mechatronics	Mechatronics	VP	5/4		K90
	Robotics	VP	5/4		K90
	Microsystems / Optoelectronics	VP	5/4		K90
	Course from the Imaging Technology specialization	VP	5/4		