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OTH Amberg-Weiden

Course Catalogue

International study programmes (IIE/IME)

Department of Industrial Engineering and Healthcare
Fakultät Wirtschaftsingenieurwesen und Gesundheit

Bachelor of Engineering (B.Eng.)

Industrial Engineering (IIE) – Bachelor Medical Engineering (IME) – Bachelor	Summer semester 2026

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Preliminary Notes

Note:

Please note in particular the regulations of the study and examination regulations of the degree programme in the currently valid version.

Structure of the study programme:

The course comprises a standard duration of 7 semesters.

Registration formalities:

In principle, all examinations must be registered via the Student Office through PRIMUSS. Additional formalities are listed in the module descriptions.

Abbreviations:

ECTS = The European Credit Transfer and Accumulation System (ECTS) is a points system for the recognition of academic achievements.
SWS = semester hours per week (Semesterwochenstunden)
SPO = Programme and Examinations Regulations (Studien- und Prüfungsordnung)
ASPO = General Study and Examination Regulations (Allgemeine Studien- und Prüfungsordnung)

Workload:

One credit point is based on a workload of approximately 30 hours.

Recognition of academic achievements:

Please pay attention to the corresponding application processes via the Student Office.

vhb:

vhb (German: virtuelle Hochschule Bayern / English: virtual university Bavaria) is an online learning platform with online courses from different universities in Bavaria. Further information can be found here: https://www.vhb.org/en/

Curriculum

Course of Study

Industrial Engineering (Start **Winter** Semester)

	Start of study: winter term	1. Semester		2. Semester		3. Semester		4. Semester		5. Semester		6. Semester		7. Semester		Total		
		Winter		Summer		Winter		Summer		Winter		Summer		winter				
		contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	**contact time (SWS)**	**ECTS**	**%**
No.	Modulegroups/Modules	**Studies Section 1**				**Studies Section 2**				**Studies Section 3**								
	Science/Technology	8	10	8	10	8	10	12	15	0	0	8	10	8	10	**52**	**65**	**31%**
T1	Mathematics I	4	5															
T2	Technical Mechanics	4	5															
T3	Mathematics II			4	5													
T4	Mechanical Development			4	5													
T5	Production Technology					4	5											
T6	Physics					4	5											
T7	Industrial Engineering							4	5									
T8	Electrical Engineering							4	5									
T9	Materials Engineering							4	5									
	Science/Technology Elective 1											4	5					
	Science/Technology Elective 2											4	5					
	Science/Technology Elective 3													4	5			
	Science/Technology Elective 4													4	5			
	Economics	8	10	4	5	4	5	4	5	0	0	8	10	4	5	**32**	**40**	**19%**
E1	Fundamentals of Business Administration	4	5															
E2	Principles of Accounting and Finance	4	5															
E3	Business Processes Management			4	5													
E5	Marketing and Sales					4	5											
E6	Labor Law							4	5									
E7	Product Management											4	5					
	Economics Elective 1											4	5					
	Economics Elective 2													4	5			
	Interdisciplinary (IIE)	8	10	12	15	12	15	8	10	0	0	8	10	4	5	**52**	**65**	**31%**
I1	German I or Basic Elective	4	5															
I2	German II or Basic Elective			4	5													
I3	German III or Basic Elective					4	5											
I4	German IV or Basic Elective							4	5									
I5	Informatics	4	5															
I6	Statistics and Quantitative Methods			4	5													
I7	Intercultural Communication			4	5													
I8	Object-oriented Coding					4	5											
I11	Project Management and Agile Methods					4	5											
I9	Logistics							4	5									
	Interdisciplinary Elective 1											4	5					
	Interdisciplinary Elective 2											4	5					
	Interdisciplinary Elective 3													4	5			
	Practical Phase										30					**0**	**30**	**14%**
PS	Internship										30							
	Bachelor's Degree														10	**0**	**10**	**5%**
BA	Bachelor Thesis														10			
	Total IIE	24	30	24	30	24	30	24	30	0	30	24	30	16	30	**136**	**210**	**100%**

Industrial Engineering (Start **Summer** Semester)

	Start of study: summer term	1. Semester		2. Semester		3. Semester		4. Semester		5. Semester		6. Semester		7. Semester		Total		
		Summer		Winter		Summer		Winter		Summer		Winter		Summer				
		contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	**contact time (SWS)**	**ECTS**	**%**
No.	Modulegroups/Modules	**Studies Section 1**				**Studies Section 2**				**Studies Section 3**								
	Science/Technology	8	10	8	10	12	15	8	10	0	0	8	10	8	10	**52**	**65**	**31%**
T1	Mathematics I			4	5													
T2	Technical Mechanics			4	5													
T3	Mathematics II					4	5											
T4	Mechanical Development	4	5															
T5	Production Technology							4	5									
T6	Physics							4	5									
T7	Industrial Engineering					4	5											
T8	Electrical Engineering					4	5											
T9	Materials Engineering	4	5															
	Science/Technology Elective 1											4	5					
	Science/Technology Elective 2											4	5					
	Science/Technology Elective 3													4	5			
	Science/Technology Elective 4													4	5			
	Economics	4	5	8	10	4	5	4	5	0	0	8	10	4	5	**32**	**40**	**19%**
E1	Fundamentals of Business Administration			4	5													
E2	Principles of Accounting and Finance			4	5													
E3	Business Processes Management	4	5															
E5	Marketing and Sales							4	5									
E6	Labor Law					4	5											
E7	Product Management													4	5			
	Economics Elective 1											4	5					
	Economics Elective 2											4	5					
	Interdisciplinary (IIE)	12	15	8	10	8	10	12	15	0	0	8	10	4	5	**52**	**65**	**31%**
I1	German I or Basic Elective	4	5															
I2	German II or Basic Elective			4	5													
I3	German III or Basic Elective					4	5											
I4	German IV or Basic Elective							4	5									
I5	Informatics			4	5													
I6	Statistics and Quantitative Methods	4	5															
I7	Intercultural Communication	4	5															
I8	Object-oriented Coding							4	5									
I11	Project Management and Agile Methods							4	5									
I9	Logistics					4	5											
	Interdisciplinary Elective 1											4	5					
	Interdisciplinary Elective 2											4	5					
	Interdisciplinary Elective 3													4	5			
	Practical Phase										30					**0**	**30**	**14%**
PS	Internship										30							
	Bachelor's Degree														10	**0**	**10**	**5%**
BA	Bachelor Thesis														10			
	Total IIE	24	30	24	30	24	30	24	30	0	30	24	30	16	30	**136**	**210**	**100%**

Medical Engineering (Start **Winter** Semester)

	Start of study: winter term	1. Semester		2. Semester		3. Semester		4. Semester		5. Semester		6. Semester		7. Semester		Total		
		Winter		Summer		Winter		Summer		Winter		Summer		winter				
		contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	**contact time (SWS)**	**ECTS**	**%**
No.	Modulegroups/Modules	**Studies Section 1**				**Studies Section 2**				**Studies Section 3**								
	Science/Technology	8	10	8	10	8	10	12	15	0	0	8	10	8	10	**52**	**65**	**31%**
T1	Mathematics I	4	5															
T2	Technical Mechanics	4	5															
T3	Mathematics II			4	5													
T4	Mechanical Development			4	5													
T5	Production Technology					4	5											
T6	Physics					4	5											
T7	Industrial Engineering							4	5									
T8	Electrical Engineering							4	5									
T9	Materials Engineering							4	5									
	Science/Technology Elective 1											4	5					
	Science/Technology Elective 2											4	5					
	Science/Technology Elective 3													4	5			
	Science/Technology Elective 4													4	5			
	Medicine	8	10	4	5	4	5	4	5	0	0	8	10	4	5	**32**	**40**	**19%**
M1	Anatomy and Physiology	4	5															
M2	Microbiology and Biophysics	4	5															
M3	Medical Device Technology			4	5													
M4	Quality Management and Regulatory Affairs					4	5											
M5	Medical Imaging							4	5									
	Medical Elective 1											4	5					
	Medical Elective 2											4	5					
	Medical Elective 3													4	5			
	Interdisciplinary (IME)	8	10	12	15	12	15	8	10	0	0	8	10	4	5	**52**	**65**	**31%**
I1	German I or Basic Elective	4	5															
I2	German II or Basic Elective			4	5													
I3	German III or Basic Elective					4	5											
I4	German IV or Basic Elective							4	5									
I5	Informatics	4	5															
I6	Statistics and Quantitative Methods			4	5													
I7	Intercultural Communication			4	5													
I8	Object-oriented Coding					4	5											
I11	Project Management and Agile Methods					4	5											
I10	Databases							4	5									
	Interdisciplinary Elective 1											4	5					
	Interdisciplinary Elective 2											4	5					
	Interdisciplinary Elective 3													4	5			
	Practical Phase										30					**0**	**30**	**14%**
PS	Internship										30							
	Bachelor's Degree														10	**0**	**10**	**5%**
BA	Bachelor Thesis														10			
	Total IME	24	30	24	30	24	30	24	30	0	30	24	30	16	30	**136**	**210**	**100%**

Medical Engineering (Start **Summer** Semester)

	Start of study: summer term	**1. Semester**		**2. Semester**		**3. Semester**		**4. Semester**		**5. Semester**		**6. Semester**		**7. Semester**		**Total**		
		Summer		Winter		Summer		Winter		Summer		Winter		Summer				
		contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	contact time (SWS)	ECTS	**contact time (SWS)**	**ECTS**	**%**
No.	Modulegroups/Modules	**Studies Section 1**				**Studies Section 2**				**Studies Section 3**								
	Science/Technology	8	10	8	10	12	15	8	10	0	0	8	10	8	10	**52**	**65**	**31%**
T1	Mathematics I			4	5													
T2	Technical Mechanics			4	5													
T3	Mathematics II					4	5											
T4	Mechanical Development	4	5															
T5	Production Technology							4	5									
T6	Physics							4	5									
T7	Industrial Engineering					4	5											
T8	Electrical Engineering					4	5											
T9	Materials Engineering	4	5															
	Science/Technology Elective 1											4	5					
	Science/Technology Elective 2											4	5					
	Science/Technology Elective 3													4	5			
	Science/Technology Elective 4													4	5			
	Medicine	4	5	8	10	4	5	4	5	0	0	8	10	4	5	**32**	**40**	**19%**
M1	Anatomy and Physiology			4	5													
M2	Microbiology and Biophysics			4	5													
M3	Medical Device Technology	4	5															
M4	Quality Management and Regulatory Affairs							4	5									
M5	Medical Imaging					4	5											
	Medical Elective 1											4	5					
	Medical Elective 2											4	5					
	Medical Elective 3													4	5			
	Interdisciplinary (IME)	12	15	8	10	8	10	12	15	0	0	8	10	4	5	**52**	**65**	**31%**
I1	German I or Basic Elective	4	5															
I2	German II or Basic Elective			4	5													
I3	German III or Basic Elective					4	5											
I4	German IV or Basic Elective							4	5									
I5	Informatics			4	5													
I6	Statistics and Quantitative Methods	4	5															
I7	Intercultural Communication	4	5															
I8	Object-oriented Coding							4	5									
I11	Project Management and Agile Methods							4	5									
I10	Databases					4	5											
	Interdisciplinary Elective 1											4	5					
	Interdisciplinary Elective 2											4	5					
	Interdisciplinary Elective 3													4	5			
	Practical Phase										30					**0**	**30**	**14%**
PS	Internship										30							
	Bachelor's Degree														10	**0**	**10**	**5%**
BA	Bachelor Thesis														10			
	Total IME	24	30	24	30	24	30	24	30	0	30	24	30	16	30	**136**	**210**	**100%**

Electives

In the third study phase (semester 5, 6 and 7), the students must complete

- 4 electives in the field Science/Technology,
- 3 electives in the field Economics / Medicine and
- 3 electives in the field Interdisciplinary.

All Students are **recommended to consult with the Director of the Study Programme to select appropriate modules**.

There are electives provided by

- OTH Amberg-Weiden (OTH)
- Language Center of OTH Amberg-Weiden (LC)
- Virtuelle Hochschule Bayern (vhb)

Students who have acquired their university entrance qualification in German / Students with knowledge of the German language of at least C1 can select "Basic Electives" instead of the German I-IV modules. More about this in the chapter "Basic Electives / Languages".

The modul decriptions of vhb can be found at https://www.vhb.org/.

The provided electives are listed in the following table (*Please note that this catalogue may change each semester. There is no claim to a repeated offer of a particular module. Additional electives may be offered and outlined in the catalogue in due time*):

#	Module groups / modules	SWS	ECTS	Offered by	Rythm	Language	Basic Elective
	Science/Technology (4 must be selected)						
T10	Sensors for Smart Systems	4	5	OTH	Winter	English	yes
T12	Robotik	4	5	OTH	Winter	English	no
T13	Data Science for Engineers (Introduction to Methods and Tools)	4	5	OTH	Winter	English	yes*
T14	SAP-Anwendungsentwicklung für Logistik 4.0	4	5	OTH	Winter	German	no
T15	IoT Technology	4	5	OTH	Winter	English	yes
T16	Communication Technology	4	5	OTH	Summer	English	no
T18	Fabrikplanung	4	5	OTH	Summer	Deutsch	no
T19	Databases	4	5	OTH	Summer	English	no
T20	Computer Aided Engineering	4	5	OTH	Winter	German	no
T21	Product Development	4	5	OTH	Summer	German	no
T22	Applied Image Processing	4	5	OTH	Summer	English	no
T23	Practical Project (Science/Technology)**	4	5	OTH	Winter/Summer	English	no
T24	Industrial Applications of Data Science	4	5	OTH	Summer	English	no
	Economics (2 must be selected for IIE)						
E10	Business Model Innovation	4	5	OTH	Winter	English	yes
E11	Technischer Einkauf	4	5	OTH	Winter	German	no
E12	Unternehmensplanung und -führung	4	5	OTH	Winter	German	no
E13	International Marketing	2	5	vhb	see vhb	English	yes
E14	International Supply Chain Management	4	5	vhb	see vhb	English	yes
E15	Performance Management in Teams	4	5	vhb	see vhb	English	yes
E16	Practical Project (Economics)**	4	5	OTH	Winter/Summer	English	no
	Medical (3 must be selected for IME)						
M10	Therapeutic Systems	4	5	OTH	Winter	English	no
M11	Medical Product Development	4	5	OTH	Winter	English	no
M12	Medical Measurement Technologies	4	5	OTH	Winter	English	no
M13	In-vitro diagnostics	4	5	OTH	Winter	English	yes
M14	Practical Project (Medical)**	4	5	OTH	Winter/Summer	English	no
	Interdisciplinary (3 must be selected)						
I10	Smart Factory	4	5	OTH	Winter	English	no
I11	Research and Evaluation Methods	4	5	OTH	Winter	English	yes
I12	Usability Engineering	4	5	OTH	Summer	German	yes
I13	Ethics in Business and Technology	4	5	OTH	Summer	English	no
I14	Practical Project (Interdisciplinary)**	4	5	OTH	Winter/Summer	English	no
I15	Entrepreneurial Project 1: Developing a Digital Solution	4	5	OTH	Winter	English	no
I16	Entrepreneurial Project 2: Business Plan for a Digital Product	4	5	OTH	Winter	English	no
I17	Basics Sustainability	4	5	vhb	see vhb	English	yes
I18	Blockchain Applications for Business	3	6	vhb	see vhb	English	yes

As an interdisciplinary elective, also further competencies in languages can be afforded (see chapter "Basic Electives / Languages", page 10).

* If prerequisites fullfilled, see module description.
** Only one practical project in total is allowed to be taken within the studies, the pillar can be chosen.

Basic Electives / Languages

Students are required to complete **four** Basic Electives (German I-IV or Basic Elective, ID I1-I4 as outlined in the curriculum) **for a total of 20 ECTS**. Different choices are recommended depending on a student's knowledge of the German language. **All Students** are recommended to **consult with the Director of the Study Programme to select appropriate modules**. Participation in any language classes other than German I-IV must be approved by the Head of the Study Programme or the deputy via formal application by email.

Students with knowledge of the **German** language of **less than level B2.2***				
* In order to enable sufficient language skills to complete the practical study semester as well as participation in all elective modules, some of which are offered in German, a sufficient knowledge of the German language must be proven by a language certificate corresponding to level B2 according to the Common European Framework of Reference for Languages before entering the third study section. For this purpose, the following modules must be selected if the German knowledge is below C1:				
Basic Electives	**Module ID**	**SWS**	**ECTS**	**Rhythm**
German I (B1.1)*	I1	4	5	Winter and Summer
German II (B1.2)*	I2	4	5	Winter and Summer
German III (B2.1)*	I3	4	5	Winter and Summer
German IV (B2.2)*	I4	4	5	Winter and Summer

Students with knowledge of the **German** language of **B2.2****				
** In order to enable progression to subsequent Master's degree programmes, students are recommended to deepen their knowledge of the German language. For this purpose, it is highly recommended that you choose German V and German VI.				
Recommended Basic Electives	**Module ID**	**SWS**	**ECTS**	**Rhythm**
German V (C1.1 part 1)**	I20	4	5	Winter and Summer
German VI (C1.1 part 2)**	I21	4	5	Winter and Summer
Additional two modules marked by "Basic Electives" from chapter "Electives", page 9.	*See chapter "Electives", page 9*			

Students who have **acquired their university entrance qualification in German** / Students who acquire their official B2 (better C1.1) certificate outside OTH AW				
Electives	**Module ID**	**SWS**	**ECTS**	**Rhythm**
Foreign Language I***	I22	4	5	Winter and Summer
Foreign Language II***	I23	4	5	Winter and Summer
Required modules from chapter "Electives", page 9.	*See chapter "Electives", page 9*			

*/** The detailed description of the German language courses can be found in the Module Handbook of the Language Center at https://www.oth-aw.de/international/internationales-profil/sprachenzentrum/modulhandbuch/. German V and VI may either be taken as basic elective or as regular elective, but **only with approval by the Head of the Study Programme** or the deputy, and each course can only be credited once. **For all German classes, please register directly with the language center**:
https://www.oth-aw.de/international/internationalesprofil/sprachenzentrum/anmeldung/

*** The detailed description of the foreign language courses can be found in the Module Handbook of the Language Center at https://www.oth-aw.de/international/internationales-profil/sprachenzentrum/modulhandbuch/. However, neither German nor English classes may be selected as Foreign Language class. For advanced students, the language modules of the TM study programme are also open. However, there is no claim to participation.
After having obtained approval by the Head of Study Programme or the deputy, for all language classes, please register directly with the language center:
https://www.oth-aw.de/international/internationalesprofil/sprachenzentrum/anmeldung/

Please also check the faqs of the language center https://www.oth-aw.de/en/international/international-profile/language-centre/questions-regarding-language-courses/, as you might find some of your questions answered here.

Module descriptions

Mandatory modules

Science/Technology

Mathematics I

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T1	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Kambis Veschgini	Prof. Dr. Kambis Veschgini

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study: 60 h Exam preparation = 30 h = 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional Skills:**
  - Students know and understand important mathematical tools for industrial engineers and can use them to analyze and solve mathematical problems and tasks in the areas mentioned in "Course content" (at the level of relevant literature for universities of applied sciences).
- **Methodological Skills:**
  - They understand mathematical models of technical and economic issues and can translate simple technical or economic problems into mathematical problems.
- **Personal Skills (Social Competence and Self-competence):**
  - They are able to independently acquire further mathematical knowledge and skills**.**

Course Content

The contents of this course are central to first-year-students in physics, chemistry, biology, computer science and all engineering sciences. It contents the following chapters

1. Fundamentals
2. Summation and Product Notation
3. Vector Analysis
4. Functions of one real variable
5. Differential Calculus
6. Integral Calculus

Teaching Material / Reading

Available via Moodle

Internationality (content-related)

The course content is universally applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes.	The exam covers the above mentioned professional and methodological skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Technical Mechanics

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	T2	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Winter Semester	100

Module Convenor	Professor / Lecturer
Prof. Dr. Kambis Veschgini	Prof. Dr. Kambis Veschgini

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study: 90 h Total effort: 150 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

Professional competence:

- Application of principles and methods of statics of rigid bodies in the solution of mechanical engineering problems (technical competence)

Methodological competence:

You are able to

- apply the tools they have learned to case studies and exercises as well as practical tasks and systematically collect, interpret and evaluate relevant information. (Application and system competence)
- Analyze technical constructions with regard to mechanical load (analysis skills)
- develop solutions based on the acquired instrumental knowledge (problem-solving skills)

Personal competence (social competence and self-competence):

- They are able to express complex technical information competently both orally and in writing, understand technical solutions to problems and communicate effectively with the relevant target group (communication skills)

Course Content

- Fundamentals of statics: force systems, internal forces, trusses, centers of gravity, friction.
- Fundamentals of kinematics: Description of the movement of mass points and rigid bodies.

Teaching material / Reading

- Engineering Mechanics 1 - 3; Russell C. Hibbeler, Pearson publishing house, 2018
- Dankert, J.; Dankert, H.: Engineering Mechanics, Springer Vieweg, 2013 (eBook)
- Gross, et al.: Engineering Mechanics 1-3 (Statics, Elastostatics, Kinetics), Springer Vieweg, 2018 (eBook)
- Gross, et al.: Task Collections on Engineering Mechanics 1-3 (Statics, Elastostatics, Kinetics), Springer Vieweg, 2018 (eBook)

Internationality (in terms of content)
Internationality

The content is valid in any industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Written Exam (Kl90)	Written Exam, 90 minutes.	With the exam, all of the above-mentioned competencies are tested, see Learning Outcomes and Course Content.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Mathematics II

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T3	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Kambis Veschgini	Prof. Dr. Kambis Veschgini

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study: 60 h Exam preparation = 30 h = 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional Skills:**
  - Students know and understand important mathematical tools for industrial engineers and can use them to analyze and solve mathematical problems and tasks in the areas mentioned in "Course content" (at the level of relevant literature for universities of applied sciences).
- **Methodological Skills:**
  - They understand mathematical models of technical and economic issues and can translate simple technical or economic problems into mathematical problems.
- **Personal Skills (Social Competence and Self-competence):**
  - They are able to independently acquire further mathematical knowledge and skills**.**

Course Content

The contents of this course are central to first-year-students in physics, chemistry, biology, computer science and all engineering sciences. It contents the following chapters

1. Series Expansions of Functions
2. Complex Numbers
3. Functions of Several Variables
4. Ordinary Differential Equations
5. Discrete Fourier Transform

Teaching Material / Reading

Available via Moodle

Internationality (content-related)

The course content is universally applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90), online	90 minutes	The exam covers the above mentioned professional and methodological skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Mechanical Development

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	T4	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Summer semester	

Module Convenor	Professor / Lecturer
Prof. Dr. Marc Hainke	Prof. Dr. Daniel Billenstein, Michael Gubitz (M. Eng.)

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises; design work	Contact time: 60 h Self-study/follow-up: 30 h Exercises: 20 h Exam preparation: 40 h Total effort: 150 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

Professional competence:
The students
- learn how to create a technical drawing.
- understand the most important rules for the systematic design of technical products.
- learn how to design with a commercial 3D CAD program (components, assemblies, creation of technical drawings).

Methodological competence:
The students
- can analyze technical drawings.
- can create components in a 3D CAD program and generate technical drawings.

Personal competence (social competence and self-competence):
The students
- are able to express complex technical information competently in writing as well as orally, can understand technical documentation and communicate with the relevant target group in a well-founded and effective manner.
- have the ability to independently expand and deepen the knowledge and skills they have acquired.

Course Content

- Drawing standards
- Representation and dimensioning of workpieces
- Edges and surfaces
- Tolerances and fits
- Form and position tolerances
- Parameters for the description of surface roughness
- Basic skills in using a 3D CAD system: modeling parts and assemblies; creation of the technical drawing
- Basics of methodical construction

Teaching material / Reading

- Labisch, S.; Weber, Ch.: Technisches Zeichnen – Selbständig lernen und effektiv üben, Springer Vieweg, 4. Auflage, 2013
- Kurz, U.; Wittel, H.: Böttcher/Forberg: Technisches Zeichnen – Grundlagen, Normung, Übungen und Projektaufgaben, Springer Vieweg, 26. Auflage, 2014
- Naefe, P.: Einführung in das Methodische Konstruieren, Springer Vieweg, 2. Auflage, 2012
- Feldhusen, J.; Grote, K.-H.: Pahl/Beitz: Konstruktionslehre – Methoden und Anwendung erfolgreicher Produktentwicklung, Springer Vieweg, 8. Auflage, 2013
- Wittel, H.; et al.: Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung, Springer Vieweg, 22. Auflage
- Vajna, S.; et al.: Siemens NX für Einsteiger – kurz und bündig, Springer Vieweg, 4. Auflage, 2020
- Vogel, H.: Konstruieren mit CAD, Hanser, 2011

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Module work (ModA)	In the course of the semester, three exercises are carried out, in which the competencies of the module are tested. Exercise 1: Technical drawing (30 %) Exercise 2: Design of a technical product (40 %) Exercise 3: 3D CAD model (30 %)	With the exam, all of the above-mentioned competencies are tested, see Learning Outcomes and Course Content.

	To pass the module, a weighted overall average of 4.0 or better must be achieved.	

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Production Technology

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T5	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Andreas Dörner	Prof. Dr. Andreas Dörner

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; case studies; practical exercise; demonstration	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional Skills:**
  - Based on a broad and integrated knowledge of various manufacturing processes and current trends like Industry 4.0, students will be able to evaluate suitable alternative manufacturing processes for production. In doing so, students know how to take into account quality, economic efficiency and flexibility as well as the economical use of resources.
  - students are able to plan suitable manufacturing processes for products and their components using the manufacturing technologies and related information systems (e.g., MES, ERP, PLM) as well as analytical approaches.
- **Methodological Skills:**
  - students can review and evaluate manufacturing processes using in-depth subject-oriented methodological knowledge. This includes, for example, the evaluation of occurring process forces or predicting tool life.
- **Personal Skills (Social Competence and Self-competence):**
  - students are able to work in a team of experts on questions of production technology in a responsible manner and to solve complex subject-related problems in a team.

Course Content

- Fundamentals of Production Management
- Organisation Forms in industrial Production
- Fundamentals of Production Technology
- Conventional Manufacturing Methods
- Additive Manufacturing
- Assembly Technologies
- Information systems for production (MES, ERP, PLM, APS)
- Analytics & Maintenance Approaches for Factories

Teaching Material / Reading

Scripts, exercises, review questions, additional media (photo, video, ...)
Gibson, Rosen and Stucker (2015): Additive Manufacturing Technologies. Springer. Available under: ISBN 978-1-4939-2112-6
Nassehi (2018): Operations Management, in: The International Academy for Production Engineering et al. CIRP Encyclopaedia of Production Engineering. Available under: DOI 10.1007/978-3-642-35950-7_16746-1

Internationality (content-related)

The content is valid in any international industrial engineering environment.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/ Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Bonus system: There is the possibility of grade improvement (German: "Notenverbesserung") through voluntary performances during the course. By preparing a presentation of short relevant topics or tasks given during the lecture, a bonus of max. 10 % of the total number of points attainable in the written examination can be added in the same semester to the points actually attained in the written examination. The grade calculation then refers to the total points, whereby more than a grade of 1.0 cannot be achieved. The bonus points apply only in the semester in which they are earned. The offer exists only in semesters in which a course is offered by the lecturer. There is no individual entitlement for students for an offer of such a bonus ((German: "Notenverbesserung") by the lecturer.	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Physics

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	T6	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Winter semester	100

Module Convenor	Professor / Lecturer
Prof. Dr. Kambis Veschgini	Prof. Dr. Kambis Veschgini

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study: 90 h Total effort: 150 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

- Students know and understand the most important physical facts for engineers in basic areas of physics (see course content) and can analyze and solve physical tasks and problems in the areas listed under "Course content" (at the level of relevant literature for universities of applied sciences).
- They can investigate physical facts experimentally and carry out and evaluate simple experiments.
- They are able to familiarize themselves independently with other areas of physics.

Course Content

- Units, Dimensions, and Measurement
- Mechanics
- Oscillations and Waves
- Light
- Thermodynamics

Teaching material / Reading

- Tipler: Physics for Scientists and Engineers, Springer Spektrum
- Mills: Bachelor-Trainer Physics, Springer Spektrum

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Written Exam (Kl90)	Written Exam, 90 minutes.	With the exam, all of the above-mentioned competencies are tested, see Learning Outcomes and Course Content.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Industrial Engineering

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T7	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Andreas Dörner	Prof. Dr. Andreas Dörner

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lectures with integrated practical demonstrations and exercises	Contact time: 60 h Self-study and exam preparation: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional Skills:**
  - Students will be able to explain the essential basics and core functions of operational performance (focus: production of goods) and their interrelationships.
  - They can apply selected calculation methods.
- **Methodological Skills:**
  - Students can comprehend technical contents and use them in a problem-oriented manner.
  - Students can choose the right methods for process optimization and problem-solving in production
- **Personal Skills (Social Competence and Self-competence):**
  - Students can participate in discussions on the topic using the specific vocabulary.

Course Content

- Fundamentals of Industrial Engineering and industrial Production
- Basic documents (drawings, parts lists, work plans) and essential tasks of order processing in manufacturing companies, i. a. from the areas of work planning, purchasing, production and assembly.
- Production Systems and Lean Management
- Quality Management
- Production Networks

Teaching Material / Reading

Scripts, exercises, review questions, additional media (photo, video, ...)
Dumbrowski and Krenkel (2021): Ganzheitliches Produktionsmanagement. Strategischer Rahmen und operative Umsetzung. Springer. Available under: DOI 10.1007/978-3-662-62452-4, ISBN 978-3-662-62451-7
Nassehi (2018): Operations Management, in: The International Academy for Production Engineering et al.. CIRP Encyclopaedia of Production Engineering. Available under: DOI 10.1007/978-3-642-35950-7_16746-1
Ortiz and others (2015): Achieving Competitive Advantage through Quality Management. Springer. Available under: DOI 10.1007/978-3-319-17251-4

Internationality (content-related)

The content is valid in any international industrial engineering environment.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Bonus system: There is the possibility of grade improvement (German: "Notenverbesserung") through voluntary performances during the course. By preparing a presentation of short relevant topics or tasks given during the lecture, a bonus of max. 10 % of the total number of points attainable in the written examination can be added in the same semester to the points actually attained in the written examination. The grade calculation then refers to the total points, whereby more than a grade of 1.0 cannot be achieved. The bonus points apply only in the semester in which they are earned. The offer exists only in semesters in which a course is offered by the lecturer. There is no individual entitlement for students for an offer of such a bonus ((German: "Notenverbesserung") by the lecturer.	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Electrical Engineering

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	T8	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Summer Semester	100

Module Convenor	Professor / Lecturer
Prof. Dr. Manfred Beham	Prof. Dr. Manfred Beham

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises including laboratory.	Contact time: 60 h Exercises/tutorial: 30 h Self-study/follow-up: 30 h Exam preparation: 20 h Internship: 10 h Total effort: 150 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

Professional competence:
- They can determine electrical variables when analyzing circuits and apply their laws when evaluating electrical components in energy technology or electronics.
- You will be able to apply electrical measurement technology to practical issues.

Methodological competence:
You are able to,
- apply the instruments and methods learned to case studies and practical tasks.
- investigate electrical issues experimentally, carry out and evaluate simple experiments in a laboratory environment.
- design simple circuits for direct or alternating current circuits, design circuit diagrams and dimension the necessary components and determine their electrical parameters.

Personal competence (social competence and self-competence):
- You will be able to express complex technical issues in electrical engineering competently both orally and in writing, understand technical documentation and communicate effectively with the relevant target group.

Dual students:
Due to the practical experience already gained in the dual company and the specialist skills already acquired in the field of electrical engineering, dual students have already gained sufficient practical experience in dealing with electrical equipment and the corresponding measurement technology:
- Compulsory participation in the laboratory practical course (PrL) is not required
- Bonus points can be gained by presenting projects from the field of electrical engineering (see examination form).

Course Content

- Basic quantities and laws of electrical engineering
- Electrical networks in direct current circuits
- Electric field and capacitor
- Magnetic field and coil
- Basics of alternating currents
- Applications of electrical networks in alternating current circuits
- Three-phase alternating current
- Basics of electrical measurement technology

Teaching material / Reading

Accompanying lectures:
- Wolfgang Bieneck: Elektro T, Grundlagen der Elektrotechnik; Information and workbook for pupils and students of electronic professions. 6th edition, Holland + Josenhans Verlag, Stuttgart, 2008
- Moodle course: Fundamentals of electrical engineering including e-tests

If required:
- Allan R. Hambley: *Electrical Engineering: Principles & Applications* (Pearson, 7th ed., ©2022 / published 2021).
- Charles K. Alexander, Matthew N. O. Sadiku: *Fundamentals of Electric Circuits* (McGraw-Hill)

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested

Cl, PrL	Written exam, duration 90 minutes Regular and successful completion of practice tests (e-learning) can earn "bonus points" that count towards a maximum of 20% of the written examination. Successful participation in the electrical engineering practical course is a prerequisite for admission to the module examination. The practical course is not graded. The practical course is deemed to have been successfully completed if the student has carried out at least 75% of the experiments (compulsory attendance) and has documented the experiments by means of test protocols. Alternative dates will be offered for excused absences.	Almost all of the above-mentioned learning objectives are tested in the written exam. The learning objective "Investigate electrical issues experimentally and carry out and evaluate simple experiments in a laboratory environment" is assessed with the practical course. This learning objective cannot be assessed with a written exam. An internship is mandatory.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Materials Engineering

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	T9	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	German	One semester	Summer semester	100

Module Convenor	Professor / Lecturer
Prof. Dr. Marc Hainke	Prof. Dr. Daniel Billenstein

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 90 h Preparation/follow-up: 30 h Exam preparation: 30 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

The students
should be able to evaluate the properties and fields of application of the most important materials as a basis for decisions on their technical and economic use through a comprehensive presentation and discussion.

- Know the properties and fields of application of the most important materials as a basis for decisions and assessments regarding their technical and economic use
- can understand the importance of materials technology for scientific and industrial applications based on examples in the lecture
- have a general overview of the basic classes of materials based on extensive lecture examples
- develop a conceptual understanding of the requirements-based approach to the selection and use of materials
- can apply the acquired knowledge with practiced methods and procedures on the basis of practical tasks
- are able to evaluate problems relating to suitable heat treatment and the resulting material properties and apply suitable heat treatment processes
- understand the relationships between tribological and corrosive processes and their effects on component damage based on damage cases presented in the lecture can interpret the thermal, chemical and mechanical material modification processes and make well-founded statements about the functionality and reliability of components.

Course Content

Material fundamentals with atomic structure of crystalline materials, alloy formation, thermally activated processes, mechanical properties, ferrous materials, non-ferrous metals, ceramic materials, corrosion, tribological stress, criteria for material selection, criteria for damage assessment.

Teaching material / Reading

- Materials science for engineers - basics, application, testing; Roos, Maile, Seidenfuß; Springer Verlag; 2017
- Materials science; Bargel, Schulze; Springer Verlag, 2012
- Materials Science; Askeland; Spektrum Akademischer Verlag, 2010
- Materials technology 1 - 2; Bergmann; Hanser Verlag, 2008

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided via Moodle and explained in the first lecture.	With the exam, all the above-mentioned competencies are tested.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Anatomy and Physiology

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	M1	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr.-Ing. Eva Rothgang	Prof. Dr.-Ing. Eva Rothgang

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture, exercises	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

Upon successful completion of this module, students will have acquired the following technical, methodological, and personal competencies:

Technical competencies:
- A solid understanding of human anatomical structures and physiological functions.
- The ability to identify and describe key systems of the human body, including the musculoskeletal, nervous, cardiovascular, respiratory, digestive, and endocrine systems.
- Familiarity with medical terminology and anatomical orientation.

Methodological competencies:
- The ability to analyze physiological processes and relate them to anatomical structures.
- Competence in connecting theoretical knowledge with practical, visual exploration of the human body.
- The capacity to engage with digital tools for visualization and analysis of human anatomy.

Personal competencies:
- The ability to work independently and collaboratively in an interactive learning environment.
- A proactive approach to learning complex interdisciplinary content combining life sciences and engineering.
- A reflective approach to learning.

Course Content

This course provides a foundational introduction to human anatomy and physiology with a specific focus on applications in medical engineering. Students will explore the structure and function of major organ systems, including the musculoskeletal, nervous, cardiovascular, respiratory, and digestive systems. Emphasis is placed on understanding how these biological systems interact and how they inform the design, development, and implementation of medical technologies.

This module combines theoretical instruction with immersive visualization techniques, requiring regular attendance and active participation.

Teaching Material / Reading

Required readings will be announced during the lecture and on the Moodle course page.

The course involves extensive use of the Apple Vision Pro headset.

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Learning portfolio of 3 components intended to demonstrate learning progress and performance level at a specific point in time.	With the module work, all of the above-mentioned competencies are tested, see Learning Outcomes and Course Content.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Microbiology and Biophysics

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	M2	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Sebastian Buhl	Prof. Dr. Sebastian Buhl, Prof. Dr. Dr. Theresa Götz

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture, exercises, guest lecture	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

Upon successful completion of this module, students will have acquired the following technical, methodological, and personal competencies:

- They know and understand the most important biological, physiological, and biophysical processes of the human body relevant to their work as medical technology engineers.
- They have the ability to recognize the origin of biosignals and thus analyze complex electronic systems that are used in medical devices.
- Students acquire basic knowledge of the structure of microorganisms, resistance mechanisms and reproduction strategies.
- They have the ability to independently expand and deepen their acquired knowledge and skills in the scientific foundations of microbiology and biophysics.
- In the exercises, students work and communicate cooperatively in small groups to develop solutions to technical problems in biophysics through joint discussion.
- In practical courses and lectures, students learn microbiological laboratory techniques and the basics of medical device diagnostics
- They know the background and standards that apply to the hygiene and reprocessing of medical devices

Course Content

- Basics of cell and membrane physics as well as electrophysiology
- Biological and physicochemical reactions
- Functionality of stimulators (neuro, TENS, etc.), hearing aids and cochlea implants
- Flow behavior in the cardiovascular system, biophysics of pressure distribution in the vascular system and positive feedback loops
- Analysis of signals from neuro- and sensory physiology
- Biosignal analysis methods and simple stimulators
- The exercises and group work cover the biophysical principles of ECG, audiometry, autonomic reflexes, blood pressure, spirometry, TENS/EMS, visual system with optics and deepen the acquired knowledge.
- Microbiological principles of hygiene for medical devices
- Basic knowledge of microbiology, hygiene and infection control (bacteria, viruses, fungi)
- Hygienic and diagnostic standards and procedures in the field of microbiology

Teaching Material / Reading

Lehrbuch der Biophysik, Erich Sackmann, Wiley-VCH Verlag;
Allgemeines Lehrbuch zur Physiologie oder Anatomie Physiologie für die Physiotherapie, Christoff Zalpour, Elsevierverlag;
Brock Mikrobiologie, Michael T. Madigan, Pearson;
Bioanalytik; Lottspeich; Springer-Spektrum Verlag

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided via Moodle and explained in the first lecture.	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Medical device technology

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	M3	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Burkhard Stolz	Dr. Larysa Kalashnikova

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture, exercises, guest lecture	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successfully completing the module, students have the following technical, methodological and personal skills:

- Knowledge and understanding of the basics, areas of application and limitations of diagnostic and therapeutic devices in medical technology as well as their clinical application
- Students can establish the connection between how medical devices work and biophysics/physiology.
- Development of an awareness of the direct connection between diagnostics and therapy and their interaction in the healthcare system
- Knowledge of the structure and function of diagnostic and therapeutic devices
- The students know medical devices that are used in everyday clinical practice.
- You are able to acquire skills to help develop technical design and solution options and to assess technical appropriateness.

Course Content

- Diagnostic systems in various functional areas in the hospital
- Functionality and areas of application of medical devices
- Medical-clinical, technical and planning aspects of medical devices
- Examples of specific systems such as ultrasound, endoscopy, monitoring, functional diagnostics, laboratory diagnostics;
- Excursions to clinical users in the field of diagnostics

Teaching Material / Reading

Kramme, Rüdiger (Hrsg.), Medizintechnik, Springer Verlag, 4. Auflage
Morgenstern, Ute, Kraft, Marc (Hrsg.), Biomedizinische Technik – Faszination, Einführung, Überblick, Verlag Walter De Gruyter, 1. Auflage
Wintermantel, Erich, Ha Suk Woo, Springer Verlag, 5. Auflage

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided via Moodle and explained in the first lecture.	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Quality Management and Regulatory Affairs

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	M4	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dipl.-Ing. Burkhard Stolz	Prof. Dipl.-Ing. Burkhard Stolz

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture, exercises, guest lecture	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successfully completing the module, students have the following technical, methodological and personal skills:
Expertise
• The students work on regulatory issues from the everyday life of a company, an authority or a notified body and can demonstrate solutions using the relevant laws and standards
• The students work on practical questions from everyday business life

Methodological competence
• Students can create the relevant documents for the approval of medical devices.

Personal competence
• Understand, formulate and communicate approval-relevant requirements with the relevant target group in a well-founded and effective manner (communication skills)

Course Content

- Medical device safety and monitoring
- Selected quality management tools
- International markets and approvals
- Qualification and validation
- Laws and standards

Teaching Material / Reading

Gesetze zur Zulassung von Medizinprodukten
MDCG Guidelines
FDA-Guidelines
Anforderungen an Medizinprodukte, Harer, Baumgartner, 4. Auflage Hanser Verlag 2021;
Software als Medizinprodukt, Hastenteufel, Ranaud, Springer Vieweg 2019

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	**Learning portfolio** of 3 components intended to demonstrate learning progress and performance level at a specific point in time	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Medical Imaging

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	M5	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr.-Ing. Eva Rothgang	Prof. Dr.-Ing. Eva Rothgang

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture, exercises, guest lecture	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successfully completing the module, students have the following technical, methodological and personal skills:

• Students know and understand the basics, areas of application and limitations of imaging systems in medicine as well as their clinical application using examples.

• You have the ability to analyze, select, synthesize, apply, evaluate and optimize the procedures presented.

• You are able to independently expand the acquired knowledge and skills in the methodological and algorithmic areas using the specialist literature and apply them to concrete clinical problems.

Course Content

- Perception-physiological and mathematical basics (human vision and color models, representation of images in the spatial and frequency domain, interpolation processes)
- Image acquisition (raw data acquisition and image reconstruction) from ionizing (X-ray and gamma radiation) and non-ionizing (magnetic resonance, ultrasound) sources
- Fundamentals of digital medical image processing, image analysis and visualization (introduction to DICOM, point operations, linear and nonlinear operators, segmentation, object description and classification, registration procedures, extraction of level sets, visualization of volume data)
- Clinical application examples of medical imaging
- Application tasks and computer exercises for digitization, tomography, DICOM, elementary image processing operations in the spatial and spatial frequency domain, morphological image processing, segmentation, feature extraction and classification

Teaching Material / Reading

Referenzwerke:
G. Dougherty: Digital Image Processing for Medical Applications, Cambridge University Press, Cambridge, UK;
B. Jähne: Digitale Bildverarbeitung und Bildgewinnung, Springer Vieweg Verlag, Berlin

Internationality (content-related)

Required readings will be announced on the Moodle course page.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	**Learning portfolio** of 3 components intended to demonstrate learning progress and performance level at a specific point in time	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Economics

Fundamentals of Business Administration

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E1	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Dr. Stefanie Steinhauser	Julia Rank

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Lecture, exercises, guest lecture	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional Skills:**
  - Students know basic business administration and management terms, functions and structures. Students will know and apply selected methods for decision-making and for assessing business management situations with quantitative and qualitative background.
  - Students are familiar with the relevant relationships between companies and the environment as a result of constitutive decisions within the framework of corporate management.
  - Students understand the integration of companies in a global market environment.
- **Methodological Skills:**
  - Students apply selected methods of analysis and decision-making in practical case studies of low to medium complexity.
- **Personal Skills (Social Competence and Self-competence):**
  - Students are familiar with the appropriate language for personal communication and discussions in selected business management contexts.
  - Students analyse, interpret and structure simple practical business issues in small group teamwork.

Course Content

The course "Fundamentals of Business Administration" introduces you to the main concepts of Business Administration ("Betriebswirtschaftslehre") from a managerial perspective. The course requires no specific prerequisites.

- Introduction: Why we do business, Corporate goals and objectives,
- Organizational structure and design
- Management: Fundamentals, Management functions, Strategic management
- Human resources
- Corporate Culture
- Change and Innovation

Teaching Material / Reading

Detailed bibliographical information will be provided in the respective semester script!

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided via Moodle and explained in the first lecture.	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Principles of Accounting and Finance

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E2	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Dr. Stefanie Steinhauser	Jens Eckberg und Dr. Christian Sparrer

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Lecture, seminar with exercises, guest lecture, computer exercise	Contact time: 60 h Self-study: 90 h Total workload: 150 h

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional and Methodological Skills:

- Have an overview of the elements and functions of managerial and cost accounting.
- Describe basic instruments of managerial and cost accounting, apply them to simple business cases and derive implications from the results
- know the basics and gain fundamental skills for preparing and analysing annual financial statements and management reports.
- understand the fundamentals of balance sheet analysis and are able to calculate relevant key figures and analyse balance sheets at a low to medium level of complexity.
- can systematically collect and evaluate relevant cost information in order to subsequently apply it to determine cost rates or calculations (application and system competence).
- can identify problems in the determination of costs and calculation in practice with the acquired instrumental knowledge and solve them at least with simple approaches (problem-solving competence).
- know the basics of corporate finance and the types and special features of financial decisions and can describe them.
- explain the basics of investment decisions and selected investment calculation methods.
- select classic methods of investment calculation and corporate finance to solve practical business problems of low to medium complexity.
- analyse, interpret, structure and solve practical questions and tasks relating to corporate finance and the assessment of investment projects.

Personal Skills (Social Competence and Self-competence):

- use the technical language of business administration in assignments, for later personal communication and discussion skills in financial and investment accounting topics.
- analyse, interpret and structure practical business issues relating to corporate finance and the assessment of investment projects working individually or in small teams.

Course Content

- Tasks and basic terms of external and internal accounting
- cost accounting
- managerial accounting
- Basic terminology of the financial industry, objectives and instruments, e.g. financial ratios, finance plan.
- Capital requirements and forms of capital; types of financing; financing rules; substitution of financing, credit security.
- Practice of financial planning; liquidity planning; basics of investment management; most important procedures of static and dynamic investment calculation; types of investment; investment planning; qualitative assessment of investments.

Teaching Material / Reading

Detailed bibliographical information will be provided in the respective semester script!

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided via Moodle and explained in the first lecture.	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Business Processes Management

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E3	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester (for winter availability, please contact the module convenor)	60

Module Convenor	Professor / Lecturer
Prof. Dr. Matthias Lederer	Prof. Dr. Matthias Lederer

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Lecture, seminar with exercises, computer exercise	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional and Methodological Skills:**
  - Define and describe important terms and concepts in the field of business processes.
  - Use methods of business process modelling.
  - Recognize possibilities for the optimization of business processes and plan their realization.
  - Execute the most important software-based core business processes of a company.
  - Capture the context and the integration of the most important production-related data, functions and documents in business.
  - Identify, collect, assess and transfer relevant and necessary data for the software-supported execution of real business processes.
- **Personal Skills (Social Competence and Self-competence):**
  - The students approach their own projects in an open and structured way.
  - They are familiar with intervention techniques in organisations and are able to use them.
  - They are able to work and communicate cooperatively as a team in order to solve a problem in the field of process management in a joint discussion.
  - And they can independently expand and deepen the acquired knowledge and competences.

Course Content

- Fundamentals of business process management, process modeling, process optimization and process execution
- Business Process Modeling with different modeling techniques (e.g., EPC, BPMN)
- Methods of process design, process optimization
- Usage of current BPM tools
- Structure, sub-processes and activities of operational, production-related business processes
- Dissemination and functionality of operational planning systems as actors of a business process
- Relevant data types and sources for software-supported business processes
- Types of integration in the context of software-supported business processes

Teaching Material / Reading

- Allweyer, T. (2015): BPMN 2.0 - Introduction to the Standard for Business Process Modeling, 2nd edition, Norderstedt: Books on Demand.
- Dumas, M./La Rosa, M./Mendling, J./Reijers, H.A. (2018): Fundamentals of Business Process Management, 2nd edition, Berlin: Springer.
- Ganesh, K./Mohapatra, S./Anbuudayasankar, S.P./Sivakumar, P.: Enterprise Resource Planning, Cham: Springer International AG
- Laudon, K. C./Laudon, J.P. (2018): Management Information Systems, 15th edition, Harlow: Pearson Education Limited.
- Scheer, A. W. (2000). ARIS—business process modeling. Springer Science & Business Media.

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/ Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Marketing and Sales

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E5	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Julia Heigl	Prof. Dr. Julia Heigl

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Lecture, seminar with exercises, guest lecture, project work, practical applications using software	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Describe and critically discuss the impact of digitalization on marketing and sales.
- Explain the theoretical foundations, essential terms, concepts and tools of digital marketing.
- Analyze the changing information and purchasing behaviour of B2B decision-makers.
- Plan and implement digital marketing campaigns and measure their performance.
- Describe the digital marketing channels which are relevant for B2B companies, to discuss them critically and to apply them to real-world cases.
- Identify, describe and apply use cases for artificial intelligence in marketing automation.
- Apply content of this module in state-of-the-art software tools to practical problems.

Course Content

- The impact of digitalization on marketing and sales - strategy, marketing mix, operations.
- Foundations of digital marketing.
- Planning digital marketing campaigns.
- Customer Journey Mapping.
- Digital marketing channels and instruments - fundamentals, applications, tools and performance measurement: e.g. corporate website design; search engine marketing (SEO / SEA); influencer marketing; social media marketing; B2B e-commerce; affiliate marketing; programmematic advertising; marketing automation and email marketing.
- Application of artificial intelligence in marketing

Teaching Material / Reading

- Chaffey, D./Ellis-Chadwick, F. (2019): Digital marketing, 7th ed., Pearson, Harlow, England ; New York.
- Artun, Ö./Levin, D. (2015): Predictive Marketing: Easy Ways Every Marketer Can Use Customer Analytics and Big Data. John Wiley & Sons, Inc, Hoboken, NJ, USA.
- Kingsnorth, S. (2019): Digital Marketing Strategy: An Integrated Approach to Online Marketing, 2nd ed., Kogan Page.
- Waite, K./Vega, R.P. (2018): The Essentials of Digital Marketing, Global Management Series. Goodfellow Publishers, Limited.
- Miller, M. (2012): B2B Digital Marketing: Using the Web to Market Directly to Businesses, Que Biz-Tech. Pearson Education.
- Chaffey, D./Smith, P. (2017): Digital Marketing Excellence: Planning, Optimizing and Integrating Online Marketing. Taylor&Francis.

Internationality (content-related)

The course content is internationally and universally relevant and applicable. Companies from around the world will serve as example for case studies and practical examples.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Labor Law

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	E6	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Winter and summer semester	

Module Convenor	Professor / Lecturer
Prof. Dr. Christian Stauf	Prof. Dr. Christian Stauf

Prerequisites

None.
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 47 h Self-study: 103 h Total effort: 150 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

- Professional Competence: Students know the current labor law regulations essential for a business economist, especially those of individual law, taking into account the references to social economy law. Student also receive an overview of collective labor law.
- Methodological Competence: Students are able to apply the acquired knowledge to different situations. They recognise the structural particularities of labor law and are able to solve problem cases even under altered legal conditions.
- Personal Competence / Soft Skills (Social Competence and Self Competence): Team behavior and self-organization are improved.

Course Content

- Basic principles of individual labor law, especially conclusion of the employment contract, employees' and employers' rights and obligations
- Termination of employment and protection against dismissal Fundamental principles of collective labor law, especially industrial constitution law and collective bargaining law

Internationality (Content): View on EU law and foreign legal systems

Teaching material / Reading

Lecture notes
Basic textbook: Becker; Investition und Finanzierung, Gabler-Verlag
Additional reading:

- Bodie, Merton, Cleeton: Financial Economics, Pearson International Edition
- Brealy, Myers, Allen: Principles in Corporate Finance, Mc Graw Hill International Edition
- Pape: Grundlagen der Finanzierung und Investition, Oldenburg-Verlag
- Ross, Westerfield, Jaffe: Corporate Finance, Mc Graw Hill International Edition
- Zantow: Finanzwirtschaft der Unternehmung, Pearson Studium

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Written Exam (Kl90)	Weighting: 100%	With the exam, all of the above-mentioned competencies are tested, see Learning Outcomes and Course Content.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Product Management

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E7	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	60

Module Convenor	Professor / Lecturer
Prof. Burkhard Stolz	Tamer Güner

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Lecture; class discussion; case studies; field trip; guest lecture	Contact time: 60 h Self-study: 60 h Module work preparation: 30 h Total effort: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:

- Students have knowledge of how product management fits into a modern, lean and agile corporate structure and are familiar with the interfaces to other areas and roles in the company.
- The students learn how to analyze and evaluate suitable markets for product launches. In addition, the students know possibilities for the collection of customer requirements in the area of requirements analysis.
- The students know possible product strategies and can apply them practically.
- The students know the gates and phases of the product development cycle from the product manager's point of view and know his task and influence in the entire product life cycle.

Methodological Skills: Students learn methods...

- for idea generation and evaluation for new products.
- for market analysis and generation of a product launch strategy.
- for identifying, structuring and prioritizing customer requirements.
- and know its role and influence throughout the product life cycle.

Personal Skills (Social Competence and Self-competence):

- Team-oriented processing of examples and case studies in the field of product management.
- Communication and presentation of results from individual and group work.

Course Content

- Definition of the role of product management with its tasks and objectives.
- Integration of product management into different product development models and its interfaces to other roles and areas in the company.
- Requirements and market analysis and ways to generate new product ideas.
- Product portfolio management
- Development and derivation of an appropriate product development strategy and product roadmap.
- Influence in the product marketing mix and establishment of marketing strategies.
- Participation and influence in the product development process and product life cycle.
- Product launch opportunities and subsequent control.
- Digital business transformation and its influence on product management.
- Different characteristics and lifestyles of product management in the enterprise: Startup vs. SME vs. corporation.

Teaching Material / Reading

- Gorchels L.: Product Manager’s Handbook - The Complete Product Management Resource, second edition; The McGraw-Hill Companies; 2000.
- Steinhardt G.: The Product Manager's Toolkit®; Springer, 2017.
- Anon J. und Villaumbrosia C. G.: The Product Book; Product School, 2017.
- Nandakumar M.: Lean Product Management - Successful products from fuzzy business ideas; Packt Publishing, Limited, 2018.
- Ellis G.: Project Management in Product Development; Elsevier, 2106.
- Barkley B. T.: Project Management In New Product Development; The McGraw-Hill Companies, 2008.
- Martinelli R. J. and Milosevic D. Z.: Project Management Toolbox 2nd Edition; Wiley, 2016.
- Herrmann A. und Huber F.: Produktmanagement Grundlagen – Methoden – Beispiele, 3., vollständig überarbeitete und erweiterte Auflage; Springer, 2013.

Internationality (content-related)

Product Management usually comprises the development and management of products for and in international markets, including e.g. technical and managerial issues in international contexts

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Group project with individual presentations: Elaboration of a topic/case study	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Project Management and Agile Methods

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I11	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Andreas Dörner	Prof. Dr. Andreas Dörner

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study: 90 h Total effort: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- **Professional and Methodological Skills:**
  - The students know the basic methods and tools of project management.
  - They are able to select the appropriate ones for a given context.
  - They can apply these methods and tools flexibly to projects.
  - They are able to manage their own projects responsibly.
  - They are prepared to deal with the dynamics of a real project.
- **Personal Skills (Social Competence and Self-competence):**
  - The students approach their own projects in an open and structured way.
  - They are able to work and communicate cooperatively as a team to manage a project together.
  - They have the ability to independently expand and deepen the acquired knowledge and competences.

Course Content

- Function, types, contents and processes of conventional project management
- Content and use of basic project documents such as project pro- posal, project order, work-breakdown-structure and Gantt-chart
- Process and resource planning in projects
- Use of an IT-tool with exercises for project planning and control
- Communication, teamwork, self-reflection and versatility in pro- jects
- Introduction and practice of agile project management methods

Teaching Material / Reading

- Project Management Institute: „A Guide to the Project Management Body of Knowledge: PMBOK Guide ", B&T, 2004
- Bibik, I.:"How to kill the Scrum Monster", Springer Verlag, 2018
- Aken van, J./Berends, H./Bij van der, H. (2012): Problem solving in organizations. A methodological handbook for business and management students. Cambridge: Cambridge University Press.
- Campell, C. (2007): The One-Page-Project Manager, Com- municate and manage any project with a single sheet of pa- per. Hoboken: Wiley.
- Easterby-Smith, M./Thorpe, R./Jackson, P.R. (2015): Management & Business Research, 5th edition, Los Angeles: SAGE.
- Hermarij, J. (2016): The Better Practices of Project Management. Based on the IPMA Competences, 4th edition, Amersfoort: Van Haren Publishing.

Internationality (content-related)

The content is valid in any international industrial engineering environment.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Presentation and Project Documentation.	With the exam, all of the above-mentioned competencies are tested, see Learning Outcomes and Course Content.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Informatics

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	I5	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Winter Semester	100

Module Convenor	Professor / Lecturer
Prof. Dr. Thomas Geigenfeind	Prof. Dr. Thomas Geigenfeind

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study: 90 h Total effort: 150 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

Technical and methodological skills:
The students:

- Have fundamental programming skills
- Know about the different number systems and data structures
- Can use their skills to solve typical engineering tasks.
- Know basic algorithms.
- Can select and apply suitable algorithms for typical engineering tasks.

Personal competence (social competence and self-competence):
The students:

- Take an open and structured approach to analyze and solve IT and algorithm related problems.
- Are able to work and communicate cooperatively as a team in order to solve a technical problem in a joint discussion.
- Have the ability to independently expand and deepen the knowledge and skills they have acquired.

Course Content

The course covers foundational topics of informatics and introduces programming fundamentals (e.g. in Python). These concepts are possibly revisited and expanded upon in later lectures (e.g. with object-oriented concepts and databases)

- Introduction to necessary IT tools, e.g. the development environment
- Variables, Assignments, operators, basic I/O
- Control structures
- Procedures and functions
- Number systems and elementary data types (including binary representation, type conversions, integer/floating-point arithmetic)
- Selected higher data structures including access, indexing, and iteration
- Examples of selected fundamental algorithms (focus on sorting and searching)
- Complexity and performance comparison of algorithms
- Representation of algorithms and data structures with suitable notations (e.g. UML)

Teaching material / Reading

Information about relevant textbooks will be provided via Moodle.

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Statistics and Quantitative Methods

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I6	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Dr. Theresa Götz	Prof. Dr. Dr. Theresa Götz Dr. Shrutika Sawan

Prerequisites*

None

***Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture with exercise; practical exercise in computer lab	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Students know and understand the possible applications of probability calculation to problems with random events and can apply them to these problems.
- Students know and understand the most important concepts and methods of descriptive and inductive statistics and can check the applicability of different methods for statistical problems.
- Students are able to select and apply suitable methods to solve statistical problems.
- Students can analyze univariate and bivariate statistical data with the methods of descriptive and inductive statistics
- Students are able to independently expand and deepen the acquired knowledge and competences.

Course Content

- Descriptive statistics: frequency distributions; graphical representations; measures (mean, variance, correlations)
- Basic probability theory
- Random variables and theoretical distributions
- Parameter estimation and confidence intervals
- Parametric and non-parametric test methods
- Regression analysis

Teaching Material / Reading

Information about relevant textbooks and collection of formulas will be provided via Moodle.

Information about relevant textbooks and collection of formulas will be provided via Moodle.

The course content is internationally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	90 minutes	The exam covers the above mentioned professional and methodological skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Intercultural Communication

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I7	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Julia Heigl	Prof. Dr. Julia Heigl / Philipp Schädler

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar with exercises (role-play exercises, partner work, group work)	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Outline the most important theoretical approaches to intercultural communication.
- Explain the impact of one´s own cultural conditioning on values, perception, expectations and behavior.
- Interpret the behaviour of people from different cultures considering their respective cultural values.
- Create and apply effective communications strategies to overcome obstacles in intercultural encounters.
- Analyse intercultural business encounters by applying intercultural terminology, theory and methods and adopt the own behavior accordingly.

Course Content

- Introduction and Basic Knowledge: concept of culture, cultural identity, perception and interpretation, stereotypes and prejudices.
- Cultural Dimensions as a theoretical framework to compare cultures
- Basic communication concepts
- Application in business: multicultural teamwork, virtual teamwork, meetings with team members from different cultures, ciritcal incidents
- Negotiation as a specific form of communication

Teaching Material / Reading

Adler, N. J./Gundersen, A. (2008): International dimensions of organizational behavior. 5th edition, Mason: Thomson South- Western.
Bakić-Mirić N. An Integrated Approach to Intercultural Communication. Cambridge Scholars Publishing; 2012. Accessed January 11, 2022. https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=524049&site=ehost-live
https://web.p.ebscohost.com/ehost/ebookviewer/ebook/bmxlYmtfXzUyNDA0OV9fQU41?sid=586dfd4f-52c1-4110-8f2b-3ac9b1b869cb@redis&vid=0&format=EB&rid=1
Comfort, J./Franklin, P. (2014): The Mindful International Manager. How to work effectively across cultures, 2nd edition, London: Kogan Page.
Fay Patel, Mingsheng Li, Prahalad Sooknanan. Intercultural Communication : Building a Global Community. Sage Publications Pvt. Ltd; 2011. Accessed January 11, 2022. https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=385324&site=ehost-live
Hofstede, G./Hofstede, G. J./Minkov, M. (2010): Cultures and organizations. Software of the mind: International cooperation and its importance for survival. 3rd edition, New York: McGraw-Hill.
Schroll-Machl, S. (2016): Doing business with Germans. Their perception, our perception, 6th edition, Göttingen: Vandenhoeck & Ruprecht.
Novinger, Tracy. Intercultural Communication: A Practical Guide, New York, USA: University of Texas Press, 2021. https://doi.org/10.7560/755703

Internationality (content-related)

Given by topic of the course

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/ Competencies to be Assessed
Module Work (ModA)	**Learning portfolio** of 4 components intended to demonstrate learning progress and performance level at a specific point in time: 1) Group presentation (approx. 8 minutes) on the culture and cultural dimensions of two assigned cultures 2) Group presentation (approx. 8 minutes) on communication in the two assigned cultures 3) Preparation and execution of a role play in groups (30 minutes) of a negotiation task in an intercultural business environment. 4) Individual, three-page single spaced 12point self-reflection paper regarding the impact of the cultural and communication-related preparation on the performance in the role play and the relevance to one's own learning progress and qualification. **Participation in all parts of the examination is required. Each team member must give at least one of the first two presentations.**	1) + 2) Outline of the most important theoretical approaches to intercultural communication, 1) + 3) Interpretation of the behaviour of people from different cultures considering their respective cultural values. 3) effective communications strategies to overcome obstacles in intercultural encounters. 3) Analysis of intercultural business encounters by applying intercultural terminology, theory and methods and adopt the own behavior accordingly.

		4) explanation of the impact of one´s own cultural conditioning on values, perception, expectations and behavior.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Object-oriented Coding

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I8	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Manfred Beham	Prof. Dr. Manfred Beham

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; instruction seminars; practical exercise	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:
- Identify core aspects of object-oriented programmeming and features of an object-oriented language.
- Use a development environment for writing and running your code.
- Develop and implement programmes that apply core object-oriented programmeming concepts like classes, polymorphism, and method overloading.
- Use built in data-structures (collections) and functions.
- Convert a given algorithm into a procedural programme.

Methodological Skills:
- You are able to analyse and design an application using OO methods
- You can use step-by-step refinement to break down a problem into sub-problems (modularisation)

Personal Skills (Social Competence and Self-competence):
- You are also able to present solutions that have been created, to discuss their quality and alternatives and to reflect on their problem-solving strategy in a technical and methodical manner.

Course Content

This course provides an introduction to object-oriented programmeming, including an overview of the language syntax and how to develop simple applications. Students will learn how to write custom classes and methods, and how to test their code using unit testing and test-driven development. Topics include basic data structures like Arrays and Lists and concepts of inheritance or overloading methods.

Teaching Material / Reading

- Depends on the concrete used programmeming language (JAVA, Python, C++, C#); will be specified in Moodle

Internationality (content-related)

The content is valid in any international software development environment

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module Work (ModA)	Project Work: An application for a given task must be developed, documented and presented. Written: Code and documentation (70 %) Orally: Presentation (30 %)	With this practical work, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Logistics

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I9	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One semester	Summer semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Andreas Dörner	Prof. Dr. Andreas Dörner

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "interdisciplinary" module group in the Bachelor's degree programme in Industrial/Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lectures with integrated practical demonstrations and exercises	Contact time: 60 h Pre- and post-processing: 50 h Exam preparation: 40 h Total 150h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological, and personal skills and competencies:

- **Professional Skills:**
  - Knowledge on logistics: Terms, problem statements, tasks, and common methods.
  - Ability to explain and use selected calculation methods.
  - Understand logistical principles and opportunities offered by an SAP ERP system (ECC 6.0 and S/4HANA).
- **Methodological Skills:**
  - Ability to know and rate different options and to consult regarding usability in different scenarios.
  - Ability to use logistics theories in practice, i.e., execute material requirements planning in an SAP ERP system.
- **Personal Skills (Social Competence and Self-competence):**
  - Ability to plan and execute typical logistics tasks from the perspective of different roles.
  - Ability to discuss with stakeholders and logistics experts on professional level.
  - Ability to collaborate as a competent interdisciplinary project team member for common logistics topics.

Course Content

- Introduction in logistics and logistics components of SAP ERP
- Product and production planning
- Production
- Procurement logistics
- Inventory management
- Distribution logistics
- Quality management (optionally)
- Recent trends and outlook

Teaching Material / Reading

Presentation script, further exercises, further training material used or recommended in lessons.

Internationality (content-related)

Much of the content covered is of relevance worldwide. One objective is to illustrate how logistics could help regarding competitiveness in a globalized world. Legal specifics of countries are not mentioned. ERP systems like SAP S/4HANA are used globally, especially in bigger companies. The terms used are valid in international context.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written examination (Kl90)	90 min. (Weighting: 100%)	The written examination assesses the entire learning contents and competence profiles.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Elective modules

Science/Technology

Sensors for Smart Systems

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T10	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	Arno Erzberger

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; case studies; practical exercise; demonstration	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional skills and competencies:
- know structure and basic elements of sensors
- know physical sensor principles
- know physical signal transmission
- evaluate performance and accuracy of sensors
- evaluate sensor specifications
- know costs and prices of sensor solutions
- know sensor system interfaces (electrical and mechanical)
- evaluate sensor system integration
- know and evaluate disturbances variables and the related system impact.

Methodological skills and competencies:
- decide if a sensor is necessary in the system or not
- decide what kind of sensors are necessary in the system
- cost-benefit consideration in sensor selection and design
- question and evaluate sensor specifications, requirements and performance

Personal skills and competencies:
systematically and competently communicating commercial and technical sensor requirements with product developers and sensor suppliers.

Course Content

This module provides students with a comprehensive overview of the broad field of sensors for smart systems in the lecture, covering functional principles, signal processing, interfaces and applications. The various sensors are presented systematically. Basic concepts for sensing requirements and performance are presented, and costs and prices for sensor deployment are evaluated. In addition to the technical/physical understanding and resulting costs, the ability to communicate professionally with both sensor/system developers and sensor suppliers is provided. A detailed practical example example with live-demonstration of a technical/commercial sensor design is developed, evaluated and alternative solutions are considered. Solutions for various sensor tasks are worked out and presented by individual student groups.

Teaching Material / Reading

Jacob, Fraden, "Handbook of Modern Sensors", Springer Verlag
Olfa, Kanoun, Nabil, Derbel, Faouzi, Derbel "Sensors, Circuits & Instrumentation Systems", De Gruyter

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed

Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided starting in the semester the module is taught for the first time	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Robotik

Robotics

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	T12	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	Deutsch	Einsemestrig	Wintersemester	24

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Manfred Beham	Prof. Dr. Manfred Beham

Voraussetzungen*
Prerequisites

- Grundlegende Kenntnisse der Vektorgeometrie (Mathematik) und Grundlagen der Programmemierung (Informatik I)
- Interesse an Robotik und die Bereitschaft zur Mitarbeit an einem Projekt in der Kleingruppe

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminaristischer Unterricht, Übungen am PC mit der Stäubli-Entwicklungs-umgebung und –Simulator, Praktikum im Labor	Seminaristischer Unterricht: 30 h Übungen/Eigenstudium: 30 h Labor mit Anleitung: 30 h Projektarbeit: 60 h Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Nach dem erfolgreichen Absolvieren des Moduls verfügen die Studierenden über die folgenden fachlichen, methodischen und persönlichen Kompetenzen:

Fachkompetenz:
Die Studierenden kennen den Aufbau und die Funktionsweise eines Industrieroboters. Sie können Bewegungsabläufe in verschiedenen Koordinatensystemen beschreiben und transformieren. Sie kennen die grundlegen Konzepte der Programmemierung, insbesondere die in der Robotik nötigen Elemente der Programmemflusssteuerung und des Multitaskings. Sie kennen die Sicherheitsrichtlinien im Umgang mit dem Roboter und können diesen mit Hilfe des Handbediengerätes steuern**.**

Methodenkompetenz:
Sie können eine VAL3-Applikation in der Stäubli-Entwicklungsumgebung konzipieren, implementieren und simulieren. Dabei sind sie in der Lage, einen komplexen Vorgang im Sinne einer Top-Down-Strategie zu modularisieren. Programmemierbare Steuerungen oder ein Bildverarbeitungssystem können in die Gesamtapplikation eingebunden werden.

Persönliche Kompetenz (Sozialkompetenz und Selbstkompetenz):
Teamarbeit und Selbstorganisation werden im Rahmen der Projektarbeit gefördert. Die Studierenden können grundlegende Methoden des Projektmanagements innerhalb ihres Teams anwenden. Sie müssen Ergebnisse und Zwischenergebnisse präsentieren.

Inhalte der Lehrveranstaltungen
Course Content

- Sicherheitseinweisung
- Der Roboter im Überblick
- Das Handbediengerät
- Orientierung/Koordinatensysteme/Kinematik
- VAL3 Applikation/Programmemierung
- Multitasking
- Einführung in die Bildverarbeitung

Lehrmaterial / Literatur
Teaching Material / Reading

Weber, W.: Industrieroboter: Methoden der Steuerung und Regelung, München, Wien: Hanser, 2002
Stäubli: Referenzanleitung VAL3. Version 7.0, © Stäubli Faverges 2015
Beham Manfred: Vorlesungsmanusskript in englischer Sprache

Internationalität (Inhaltlich)
Internationality

Die Grundlagen der Robotik können weltweit in allen industriellen Fertigungsbereichen eingesetzt werden und sind auch auf andere Robotersysteme übertragbar. Unterrichtsmaterialien und Referenzhandbücher sind in Englisch.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform*1)	Art/Umfang inkl. Gewichtung*2)	Zu prüfende Lernziele/Kompetenzen
PrA **Projektarbeit**	Projekt-Thema: Realisierung einer Robotersteuerung Durchführung in der Gruppe (3 – 4 Personen) Zwischenbericht 15 – 20 min. (30% Gewichtung) Schriftliche Ausarbeitung 15 – 25 Seiten (70% Gew.)	Über die Projektarbeit werden nahezu alle o.g. Kompetenzen geprüft. Insbesondere praktische Fähigkeiten und die Methodenkompetenz werden durch eine erfolgreiche Projektarbeit bewiesen.

*1) Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
*2) Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

Data Science for Engineers (Introduction to Methods and Tools)

Classification	Module ID	Kind of Module	ECTS
	T13	Elective	5

Location	Language	Duration of Module	Term/frequency	Max. Number of Participants
Weiden	English	One Semester	Winter	30 *There is neither a claim to actual realization of the module nor to participation*

Module Convenor	Instructor
Prof. Dr. Thomas Geigenfeind	Prof. Dr. Thomas Geigenfeind

Prerequisites*

- **Module: Statistics and Quantitative Methods**
- **Module: Object-oriented Coding**

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Forms of Instruction	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminaristic lecture	150h (60h contact time, 90h self-study)

Description of Qualifications

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Students have an overview of the data science and machine learning domain
- Students can assess what problems can be tackled with data science and machine learning
- Students know the fundamentals of loading, analyzing and visualizing datasets from various sources
- Students can implement simple machine learning pipelines with the most common Python libraries
- Students learn to find their own solutions, develop methods for solving problems, discuss and overcome issues, and present results through supervised but independent programming exercises

Course Content

- Fundamentals of Python programming for statistics and data science
- Introduction to data analysis (ETL, data selection, visualization,…)
- Selection of traditional machine learning tasks and respective algorithms, including but not limited to linear regression, classification, cluster analysis,…
- Introduction to neural networks
- Application of machine learning models to real-world engineering applications

Literature

- Python for Data Analysis (3rd edition), Wes McKinney, O'Reilly, 2022
- Machine Learning with PyTorch and Scikit-Learn, Sebastian Raschka, Packt, 2022
- Data Science from Scratch (2nd edition), Joel Grus, O'Reilly 2019
- Machine Learning with Python Cookbook, Chris Albon, O'Reilly, 2018

Internationality (content-related)

internationally relevant topics

Examination (If applicable, note on multiple choice - § 22 para. 1 sentence 2 ASPO)

Form*1)	Scope/duration including weighting *2)	Learning Objectives/Competencies to be Assessed
Module Work (ModA)	Multiple equally weighted programming case studies	The entire learning contents and competence profiles are assessed by way of the aforementioned examination form.

*1) Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
*2) Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

SAP-Anwendungsentwicklung für Logistik 4.0

SAP Application Development for Digital Logistics

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	T14	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	Deutsch	Einsemestrig	Wintersemester	25

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Günter Kummetsteiner	M.A. Christoph Hammer

Voraussetzungen*
Prerequisites

Dieser Kurs ist gezielt auf „Nicht-Informatiker" ausgerichtet. Die Teilnehmer(innen) sollten allerdings über folgende Kenntnisse verfügen:

- Grundkenntnisse in der Softwareentwicklung mit mind. einer Programmiersprache

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminaristischer Unterricht mit Übungen	Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Nach dem erfolgreichen Absolvieren des Moduls verfügen die Studierenden über die folgenden fachlichen, methodischen und persönlichen Kompetenzen:

Das Ziel ist der Erwerb grundlegender Kenntnisse in Konzeption und Entwicklung moderner SAP-Anwendungen mit ABAP Objects.

Fachkompetenz:

- Die Studierenden kennen das Grundkonzept und die Syntax der Programmemiersprache ABAP bzw. ABAP Objects und können diese anwenden.
- Die Studierenden kennen Besonderheiten, Beschränkungen und Möglichkeiten der Anwendungsentwicklung im ERP-System SAP.

Methodenkompetenz:

- Die Studierenden können einfache Anwendungen mit ABAP bzw. ABAP Objects selbständig entwerfen, im SAP-System implementieren und testen.
- Sie können die dazu erforderlichen Entwicklungswerkzeuge anwenden.

Persönliche Kompetenz (Sozialkompetenz und Selbstkompetenz):

- Im Rahmen der betreuten Programmemierübungen lernen die Studierenden ihre erstellten Lösungen zu erläutern, deren Qualität und mögliche Lösungsalternativen zu diskutieren und die persönlich angewandte Problemlösungsstrategie kritisch zu reflektieren.

Inhalte der Lehrveranstaltungen
Course Content

Die Lehrveranstaltung bietet einen Überblick über Grundlagen und Potentiale der Programmemiersprache ABAP bzw. ABAP Objects.
Als Basis werden zunächst folgende Themen behandelt:

- Navigation und Grundkonzepte in SAP ERP
- Moderne Entwicklungsumgebungen Eclipse und ABAP Workbench
- Modularisierung mit ABAP, Datentypen und DataDictionary
- Datenbankzugriffe mit SQL
- Erstellung einfacher Datenauswertungsfunktionen
- Dialogprogrammemierung mit ABAP-Dynpro's
- Debuggen von ABAP-Coding
- Erweiterte objektorientierte Techniken

Um abschließend das Nutzenpotential der ABAP-Anwendungsentwicklung im betrieblichen Umfeld zu verdeutlichen, haben die Teilnehmer(innen) am Ende des Kurses die Möglichkeit z.B.

- einen ERP-Dialog aus dem SAP-Modul Logistik individuell anzupassen
- einen spezifischen Report in die SAP-Oberfläche einzubinden
- o.ä.

Zudem werden im Laufe des Kurses weitere ABAP-Anwendungen vorgestellt.

Lehrmaterial / Literatur
Teaching Material / Reading

- OTH-spezifische Schulungsunterlagen

Internationalität (Inhaltlich)
Internationality

Viele große, weltweit agierende Unternehmen setzen branchenübergreifend SAP-Software ein.
Die behandelten Inhalte sind zu großen Teilen weltweit von Relevanz.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
Klausur (Kl)	Schriftliche Prüfung; Dauer 90 Min. Teilnahme an der Klausur ist nur mit gültigen kursspezifischen Zugangsdaten zum SAP-System zulässig. Diese werden zu Beginn des jeweiligen Vorlesungssemesters vergeben. Hinweis (unabhängig von der regulären Mindestpunktzahl für das Bestehen der WPM-Prüfung): Bei regelmäßiger Teilnahme (max. 2 Fehltermine) und Erreichen von mind. 65% der Gesamtpunktzahl der Prüfung wird zusätzlich ein Zertifikat inkl. Logo der SAP UA ausgestellt. (Muster siehe ergänzende Kursbeschreibung unter https://oth-aw.de/sap-factory)	Über die schriftliche Prüfung werden die grundlegenden Elemente der o.g. Kompetenzen abgeprüft.

[*1)] Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
[*2)] Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

IoT Technology

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T15	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	30

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	Prof. Dr. Kris Dalm

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; instruction seminars; case studies; field trip; practical exercise	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional skills:
- Basics of IoT technology (hardware, software, cloud)
- Programmeming of IoT devices using a development environment
- IoT cloud solutions
- IoT application development
- Embed, control and read sensors in IoT applications
- Visualization of IoT applications in suitable user interfaces

Methodological skills:
- Ability to programme algorithms for IoT applications
- Ability to develop software projects in IoT environment
- Ability to implement sensors and actuators using libraries in IoT projects

Personal Skills (Social Competence and Self-competence):
Ability to develop IoT applications using IoT devices and cloud environments.

Course Content
- Introduction and basics of IoT technology
- IoT cloud solutions
- IoT hardware and software
- IoT application development

Teaching Material / Reading
- Kernighan, Ritchie. C Programmeming Language, 2nd Edition. 2021.
- Lakhwani. Internet of Things (IoT): Principles, Paradigms and Applications of IoT. 2020
- Veneri, Capasso. Hands-On Industrial Internet of Things: Create a powerful Industrial IoT infrastructure using Industry 4.0. 2018.

Internationality (content-related)

IoT is an international phenomenon, IoT applications are developed and used worldwide.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/ Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Communication Technology

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T16	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	60

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	Prof. Dr. Kris Dalm

Prerequisites*

* Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; case studies; practical exercise; demonstration	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Students will be able to describe the components and functions of communications technologies required for IoT and industrial communication.

Professional skills:

- Basics of communication technology
- Communication in Smart Factories and Industry 4.0 environments
- Knowing relevant parameters of wired and wireless communication technologies
- Usage and application of communication technologies
- Automation basics and digital technology
- Condition monitoring using communication technologies

Methodological skills:

- Ability to develop automation applications
- Being familiar with OSI and TCP/IP models
- Knowing automation pyramid

Personal Skills (Social Competence and Self-competence):

Ability to understand communication technologies and implementation in personal and industrial environments.

Course Content

- Introduction to communication technology
- Industry 4.0 and automation
- PLC
- Automation development and communication basics
- Basic communication technologies
- Network technologies
- Industrial and mobile communication technologies

Teaching Material / Reading

- Karaali. Grundlagen der Steuerungstechnik: Einführung mit Übungen. 2018.
- Tapken. SPS Theorie und Praxis: mit Übungsaufgaben und Programmemier- und Simulationssoftware. 2020.
- Bök, Noack, Müller, Behnke. Computernetze und Internet of Things. 2020.
- Sadiku, Akujuobi. Fundamentals of Computer Networks. 2022.
- Sauter. Grundkurs Mobile Kommunikationssysteme. 2018.

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/ Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Fabrikplanung
Factory Design

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	T18	Wahlpflichtmodul/Vertiefung	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	Deutsch	einsemestrig	Wird regelmäßig im Sommersemester angeboten	25

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dipl.-Ing. Ulrich Müller	Prof. Dipl.-Ing. Ulrich Müller

Voraussetzungen*
Prerequisites

Grundlegende Kenntnisse aus dem Bereich der Produktionswirtschaft

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Seminaristischer Unterricht mit Übungen, Exkursionen	Kontaktzeit: 60 h Selbststudium/Nachbereitung: 60 h Prüfungsvorbereitung: 30 h Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Nach dem erfolgreichen Absolvieren des Moduls verfügen die Studierenden über die folgenden fachlichen, methodischen und persönlichen Kompetenzen:

Sie sind in der Lage

Fachkompetenz:
- Probleme bei der Gestaltung von Fabriken unter produktionstechnischen Gesichtspunkten zu lösen.
- komplexe fabrikplanerische Aufgaben systematisch zu differenzieren und spezifische Lösungen zu entwickeln.

Methodenkompetenz:
- Standortalternativen für die Produktionslokalisierung systematisch zu bewerten und vor dem Hintergrund unvollständiger Informationen einen Vorschlag zu generieren.
- die wesentlichen Strukturelemente einer Fabrik (Fertigungsmittel, Logistik, Personal, Flächen und Gebäude) basierend auf einem vorgegebenen Produktionsszenario systematisch zu planen.

Persönliche Kompetenz (Sozialkompetenz und Selbstkompetenz):
- In Expertenteams zu Fragen der Fabrikplanung verantwortlich zu arbeiten und komplexe fachbezogene Probleme im Team zu lösen.

Inhalte der Lehrveranstaltungen
Course Content

- Grundlagen der Fabrikplanung (Aufgaben/Ziele, Planungsgrundsätze, Projektorganisation, ...)
- Zielplanung
- Standortplanung
- Strukturplanung
- Fertigungsmittelplanung
- Materialflussplanung
- Personalplanung
- Flächen- und Gebäudeplanung

Lehrmaterial / Literatur
Teaching Material / Reading

- Grundig: Fabrikplanung, Planungssystematik – Methoden – Anwendungen, Carl Hanser Verlag, München, Wien, 2014
- Kettner, Schmidt, Greim: Leitfaden der systematischen Fabrikplanung, Carl Hanser Verlag, München, Wien, 1984
- Koether, Kurz, Seidel, Weber: Betriebsstättenplanung und Ergonomie, Planung von Arbeitssystemen, Carl Hanser Verlag, München, 2001
- Kühn: Digitale Fabrik, Fabriksimulation für Produktionsplaner, Carl Hanser Verlag, München, Wien, 2006
- Pawellek: Ganzheitliche Fabrikplanung, Grundlagen, Vorgehensweise, EDV-Unterstützung, Springer Verlag, Berlin, 2008
- Wiendahl, Reichardt, Nyhuis; Handbuch Fabrikplanung, Carl Hanser Verlag, München, Wien 2014

Internationalität (Inhaltlich)
Internationality

Die grundlegenden Zusammenhänge sind durchweg weltweit von Relevanz. Bei den konkreten Vorgaben, Methoden u.ä. liegt aufgrund der rechtlichen Grundlagen der Fokus auf Deutschland.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
Klausur	Klausur, Dauer 90 Minuten Durch erfolgreiche Teilnahme an einer Fabrikplanungsstudie können Bonuspunkte (gem. § 9 APO) in Höhe von 20 % der maximalen Punktzahl der Klausur erreicht werden.	Über die Klausuren werden nahezu alle o. g. Kompetenzen geprüft.

[*1)] Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
[*2)] Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

Databases

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T19	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	40

Module Convenor	Professor / Lecturer
Prof. Dr. Dr. Theresa Götz	Prof. Dr. Dr. Theresa Götz

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; instruction seminars; practical exercise	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:
- You can design and implement a relational database.
- You can obtain information from relational databases with the help of elementary SQL queries.

Methodological Skills:
- You can analyze operational processes with object-oriented methods and document them using the UML notation.
- You can create an object-oriented concept for a simple, operational application system.
- You can transform a class-model into a relational schema.

Personal Skills (Social Competence and Self-competence):
- You have the ability to describe complex information structures with abstract models.
- You are familiar with the basics of process management for working in a team on an IT project.

Course Content

- Relational database systems and their application
- Development of a relational schema
- Basics of SQL-queries
- Exercises in designing and using an exemplary relational database

Teaching Material / Reading

Michael Blaha: **UML Database Modeling Workbook**, Technics Publications, LLC (2. Februar 2014), ASIN: B00I82HHLC
Janis Osis, Uldis Donins: **Topological UML Modeling: An Improved Approach for Domain Modeling and Software Development**, Elsevier; 1. Edition (16. Juni 2017), ASIN: B07385XW26

Internationality (content-related)

The content is valid in any international IT design and development environment

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes *Information about a possible bonus system will be provided starting in the semester the module is taught for the first time*	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Computer Aided Engineering

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	T20	Wahlpflichtmodul/Vertiefung	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	Deutsch	einsemestrig	Sommer	20

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Marc Hainke	Prof. Dr. Marc Hainke

Voraussetzungen*
Prerequisites

Technical Mechanics, Materials Engineering

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
Das Modul ist Teil der Modulgruppe „Technik" in den Vertiefungsrichtungen „Digitale Produktentwicklung" sowie „Digitalisierung in Produktion und Logistik" des Bachelorstudiengangs Wirtschaftsingenieurwesen. Die Verwendbarkeit in anderen Studiengängen der Hochschule ist im Einzelfall zu prüfen.	Seminaristischer Unterricht mit Übungen	Kontaktzeit: 60 h Selbststudium: 60 h Prüfungsvorbereitung: 30 h Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Nach dem erfolgreichen Absolvieren des Moduls verfügen die Studierenden über die folgenden fachlichen, methodischen und persönlichen Kompetenzen:

Die Studierenden lernen den virtuellen Produktentwicklungsprozess unter besonderer Berücksichtigung der Methode der Finiten-Elemente (FEM) und der Mehrkörpersysteme (MKS) theoretisch und praxisnah kennen und anzuwenden:

- können die Bedeutung der virtuellen Produktentwicklung für wissenschaftliche und industrielle Anwendungen nachvollziehen
- verfügen über einen Überblick über die verschiedenen grundlegenden Simulationsverfahren
- entwickeln ein konzeptionelles Verständnis für die Vorgehensweise bei der numerischen Simulation
- können die erworbenen Kenntnisse mit eingeübten Methoden und Vorgehensweisen an Hand von Aufgabenstellungen praxisnah anwenden
- sind fähig, Problemstellungen zur virtuellen Produktenwicklung zu bewerten und Lösungswege anzuwenden
- verstehen die Zusammenhänge zwischen den Annahmen bei der Simulation und der erzielten Ergebnisse
- können die Simulationsergebnisse interpretieren und fundierte Aussagen über die Funktionalität und Zuverlässigkeit machen.

Inhalte der Lehrveranstaltungen
Course Content

- Einordnung des virtuellen Produktentwicklungsprozesses in der Forschung und Entwicklung
- Exemplarische Darstellung des Potentials der unterschiedlichen numerischen Simulationsmethoden
- Darstellung der unterschiedlichen Leichtbaustrategien
- Einführung in die Simulation mit Mehrkörpersystemen (MKS)
- Einführung und Vertiefung in die Simulation mit der Finiten Elemente Methode (FEM)
- Darstellung des Ablaufes einer Simulation (Pre-Processing, Analyse, Post-Processing)
- Übungen zu grundlegenden Anwendungen der MKS und FEM mit Bewertung der Ergebnisse

Lehrmaterial / Literatur
Teaching Material / Reading

- Vorlesungsunterlagen
- Übungsaufgaben
- FEM – Grundlagen und Anwendungen der Finite-Element-Methode im Maschinen- und Fahrzeugbau; Klein; Springer Verlag; 2012
- Finite-Elemente-Methoden; Bathe; Springer Verlag; 2002
- The Finite Element Method: Its Basis and Fundamentals; Zienkiewicz, Butterworth-Heinemann, 2013

Internationalität (Inhaltlich)
Internationality

- Die Vorlesung stellt einen internationalen Standard im Bereich der Virtuellen Produktentwicklung dar.
- Übungs- und Praktikumsaufgaben in englischer Sprache
- FE-Software in englischer Sprache

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)

Method of Assessment		
Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
Klausur	Schriftliche Prüfung; Dauer 90 Minuten	Durch die Klausur werden die gesamten Lerninhalte und Kompetenzprofile abgeprüft.

[*1)] Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
[*2)] Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

Product Development

Classification	Module ID	Type of module	Number of Credit Points (ECTS)
	T21	Mandatory	5

Location	Language	Duration of the module	Frequency of Module	Max. Number of participants Max. Number of Participants
Weiden	English	One semester	Winter semester	100

Module Convenor	Professor / Lecturer
Prof. Dr. Marc Hainke	NN

Prerequisites

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminar-based teaching with exercises.	Contact time: 60 h Self-study/follow-up: 20 Exam preparation: 20 Project/construction work: 50 h

Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

Professional competence:
- They are able to analyze and evaluate designs from the field of mechanical engineering (technical expertise)
- Ability to design complex machine parts (technical expertise)

Methodological competence:
- You are able to
- apply the tools they have learned to case studies and exercises as well as simple practical tasks and systematically collect, interpret and evaluate relevant information. (Application and system competence)
- Analyze technical constructions (analysis skills)
- develop solutions based on the acquired instrumental knowledge (problem-solving skills)

Personal competence (social competence and self-competence):
- They are able to express complex technical information competently both in writing and orally, to understand technical problem solutions in order to find solutions in group work and to communicate with the relevant target group in a well-founded and effective manner. (Communication skills)

Course Content
- Strength calculation and material properties
- Axles, shafts and journals
- Rolling and plain bearings
- Positive and non-positive shaft-hub connections
- Screw connections
- Tolerances and fits
- Overview of gearbox types: belt, chain and gearwheel gearboxes
- Power flow
- Modeling
- Technical documentation and presentation
- Development project: Dimensioning of components and selection of suitable machine elements for a medical technology product

Teaching material / Reading
- Naefe, P.; Luderich, J.: Konstruktionsmethodik für die Praxis - Effiziente Produktentwicklung in Beispielen, Springer Vieweg, 2016 (eBook)
- Feldhusen, J.; Grote, K.-H.: Pahl/Beitz: Konstruktionslehre - Methoden und Anwendung erfolgreicher Produktentwicklung, Springer Vieweg, 8th edition, 2013 (eBook)
- Wittel, H.; et al: Roloff/Matek Maschinenelemente: Standardization, Calculation, Design, Springer Vieweg, 22nd edition (eBook)
- Harer, J.: Requirements for medical devices, Hanser, 2nd edition, 2014 (eBook)
- Dössel, O.: Imaging techniques in medicine, Springer Vieweg, 2nd edition, 2016 (eBook)

Internationality (in terms of content)
Internationality

The content is valid in any international industrial engineering environment.

Module examination (if applicable, note on multiple choice - APO §9a)
Method of Assessment

Form of examination[*1)]	Type/scope incl. weighting[*2)]	Learning objectives/competences to be tested
Written exam and project work	• Written exam (50%) 90 minutes: Knowledge of different levels can be tested in part by questions using the answer selection procedure. • Project work (50%)	• The entire learning content and competence profiles are tested via the aforementioned examination forms. • Written exam (technical and methodological competence) Project work (methodological and personal skills)

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Applied Image Processing

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T22	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester	30 *There is neither a claim to actual realization of the module nor to participation*

Module Convenor	Professor / Lecturer
Prof. Dr. Thomas Geigenfeind	Prof. Dr. Thomas Geigenfeind

Prerequisites*

- **Module: Data Science for Engineers (Introduction to Methods and Tools)**

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; instruction seminars; case studies; field trip; practical exercise	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Students can assess what problems can be tackled with image processing and computer vision
- Students know the basics of image processing with Python and OpenCV
- Students can implement a collection of fundamental computer vision tasks with the most common Python libraries
- Students learn to find their own solutions, develop methods for solving problems, discuss and overcome issues, and present results through supervised but independent programming exercises

Course Content

- Fundamental concepts of image processing (channels, datastructures, colorspaces,...)
- Image transformations
- Image restoration/enhancement (spatial filtering, denoising, …)
- Introduction to Convolutional Neural Networks and their applications for image related tasks
- Classification of image contents
- Object detection
- Selected real-world applications

Teaching Material / Reading

- Hands-On Image Processing with Python, Dey Sandipan Dey, Packt, 2018
- Practical Machine Learning and Image Processing, Himanshu Singh, Apress, 2019
- OpenCV with Python By Example, Prateek Joshi, Packt, 2015.

Internationality (content-related)

Image processing is applied worldwide in production environments.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/ Competencies to be Assessed
Module Work (ModA)	Multiple equally weighted programming case studies	The entire learning contents and competence profiles are assessed by way of the aforementioned examination form.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Industrial Applications of Data Science

Classification	Module ID	Kind of Module	ECTS
	T24	Elective	5

Location	Language	Duration of Module	Term/frequency	Max. Number of Participants
Weiden	English	One Semester	Summer	30 *There is neither a claim to actual realization of the module nor to participation*

Module Convenor	Instructor
Prof. Dr. Thomas Geigenfeind	Prof. Dr. Thomas Geigenfeind

Prerequisites*

- **Module: Data Science for Engineers (Introduction to Methods and Tools)**

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Forms of Instruction	Workload
The module is part of the "Science/Technology" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminaristic lecture	150h (60h contact time, 90h self-study)

Description of Qualifications

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Students have an overview of the data science and machine learning domain
- Students can assess what problems can be tackled with data science and machine learning
- Students learn to find their own solutions, develop methods for solving problems, discuss and overcome issues through supervised but independent programming exercises
- Students learn to give convincing presentations of their results

Course Content

- Overview of data science and its significance in the industrial sector
- Industry process frameworks for structuring data science related projects
- Typical data sources, storage solutions and ETL pipelines
- Predictive Maintenance and Quality Control
- Exploratory Data Analysis case studies on assorted samples of industry problems (selection of e.g. sales data analysis, customer segmentation, portfolio analysis, supply chain optimization,…) including typical features/KPIs, relevant algorithms (e.g. for time-series analysis), report generation and result presentation

Literature

- Data Science Concepts and Techniques with Applications (2nd edition), Usman Qamar, Springer, 2023
- Data Science for Business, Foster Provost, O'Reilly, 2013

Internationality (content-related)

internationally relevant topics

Examination (If applicable, note on multiple choice - § 22 para. 1 sentence 2 ASPO)

Form*1)	Scope/duration including weighting *2)	Learning Objectives/Competencies to be Assessed
Module Work (ModA)	Multiple equally weighted programming case studies	The entire learning contents and competence profiles are assessed by way of the aforementioned examination form.

*1) Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
*2) Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

Therapeutic Systems

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	M10	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	English	One Semester	Summer Semester	

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Ralf Ringler	NN

Voraussetzungen*
Prerequisites

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture; seminar-based teaching; exercise/project work; laboratory practical; excursion	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

- Knowledge and understanding of the fundamentals of therapeutic systems in medical technology;
- Ability to assess the methods of therapeutic procedures in medical technology.
- Ability to assess the technical appropriateness of individual therapeutic procedures and their application to patients in practice;
- Ability to independently expand and deepen the acquired knowledge of the functioning of therapeutic systems.

Inhalte der Lehrveranstaltungen
Course Content

- Structure and basics of therapeutic systems;
- Areas of application in outpatient and clinical medicine;
- Physical, technical and planning aspects of medical devices for therapeutic procedures;
- Medical technology using the example of radiotherapy, brachytherapy, therapy with open radioactive substances and X-ray therapy;
- Exercises in planning the installation of therapeutic systems with the specifications from the relevant DIN standards;
- Practical laboratory course with exercises on an irradiation planning system for brachytherapy or teletherapy therapy

Lehrmaterial / Literatur
Teaching Material / Reading

- Relevant literature will be announced in the lecture at the beginning of the semester.

Internationalität (Inhaltlich)
Internationality

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
Written exam	Written exam, 90 minutes duration	Almost all of the above-mentioned learning objectives, skills, course content, exercises and internship content are tested in the written examination.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Medical Product Development

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	M11	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	Englisch	One Semester	Summer Semester	

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Marc Hainke	N.N.

Voraussetzungen*
Prerequisites

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture; seminar-based teaching; exercise/project work	Contact time: 60 h Self-study: 20 h Project work: 70 h Total workload: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

After successfully completing the module, students have the following professional, methodological and personal skills:

Professional competence:
Students
- are able to abstract design tasks (functional analysis) and develop and evaluate various possible solutions (conception)
- acquire the ability to dimension and design complex machine parts (design)
- create designs using a commercial CAD programme (assemblies, technical drawings)

Personal competence (social competence and self-competence):

- They are able to express complex technical information competently in writing as well as orally, to find solutions in a group work, to understand technical problem solutions and to communicate with the relevant target group in a well-founded and effective manner. (Communication competence)

Inhalte der Lehrveranstaltungen
Course Content

- - Product development process (PEP)
- - Modular product structuring (interfaces)
- - Requirements for machine elements in medical devices
- - From requirements to validation: basic concept of product design and the V-model, processes, requirements engineering, systems engineering, implementation, design verification and design validation, product development according to ISO 13485, laws and standards, regulations, product liability, legal normative and organizational framework conditions
- - Models and virtual product development (FEM analyses with ANSYS)
- - Test plans and product safety
- - Technical documentation and presentation techniques
- - Development project

Lehrmaterial / Literatur
Teaching Material / Reading

- Relevant literature will be announced in the lecture at the beginning of the semester.

Internationalität (Inhaltlich)
Internationality

The contents of the course are internationally valid.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a) Method of Assessment		
Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
Module work (ModA)	Es werden mehrere Übungsleistungen erstellt, aus denen the overall grade is calculated. The content, date and weighting of the exercises will be announced at the beginning of the semester. Development project as group work with individual performances: 1. interim reports (written and oral, 30 %) 2. final presentation (20 %) 3. final report (50 %)	Almost all of the above-mentioned competencies are tested in the module work.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Medical Measurement Technologies

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	M12	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	English	One Semester	Winter Semester	

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Burkhard Stolz	N.N.

Voraussetzungen*
Prerequisites

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture; seminar-based teaching; exercise/project work; laboratory practical; excursion	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

After successfully completing the module, students have the following technical, methodological and personal skills:

- Knowledge and understanding of the fundamentals and special features of medical measurement technology compared to conventional measurement technology;
- Ability to independently set up and optimize medical measurement systems, analyze and quantify measurement errors, recognize and minimize undesirable influences on medical measurements, critically compare, select, adapt and evaluate different sensor principles and measurement methods in medical technology with regard to their suitability;
- Competence to act independently in the professional fields of development, research, design, production, sales and service in medical technology;
- Ability to reflect ethically on interdisciplinary problem areas of human medical measurement technology

Inhalte der Lehrveranstaltungen
Course Content

-
-Introduction, basics and special features of medical metrology
-Basic concepts of measurement technology: measurand, unit of measurement, SI system of units, standards
-Classification, conversion and characterization of measurement signals
-Various measurement methods and measuring equipment
-Evaluation of measurement results: Basic concepts, random or systematic deviation
-Basics of electronic measuring amplifiers and biosignal amplifiers
-Measurement of bioelectric signals and non-electric physiological variables

-Lecture-integrated seminar exercises on the above content

-Lecture-integrated practical course on topics: Introduction to the use of a universal digital biosignal amplifier; practical experiments, e.g. on electromyography (EMG), electrooculography (EOG), electroencephalography (EEG); implementation of selected case studies from medical measurement technology where applicable

Lehrmaterial / Literatur
Teaching Material / Reading

Relevant literature will be announced in the lecture at the beginning of the semester.

Internationalität (Inhaltlich)
Internationality

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a) Method of Assessment		
Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
Module work (ModA)	Several exercises are created from which the overall grade is calculated. The content, date and weighting of the exercises will be announced at the beginning of the semester.	Almost all of the above-mentioned competencies are tested in the module work.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

In-vitro diagnostics and pharmaceuticals

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	M13	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden and/or online	English	One Semester	Winter Semester	60

Module Convenor	Professor / Lecturer
N.N.	N.N.

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Medicine" module group in the Bachelor's degree programme in Medical Engineering (IME). The usability in other courses of study must be checked in each individual case.	Lecture, exercises, guest lecture	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successfully completing the module, students have the following technical, methodological and personal skills:
Expertise
• Knowledge and understanding of the basics, areas of application and limitations of in-vitro diagnostic systems and their application
• Knowledge of the structure and function of in-vitro diagnostic systems
• Development of an awareness of the direct connection between diagnostics and therapy and their interaction in the healthcare system
• Knowledge and understanding of the production, application and mode of action of pharmaceutical products

Methodological competence
• Application of the knowledge learned to simple case studies and exercises as well as simple practical tasks (application and system competence)

Personal competence
• Absorb complex information, understand scientific issues and communicate well-founded and effectively with the relevant target group (communication skills)

Course Content

- Importance of laboratory medicine
- In vitro diagnostic systems: clinical chemistry, immunology and molecular diagnostics;
- Applications of in-vitro diagnostics decentralized and local;
- Automation in in-vitro diagnostics
- Dosage forms of medication
- Pharmacokinetics and dynamics
- Drug development and approval
- Manufacturing of medicines

Teaching Material / Reading

- Relevant literature will be announced in the lecture at the beginning of the semester.

Internationality (content-related)

The course content is internationally and universally relevant and applicable.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided via Moodle and explained in the first lecture.	With the exam, all of the above-mentioned competencies are tested.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Business Model Innovation

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E10	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
vhb	English	One Semester	Winter semester	Depending on availability

Module Convenor	Professor / Lecturer
Prof. Dr. Julia Heigl	Prof. Dr. Julia Heigl

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study and project work: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:

- Students analyze current and expected environment, industry, and company specifics, particularly with regard to the effects of digitization (and other megatrends).
- Students will analyze customer needs and develop new value propositions.
- Students will analyze, develop and evaluate business models, including revenue model and necessary architecture (resources, activities, partnerships).

Methodological Skills:

- The students apply common methods of business model development, requirements and needs analysis as well as innovation approaches for the further development of the business model in a concrete (practical) project. They use personas, business model canvas and other templates.
- Students recognize intercultural and interdisciplinary challenges in teamwork and adapt their working methods accordingly.
- The students use digital cooperation and communication tools.

Personal Skills (Social Competence and Self-competence):

- Students will be able to cooperatively plan and execute a team project on time, working effectively and thoughtfully, especially in a heterogeneous, interdisciplinary, and international team, and if necessary, leading the team.
- Students will be able to communicate results effectively and express complex information concisely and comprehensively, both orally and in writing.

Course Content

Global megatrends such as digitization have a radical impact on what and how companies create benefits for customers (value proposition innovation), how these benefits are delivered (architectural innovations) and how companies earn money (revenue model innovations). Therefore, existing business models must be deliberately changed in the sense of a business model innovation or others must be created from scratch. In contrast to product or process innovations, business model innovations thus directly address a company's business model. Not only are customer needs better satisfied, but the basic structures and competitive rules of the industry are also called into question.

As part of the module, students work on an international project in teams with students from other universities on a current, real-life practical issue in which a new platform business model (virtualtraveller.com) is to be scrutinized and made more attractive for both end users (young travelers) and advertisers (including FinnAir, Samsung, but also small local providers).

The task will be worked on in defined sub-steps, supported by teaching units on the following topics:
- Working with the Business Model Canvas: analysis, development and evaluation of an own business model.
- Impact of digitalization and other megatrends on business models and organizations
- Platform business
- Basics of the design thinking process
- Understanding user groups and their needs, requirements and problems (developing persona)
- Working with a 360° camera, shooting your own filem
- Brainstorming and creativity techniques
- Evaluating market potential and revenue model
- Business models in practice

Teaching Material / Reading

Kim, W. C./Mauborgne, R.: How to create uncontested market space and make the competition irrelevant. Harvard Business Review, 4. Jahrgang (2005), Nr. 13, 1-2.

Osterwalder, A./Pigneur, Y.: Business model generation: a handbook for visionaries, game changers, and challengers. John Wiley & Sons, 2010.
Robier, J.: UX Redefined. Winning and Keeping Customers with Enhanced Usability and User Experience, Springer 2016.

Internationality (content-related)

The project takes place in cooperation with the universities Haaga-Helia University of Applied Sciences, Helsinki/Finland and Thomas More Hoge-school, Geel/Belgium.
Teams are international and must communicate in English.
The accompanying lectures will also be held in English.
The practical question dealt with is of international relevance.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination[*1)]	**Type/Scope incl. Weighting** [*2)]	**Learning Objectives/Competencies to be Assessed**
Module work (ModA)	Project work (written + oral) in groups of approx. 6 students each (2 from Weiden, 4 from Finland and/or Belgium) on a business question presented at the beginning of the semester in several phases, which are presented at the project kickoff and are to be worked on successively. Each student has to contribute individually to the common task. The overall results are to be submitted in the form of a pitch video (English) as well as a written summary (approx. 15 pages per German group of 2, language English or German), weighting 50/50.	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

[*1)] Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
[*2)] Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Technischer Einkauf
Technical Purchasing

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	E11	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden und online	Deutsch	Einsemestrig	Wintersemester	25

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Julia Heigl	Harald Klose

Voraussetzungen*
Prerequisites

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Seminaristischer Unterricht mit Übungen und Fallstudien	Kontaktzeit: 60 h Eigenstudium: 90 h Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Nach Abschluss des Moduls sind die Studierenden in der Lage:

Fachkompetenz:
- diskutieren anhand technologischer Innovationen und des Produktlebenszyklus die Rolle und die Aufgaben der Einkaufsorganisation sowie die lang- und kurzfristigen Herausforderungen der Beschaffung
- kennen unterschiedliche Beschaffungsziele und Standpunkte (Hersteller, Entwickler, Lieferant, Beschaffer)
- verstehen die Bedeutung von strategischen Entwicklungspartnern
- erläutern Beschaffungsstrategien sowie die Hintergründe von Lieferantenstrategien.
- lernen verschiedene Einkaufsorganisationen kennen.
- erkennen Bedarfe, definieren Anforderungsprofile, klassifizieren Beschaffungsobjekte und verstehen Lasten- und Pflichtenhefte.
- sammeln Informationen über Beschaffungsmärkte, deren Strukturen und Zusammensetzung
- suchen und qualifizieren Lieferanten
- verstehen den Prozess des Anfragemanagements und kennen Möglichkeiten beim Aufbau von Wettbewerbsdruck sowie die Chancen und Risiken des Global Sourcing
- verstehen Kennzahlensysteme zur Erfolgsmessung
- diskutieren den Einsatz von KI und elektronischen Auktionen

Methodenkompetenz:
- klassifizieren Produkte mithilfe von Methoden wie ABC & XYZ-Analyse
- führen Make-or-Buy Analysen durch
- entwickeln ein einfaches Lieferantenbewertungssystem, z.B. mittels Nutzwertanalyse
- bewerten Angebote, Preisstrukturen und Lieferanten
- kennen Methoden und Aufgaben des Cost Engineering
- kennen verschiedene Verhandlungsstrategien und nutzen Verhandlungstaktiken
- können Methoden des Risk Monitorings anwenden

Persönliche Kompetenz (Sozialkompetenz und Selbstkompetenz):
- Die Studierenden sind in der Lage strukturierte Entscheidungen zu treffen, Ergebnisse effektiv zu kommunizieren und komplexe Informationen prägnant und umfassend sowohl schriftlich als auch mündlich kompetent auszudrücken.
- können sich eigenständig einen Überblick über die wesentlichen technologischen Aspekte der modernen Beschaffung erarbeiten, reflektieren dabei gewonnene Erkenntnisse kompetent, dokumentieren nach technisch-wissenschaftlichen Standards, und präsentieren ihre Ergebnisse überzeugend

Inhalte der Lehrveranstaltungen
Course Content

- Einführung in das Beschaffungsmanagement
- Aufgaben der Beschaffung entlang des Produktentstehungsprozesses und des Produkt Life Cycles (Value- und Innovationsmanagement, Lieferantenmanagement, Ersatzteilgeschäft), Cost Engineering (Konzeptwertanalysen bis zu Produktkalkulation: Zero Base, Best Practice, Optimierung)
- Beschaffungsziele und deren Gewicht (z.B. Nachhaltigkeit, Kosten, Versorgungssicherheit)
- Aufbau einer Sourcing-Strategie (z.B. Single/Dual/Multiple, Global/Local, Make/Buy)
- Beschaffungsorganisationen, Aufgaben strategisch vs. operativ, Lokalisierungen, Werkeversorgung (zentral oder lokal)
- Bedarfserkennung
- Beschaffungsmarktforschung
- Lieferantenqualifizierung und Anfragemanagement
- Angebotsanalyse
- Verhandlungsmanagement

- Beschaffungs- und Risk-Controlling
- Lieferantenmanagement
- Diskussion, Recherche, Austausch zu aktuellen Trends und Technologien des Beschaffungsmanagements

Lehrmaterial / Literatur
Teaching Material / Reading

- Arnolds, Hans / Heege, Franz / Röh, Carsten / Tussing, Werner: Materialwirtschaft und Einkauf, Wiesbaden: Springer-Gabler
- Krampf, Peter: Beschaffungsmanagement, München: Vahlen;
- Lemme, Markus: Gewinnfaktor Einkauf, Berlin: Cornelsen;
- Schuh, Christian (Hrsg.): Einkaufsmanagement. Handbuch Produktion und Management, Berlin/Heidelberg: Springer;
- Schuh, Christian / Bremicker, Michael: Der Einkauf als Margenmotor - Methoden zur Kostensenkung. Wiesbaden: Gabler/GWV
- Grossmann, Matthias, Renningen: Die 10 Schritte zum Einkaufserfolg

Jeweils neueste Auflage

Skript, Übungsaufgaben sowie weitere Informationen werden über das Lernmanagementsystem „Moodle" zur Verfügung gestellt. Eine Registrierung für den Kurs ist daher erforderlich. Das Passwort wird im ersten Termin bekannt gegeben.

Internationalität (Inhaltlich)
Internationality

Tw. englischsprachige Literatur, Fallstudien, Fallbeispiele international tätiger Unternehmen, internationaler Bezug bei fast allen Inhalten. Es wird auf Möglichkeiten und Grenzen des Global Sourcing eingegangen. Die erlernten Methoden haben internationale Gültigkeit.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
PrA	Projektarbeit (schriftl. 50% + mündl. 50%) in Teams für Aufgabenstellung aus einem der folgenden Themengebiete: • Elektronische Auktionen • Einsatz von KI • Kennzahlensysteme • Global Sourcing im aktuellen Kontext • Risk Monitoring Die Ergebnisse jeder Projektarbeit sind in Form einer Präsentation (ca. 6-7 Minuten /Teammitglied) mündlich vorzustellen sowie in Form einer schriftlichen Ausarbeitung (ca. 10 Seiten/Teammitglied) zusammenzufassen.	Im Rahmen der Projektarbeit werden nahezu alle der definierten Kompetenzen abgeprüft.

[*1)] Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
[*2)] Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

Unternehmensplanung und -führung

Corporate Strategic Planning and Management

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	E12	Elective	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden und/oder online	Deutsch	einsemestrig	Winter semester	

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Dr. Stefanie Steinhauser	Prof. Dr. Dr. Stefanie Steinhauser

Voraussetzungen*
Prerequisites

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Seminaristischer Unterricht mit Planspiel, Übungen und Fallstudien	Kontaktzeit: 60 h Eigenstudium: 90 h Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Fachkompetenz:

- die gängigen theoretischen und praxisüblichen Ansätze und Instrumentarien zur Analyse, Formulierung und Auswahl von Strategien sowie deren Implementierung zu beschreiben,
- relevante Funktionen der betrieblichen Leistungserstellung und -vermarktung und deren Abhängigkeiten zu beschreiben und mittels ausgewählter Kennzahlen zu beplanen,
- diese im Rahmen eines Unternehmensplanspiels sowie anhand von Fallstudien anzuwenden und Herausforderungen der Umsetzung im Unternehmensalltag zu verstehen. (Fachkompetenz Wirtschaft)

Methodenkompetenz:

- ausgewählte Kennzahlen zur Planung von Material- und Geldflüssen in der betrieblichen Leistungserstellung und -vermarktung zu beplanen,
- relevante externe Chancen und Risiken sowie interne Stärken und Schwächen systematisch zu sammeln und dabei insbesondere auch ihr Wissen aus Technologie und Ingenieurswissenschaften zu verwenden (Transfer Kompetenz) um diese Informationen zu interpretieren und zu bewerten, um sie in der Folge zur Strategieableitung zu nutzen (Anwendungs- und Systemkompetenz)
- Unternehmensstrategien und strategische Herausforderungen zumindest einfach mittels logischer, schlüssiger Argumentation und nachgewiesener Tatsachen zu analysieren. (Analyse- und Synthesekompetenzen)

Persönliche Kompetenz (Sozialkompetenz und Selbstkompetenz):

- das Handeln der Unternehmensführung ethisch und in Bezug auf diverse Anspruchsgruppen zu reflektieren. (Ethikkompetenz)

Inhalte der Lehrveranstaltungen
Course Content

- Grundlagen der Unternehmensführung
- Normatives Management: Unternehmensziele, Vision, Mission, Unternehmensverfassung und -kultur
- Strategisches Management auf Geschäftsfeld- und Unternehmensebene
- Unternehmensplanspiel: Die Studenten übernehmen dabei die Rolle des Geschäftsleitungsgremiums und konkurrieren in Teams. Komplexe Entscheidungssituationen u.a. Wettbewerbsstrategien, Portfolio Management, Festlegen von Produkteigenschaften, Preis, Vertrieb und Kommunikation, Produktions- und Ressourcenplanung, Investitionsentscheidungen und Finanzierung, Personalmanagement, Rohstoffeinkauf und Logistik) werden informationsunterstützt in der Gruppe aufbereitet und bearbeitet. Entscheidungen werden auf Basis von betriebswirtschaftlichen Analysen (u.a. Finanzberichte: Bilanz, GuV, Kapitalflussrechnung, Segmentbericht; Kostenrechnung; Steuerung mit Kennzahlen zur Rentabilität, Liquidität, Finanzierung, Vermögensstruktur) und Berechnungen fundiert getroffen. Die Studierenden erhalten bzw. erarbeiten sich dazu Planungs- und Steuerungstools. Die Studierenden erstellen Ausarbeitungen zu strategischen Entscheidungen sowie Kapitalmarktentscheidungen. Das Planspiel schließt mit der Simulation einer Hauptversammlung ab.

Lehrmaterial / Literatur
Teaching Material / Reading

- Hungenberg/Wulf „Grundlagen der Unternehmensführung" (Springer);
- Hungenberg „Strategisches Management in Unternehmen" (Springer Gabler);
- Junge „BWL für Ingenieure" (Springer Gabler);

jeweils neueste Auflage.

Skript, Übungsaufgaben sowie weitere Informationen werden über das Lernmanagementsystem „Moodle" zur Verfügung gestellt. Eine Registrierung für den Kurs ist daher erforderlich. Das Passwort wird im ersten Termin bekannt gegeben.

Internationalität (Inhaltlich)
Internationality

Tw. englischsprachige Literatur und Fallstudien; es werden zudem in Fallstudien generell international tätige Unternehmen analysiert und ausgewählte Besonderheiten eines internationalen Geschäfts mit Bezug auf die Veranstaltungsthemen erläutert und diskutiert.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform[*1)]	**Art/Umfang inkl. Gewichtung**[*2)]	**Zu prüfende Lernziele/Kompetenzen**
PrA	Projektarbeit (schriftl. + mündl.) in Teams zu Fragestellungen der Unternehmensplanung und -führung. Das Team legt ein Projektdokument (ca. 15 Seiten) vor. Das Ergebnis wird innerhalb einer mündlichen Präsentation durch die Teammitglieder vorgestellt und im Plenum diskutiert. Jedes Teammitglied muss präsentieren.	In der Projektarbeit werden alle o. g. Kompetenzen geprüft.

[*1)] Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
[*2)] Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

International Marketing

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E13	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
vhb	English	One Semester	On lecturer	Depending on availability

Module Convenor	Professor / Lecturer
Prof. Dr. Dirk Holtbrügge (vhb, FAU Nürnberg)	Prof. Dr. Dirk Holtbrügge (vhb, FAU Nürnberg)

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study and project work: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

The participants acquire detailed expertise in the field of international marketing. Effective international marketing is increasingly important for companies due to rising international connectivity between countries and companies, and companies' need to grow by selling their products and services globally. They can understand, explain, reflect, and apply the theories, concepts, and terminology of the field and are familiar with empirical studies in the field of international marketing. The participants understand the challenges of international marketing and can independently develop solutions for problems to questions of standardization and differentiation in an international context, of international market entry, and of the design of the marketing mix in an international context. They also understand these aspects with regard to different industries (B2B, B2C) and different countries Special attention is paid to the transfer of theoretical contents to practical examples. Therefore, different country and company case studies are included in the form of video interviews. The participants are provided with interesting insights into the international marketing activities of several international companies headquartered in the Nürnberg Metropolitan Area.

Course Content

Course structure
I. Foundations
1. Challenges and Opportunities of International Marketing
II. Methods
2. International Market Research
III. Strategies
3. International Market Entry Strategies
4. Standardization vs. Differentiation of International Marketing
IV. Policies: International Marketing Mix
5. International Product Policy
6. International Price Policy
7. International Placement Policy
8. International Promotion Policy

Teaching Material / Reading

https://kurse.vhb.org/VHBPORTAL/kursprogramm/kursprogramm.jsp?kDetail=true&COURSEID=14039,74,1407,1

Internationality (content-related)

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Seminar paper, for details please see vhb.	The entire learning contents and competence profiles are assessed by way of the aforementioned examination form.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

International Supply Chain Management

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E14	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
vhb	English	One Semester	On lecturer	Depending on availability

Module Convenor	Professor / Lecturer
Prof. Dr. Jörg Franke (vhb, FAU Nürnberg)	Prof. Dr. Jörg Franke (vhb, FAU Nürnberg)

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study and project work: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Supply chain management "[…] encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners [...]. In essence, Supply Chain Management integrates supply and demand management within and across companies."

Course Content

Course structure
1. Integrated Logistics, Procurement, Materials Management, and Production
2. Material Inventory and Material Requirements in the Enterprise
3. Strategic Procurement
4. Management of Procurement and Purchasing
5. In-Plant Material Flow and Production Systems
6. Distribution Logistics, Global Tracking and Tracing
7. Modes of Transport in International Logistics
8. Disposal Logistics
9. Logistics Controlling
10. Network Design in Supply Chains
11. Global Logistic Structures and Supply Chains
12. IT Systems in Supply Chain Management
13. Sustainable Supply Chain Management

Teaching Material / Reading

Communicated by lecturer.

Internationality (content-related)

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Communicated by lecturer.	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Performance Management in Teams

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	E15	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
vhb	English	One Semester	On lecturer	Depending on availability

Module Convenor	Professor / Lecturer
Prof. Dr. Klaus Moser (vhb, FAU Nürnberg)	Prof. Dr. Klaus Moser (vhb, FAU Nürnberg)

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Economics" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study and project work: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Performance management is a comprehensive systematic approach aimed at aligning the performance of groups and individuals with organizational goals and strategy and at achieving continuous improvement. Strategically derived performance indicators and motivational interventions such as goal setting, feedback, and participation are core elements of performance management. This course covers several topics that are relevant for the design of effective performance management systems.

Course Content

Course structure
1. Motivational Theories
2. Performance Evaluation
3. Productivity Measurement and Enhancement System (ProMES)
4. Case Study
5. Developing a Team Vision
6. Developing Objectives
7. Developing Indicators
8. Developing Contingencies
9. Developing a Feedback Report

Teaching Material / Reading

Communicated by lecturer.

Internationality (content-related)

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Communicated by lecturer.	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Interdisciplinary

Smart Factory

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I10	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester, start expected 2024/25	30 *There is neither a claim to actual realization of the module nor to participation*

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	Prof. Dr. Kris Dalm

Prerequisites*

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial Engineering (IIE). The usability in other courses of study must be checked in each individual case.	details to be specified in the first semester the module is taught	Contact time: 60 h Self-study: 90 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

In this module, students develop the Weiden Smart Factory by conducting several projects within the factory. Students define projects and apply the visited lectures to conduct them, e.g., Project Management, Industrial Engineering or Communication Technology.

Projects can be (selection):
- Human-Robot-Interaction and mobile/stationary robot applications
- Assembly applications and worker assistant systems
- Predictive maintenance procedures
- Augmented/Virtual Reality applications
- Communication technology and automation applications (e.g., for training purposes)
- Logistics application (e.g., AGVs, RFID, 5G)

Technologies and methods that can be applied (selection):
- Machine Learning algorithms (both vision and data driven)
- Digital technologies (e.g., AR/VR)
- Automation programmeming
- Data mining
- Human-Robot-Interaction
- Software/hardware development

Course Content
- Defining and structuring of Smart Factory applications
- Project Management of defined project
- Conceptual engineering (design, CAD, PCB layout, etc.)
- Conduction phase (programmeming, assembling, etc.)
- Test/validation phase

Teaching Material / Reading
- Wengle, M., Dalm, K., Sahuji, R. (2023). Implementation of a Prototype Production Line based on concept of Industrial Digitalization in an existing Learning Factory environment. Reutlingen (13th Conference on Learning Factories - CLF 2023). Available at SSRN: https://ssrn.com/abstract=4456952
- Dalm, K. and Sahuji, R. (2021). Industrial Digitalization for Society - A Learning Factory Concept based on Four Pillars. Graz (11th Conference on Learning Factories - CLF 2021). Poster Publication. Available at SSRN: http://dx.doi.org/10.2139/ssrn.3858347

Internationality (content-related)

internationally relevant topics

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Project Work in Groups; each group must present their project result in a written format and a final presentation	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Research and Evaluation Methods

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I11	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester, start expected in 2024/2025	60

Module Convenor	Professor / Lecturer
Prof. Dr. Sebastian Buhl	Prof. Dr. Sebastian Buhl

Prerequisites*

None
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lecture; instruction seminars; practical exercise	Contact time: 60 h Self-study: 60 h Module work preparation: 30 h Total effort: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Be an able and critical consumer of research
- Be able to create a formal statement and proposal of research addressing well-formed research questions
- Understand the process of research inquiry and apply it to an appropriate research design
- Gain a practical working knowledge of a variety of research methods and analytical techniques relevant to research
- Understand and evaluate the advantages and disadvantages of quantitative and qualitative research.
- Critically analyze and evaluate existing research reports and identify the intent of the research
- Effectively communicate research findings through oral, visual and written methods

Course Content

• Role of research and scientific basics
• Development of a scientific topic
• Applied research design process
• Critical evaluation of published research
• Objectivity, validity and reliability
• Quantitative and qualitative research strategies
• Questionnaire design
• Observation methods
• Content and Data analysis
• Scientific reading and writing
• Time Management in scientific research

Teaching Material / Reading

Remler, D.K; (2015) Research Methods in Practice: Strategies for Description and Causation.
Franceschetti, D.; (2017) Principles of Scientific Research.
Voss, R. (2024) Wissenschaftliches Arbeiten

Internationality (content-related)

Research is international and uniform international standards apply.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	*1. Development and creation of a scientific poster. Presentation of the poster in a poster exhibition. (50%)* *2. Further development of a scientific topic and preparation of a presentation. Presentation and defense of the topic in a presentation round. (50%)*	The form of examination covers the above mentioned professional and methodological skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Usability Engineering

Usability Engineering

Zuordnung zum Curriculum Classification	Modul-ID Module ID	Art des Moduls Kind of Module	Umfang in ECTS-Leistungspunkte Number of Credits
	I12	Wahlpflichtmodul/Vertiefung	5

Ort Location	Sprache Language	Dauer des Moduls Duration of Module	Vorlesungsrhythmus Frequency of Module	Max. Teilnehmerzahl Max. Number of Participants
Weiden	Deutsch	einsemestrig	Wird regelmäßig im Sommersemester angeboten	25

Modulverantwortliche(r) Module Convenor	Dozent/In Professor / Lecturer
Prof. Dr. Eva Rothgang	Andreas Gradl

Voraussetzungen*
Prerequisites

***Hinweis: Beachten Sie auch die Voraussetzungen nach Prüfungsordnungsrecht in der jeweils gültigen SPO-Fassung.**

Verwendbarkeit Availability	Lehrformen Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminaristischer Unterricht mit Übungen	Kontaktzeit: 60 h Eigenstudium: 90 h Gesamtaufwand: 150 h

Lernziele / Qualifikationen des Moduls
Learning Outcomes

Nach dem erfolgreichen Absolvieren des Moduls verfügen die Studierenden über die folgenden fachlichen, methodischen und persönlichen Kompetenzen:

Fachkompetenz:
Die Studierenden können nach dem Usability Engineering Prozess entwicklen.

Methodenkompetenz:
Die Studierenden können Methoden (z.B.Prototyping, Usability Testing inkl. Auswertung) anwenden, um das User Interface für den Benutzer effizient und effektiv zu entwicklen.

Persönliche Kompetenz (Sozialkompetenz und Selbstkompetenz):
Die Studierenden sind in der Lage nutzerzentriert zu denken und zu entwickeln. Sie sind in der Lage eigene Annahmen im Entwicklungsprozess zurückzustellen.

Inhalte der Lehrveranstaltungen
Course Content

Die Inhalte der Lehrveranstaltung orientieren sich am Curriculum „Certified Professional for Usability and User Experience" (CPUX). Anhand eines praxisnahen Beispiels wird der UX-Prozess zudem exemplarisch erarbeitet. Hierbei lernen die Studierenden auch den Einsatz von Softwaretools wie z.B. Axure für das High-Fidelity Prototyping.

Lehrmaterial / Literatur
Teaching Material / Reading

CPUX-F Curriculum und Glossar https://uxqb.org/wp-content/uploads/documents/CPUX-F_DE_Curriculum-und-Glossar.pdf
Weitere Literatur wird in der Vorlesung bekannt gegeben.

Internationalität (Inhaltlich)
Internationality

Die Inhalte sind international gültig.

Modulprüfung (ggf. Hinweis zu Multiple Choice - APO §9a)
Method of Assessment

Prüfungsform*1)	Art/Umfang inkl. Gewichtung*2)	Zu prüfende Lernziele/Kompetenzen
Übungsleistung (Übl)	Schriftlich, mündlich, praktisch: Aufgabe 1: Zwischenpräsentation, Gewichtung 25 %; Aufgabe 2: Dokumentation und prototypische Umsetzung, Gewichtung 75 %; Alle Prüfungsleistungen müssen im gleichen Studiensemester erbracht werden. Für entschuldigte Abwesenheit werden Ersatztermine angeboten.	Mit der Übungsleistung werden alle oben genannten Kompetenzen geprüft.

*1) Beachten Sie dazu geltende Übersicht zu den Prüfungsformen an der OTH Amberg-Weiden
*2) Bitte zusätzlich Angaben zur Gewichtung (in % Anteil) und ggf. auch einen Hinweis auf ein Bonussystem führen

Ethics in Business and Technology

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I13	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Summer Semester, start expected in 2024	60

Module Convenor	Professor / Lecturer
Prof. Dr. Dr. Theresa Götz	Georg Klampfl

Prerequisites*

None

* **Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Lectures with integrated practical demonstrations and exercises, project work	Contact time/coaching: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Part A: Foundations of Business Ethics

- define the term business ethics and understand its importance to business.
- be familiar with ethical theories in the context of business and be able to apply them to practice.
- develop an understanding for different market participants in terms of consumer, producer and investor ethics.
- explain the different forms of business ethics standards and concepts.
- be familiar with the difference between Corporate Giving and Corporate Volunteering.
- explain the different types of business ethics instruments.
- identify and apply suitable forms of ethical instruments for companies in practice.

Part B: Foundation of Technology Ethics:

- define the term and the associated subject area of technology ethics and relate it to the social challenges of new technologies.
- be familiar with ethical decision-making models in the context of technology ethics and apply these to case studies.
- develop and apply appropriate evaluation and consideration criteria for (new) innovative technologies.
- develop their own ethical position on technology ethics and apply it in ethical-argumentative discussions.
- understand the content of technology assessment and develop an understanding of future relevant developments in technology ethics

Course Content

This course explores the ethical challenges facing businesses and digital technology today, and how individuals and firms can address those challenges. The course aims to enhance the skills and expertise of participants through combining examination of ethical and managerial theory with discussion of common ethical problems in context. This achieved using real-world examples throughout the text and extended case studies at the end of each chapter. Course material includes individual moral theory, the development of ethical organizational culture, the development of ethical management systems designed to respond to ethical challenges, and wide-ranging discussion regarding major trends, challenges, and opportunities in the field of ethical business and technology ethics.

Part A (weeks 1-5): Foundations of Business Ethics

Week	Topic	Reading	Suggested Learning Outcomes
1	**Fundamentals of business ethics**	*Chapter 1*	• provide a basic definition of business ethics • distinguish between ethics, morality, values and norms • evaluate the importance of business ethics as an academic subject and as a practical management issue • specify ethical challenges in different types of organisations • explain the different sub-areas of applied ethics
2	**Theories and applications of (business) ethics**	*Chapter 2*	• distinguish the stages of moral development according to Kohlberg • provide an overview of the historicity of moral theories • explain the different major theories of ethics • critically evaluate the previously learned theories • apply the theories to current examples of real-life companies
3	**Responsibility of market participants**	*Chapter 3*	• provide an overview of the different market participants and their ethical approaches • distinguish between the different reference levels of business ethics • understand and critically reflect consumers, producers and investor ethics

4	**Business ethics standards and concepts**	*Chapter 4*	• explain the different concepts of business ethics • distinguish between Corporate Giving and Corporate Volunteering • critically reflect the benefit of the different standards for companies • apply Corporate Social Responsibility, Corporate Citizenship and Corporate Governance in business cases
5	**Instruments of business ethics**	*Chapter 5*	• provide a basic definition of Value Management • distinguish between normative, organizational and resolution instruments • analyze and critically reflect examples of corporate ethics instruments • explain the different process stages of value management

Part B (weeks 6-10): Foundations of Technology Ethics

Week	Topic	Reading	Suggested Learning Outcomes
6	**Introduction to Technology Ethics, overview of relevant application areas**	Chapter 6	• understand and define the term technology ethics • overview and describe areas of application of technology ethics
7	**Ethical decision-making models in the context of technology ethics**	Chapter 7	• obtain an overview of ethical decision-making models in the context of technology ethics • select and apply relevant evaluation and consideration criteria • develop an own position on the topic of technology ethics
8	**Application of theoretical models to technical-ethical questions, ethical aspects of digital technologies**	Chapter 8	• apply theoretical models appropriately to questions of technological ethics (e.g. autonomous driving) • gain an overview of ethical aspects of digital technologies
9	**Technology assessment and Quo Vadis technology ethics**	Chapter 9	• understand the process of technology assessment • apply individual elements of the process to technical and digital examples • gain an understanding of unresolved ethical issues in relation to new technologies • be able to make accurate assessments of future developments in technology ethics
10	**Final presentation and discussion of the seminar paper**	Chapter 10	• Presentation of a selected technical-ethical challenge • conducting an ethically coherent discussion on the seminar topic • subsequent shooting of a one-minute video on takeaways from the seminar topic and the event

Teaching Material / Reading

- Crane, Matten et. al. (2019): Business Ethics - Managing Corporate Citizenship and Sustainability in the Age of Globalization (5th edition), Oxford New York: Oxford University Press
- Dörr, S. (2021): Corporate Digital Responsibility – Managing Corporate Responsibility and Sustainability in the Digital Age (1st edition), Berlin: Springer Verlag GmbH
- Farrel, O. C., Fraedrich, J., Farrel, S. (2021). Business Ethics: Ethical Decision Making and Cases (13th edition), Boston: Cengage
- Kefi, H. (2015): Information Technology Ethics – Concepts and Practices in the Digital World (1st edition), Newcastle: Cambridge Scholars Publishing
- Siep, Ludwig (2022): Ethics and the limits of technology (1st edition), Paderborn: Brill mentis
- Velasquez, M. G. (2014). Business Ethics: Concepts and Cases (7th edition), Harlow: Pearson Education Limited
- van de Poel, I.; Royakkers, L. (2011): Ethics, Technology, and Engineering - An Introduction, (1st edition), Chichester, West Sussex: Wiley-Blackwell

Werthner, H., Ghezzi, C., Kramer, J., Nida-Rümelin, J. (2024): Introduction to Digital Humanism – A Textbook (1st edition), Cham: Springer Nature Switzerland

Internationality (content-related)

the topic is internationally applicable and relevant

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	50 % weighting each for business ethics and technology ethics: proven by seminar paper (written + oral) for freely selectable business and ethical issues: • written elaboration (approx. 10 pages) • presentation of the results (30-minute presentation incl. discussion) shooting of a 1-minute summary video (reflection on the presentation and the lecture)	The form of examination covers the above mentioned professional and methodological skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Practical Project

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	T23, E16, M14, I14	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Depending on availablility	30 *There is neither a claim to actual realization of the module nor to participation*

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	Respective professor depending on project

Prerequisites*

Participation must be coordinated in advance with the person responsible for the module.
Please check AVIS-Module in Moodle for available projects or discuss with professors directly.
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the different module groups in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Depending on the respective programme	150h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Acquisition and application of specific knowledge to a pratical problem in the fields of science/engineering, economics, medicine or interdisciplinarity.

Course Content

Depending on the type of project.

Project must be defined and arranged before semester starts with respective professor, initiated by student or student group.

Teaching Material / Reading

Will be provided by respective professor

Internationality (content-related)

Internationally relevant topics, e.g. Smart Factory.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Details will be provided by the respective lecturer.	The entire learning contents and competence profiles are assessed by way of the aforementioned examination form.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Entrepreneurial Project 1: Developing a Digital Solution

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I15	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester	30

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	Matthias Pohl

Prerequisites*

Project Management

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

In this module, students develop digital solutions based on innovations and questions from industrial companies. Students work solution-oriented in order to develop a digital solution. The procedure starts with understanding the issues, planning the project professionally based in project management tools, developing the solution (e.g. in form of a prototype) and presenting it to the "customer". Finally, usability and acceptance engineering will be conducted based on the developed prototype. The projects can also be self-invented.

Professional and Methodological Skills:

- Applied project management (classic and agile)
- User-centered development and design
- (Rapid)-Prototyping
- Acceptance engineering
- Usability engineering

Personal Skills and Competencies:

- Interaction with real industrial questions
- Communication with industrial companies
- Critically reflect upon own ideas
- Solution-driven thinking
- Presentation skills

Course Content

- Applied project management (classic and agile)
- User-centered development and design
- (Rapid)-Prototyping
- Acceptance engineering
- Usability engineering
- Presentation

Teaching Material / Reading

- Greene: Entrepreneurship Theory and Practice. 2020. ISBN 978-1137589552.
- Adithan: Rapid Prototyping. 2015. ISBN 978-8126920556.
- Brooke, J. (1996) SUS - A quick and dirty usability scale, Usability Evaluation in Industry.
- Weiss, A., Bernhaupt, R., Lankes, M. and Tscheligi, M. (2009) The USUS evaluation framework for human-robot interaction, Proc. of AISB 09. 4. 11-26.

Internationality (content-related)

Students develop digital solutions in cooperation with international companies.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed

Module work (ModA)	Project Work in Groups, including final presentation and documentation	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Entrepreneurial Project 2: Business Plan for a Digital Product

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I16	Mandatory	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Weiden	English	One Semester	Winter Semester, start expected in winter 2024/25	30

Module Convenor	Professor / Lecturer
Prof. Dr. Jens Löbus	Prof. Dr. Jens Löbus

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Seminaristic lecture, team work	Contact time/coaching: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Know the important concepts and instruments of entrepreneurship.
- Identify and understand the determinants of successful entrepreneurship and apply them.
- Find, analyse and evaluate business ideas in a systematic process.
- Develop and evaluate alternative solutions to individual modules of a business plan and select the best possible solution alternative with regard to the success potential of the business idea.
- Understand the interactions between the planning modules of a business plan and adjust the planning parameters accordingly.
- Present a convincing business idea for potential investors.

Course Content

Team project continued: business plan, commercialisation and business model for developed digitisation solution.

- Finding ideas for an innovative and sustainable business idea and evaluating them with regard to their prospects of success.
- Methods for the development of a business plan.
- Linking elementary economic basic functions (e.g. planning, evaluating, analysing consequences, adjusting planning parameters) along the steps to create a business plan for a business idea in an iterative process.
- Development of a business plan containing all essential components for the documentation and presentation of a business idea to potential investors:
  o Trigger, Background
  o Product and service
  o Customer benefits and USPs (Unique Selling Proposition) o Entrepreneur team
  o Market and competition
  o Target groups, marketing and sales
  o Business system and organization
  o Timetable for implementation
  o Opportunities and risks
  o Financial plan and financing

Teaching Material / Reading

- Abrams, R. (2014): Successful Business Plan, 6th edition, Redwood City, CA: Planning Shop.
- Pinson, L. (2014): Anatomy of a Business Plan, 8th edition, Tustin, CA.: Out of Your Mind & Into The Marketplace.
- Schwetje, G./Vaseghi, S. (2007): The Business Plan, Berlin: Springer.

Internationality (content-related)

Students are encouraged to develop ideas that have the potential for a potential international commercialization; Entrepreneurship, business plans and business models are universally relevant topics.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Project Work in Groups -Details to follow-	The group project is used to test the practical learning content and competence profiles

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden

*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Basic Sustainability

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I17	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
vhb	English	One Semester	On lecturer	Depending on availability

Module Convenor	Professor / Lecturer
Prof. Dr. Robert Feicht (vhb, TH Deggendorf)	Prof. Dr. Robert Feicht (vhb, TH Deggendorf)

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study and project work: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

The consistent overstepping of planetary boundaries by humans is the cause of many environmental problems and social tensions regionally, globally and between generations. For sustainable development in the sense of a fair distribution of resources, an interdisciplinary approach to solutions and the consideration of the interrelationships of social, ecological and economic factors and actors are indispensable. The course "Basics Sustainability" teaches the most important sustainability models and analysis methods for sustainable development. From environmental and resource economics, basic methods for a fair distribution of environmental goods as well as environmental policy instruments and tools for sustainable spatial design are presented. With regard to materiality, the goal is the use of renewable raw materials for the production of materials and products, the recycling or pollutant-free landfilling of existing products and materials, and the optimisation of natural processes from a material and energy point of view. Against the background of climate change, students learn about current technologies and developments and assess measures in the field of renewable energy systems in the context of grid expansion, energy distribution and storage technologies.

Course Content

Course structure
1. General principles of sustainability
2. Economic framework for sustainability
3. Materiality and sustainability
4. Energy and sustainability

Teaching Material / Reading

Communicated by lecturer.

Internationality (content-related)

internationally relevant topics

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Communicated by lecturer.	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Blockchain Applications for Business

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	I18	Elective	5

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
vhb	English	One Semester	On lecturer	Depending on availability

Module Convenor	Professor / Lecturer
Prof. Dr. Björn Ivens (vhb, Otto-Friedrich-Universität Bamberg)	Prof. Dr. Björn Ivens (vhb, Otto-Friedrich-Universität Bamberg)

Prerequisites*

None

*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
The module is part of the "Interdisciplinary" module group in the Bachelor's degree programme in Industrial /Medical Engineering (IIE/IME). The usability in other courses of study must be checked in each individual case.	Guided project work	Contact time/coaching: 60 h Self-study and project work: 90 h Total workload: 150 h

Learning Outcomes

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

In order to account for the increasing importance of blockchain technology in business practice and in order to get students ready for this new wave of innovation, we created this course, entitled "Blockchain Applications for Business". In a nutshell, by taking this course, students can acquire a holistic understanding of basic blockchain fundamentals and gain comprehensive insights into the potential of blockchain technology in a multitude of business use cases. That said, this course will help students understand current developments in blockchain from many diverse perspectives and lay a solid foundation to further explore the blockchain topic.

Course Content

Course structure
1. Foundations of Blockchain Technology and Applications
1.1 Introduction to Blockchain Technology
1.2 Tech Basics of Blockchain Technology
1.3 Exploring the Bitcoin Whitepaper
1.4 Hands-on Tutorial: Smart Contracts on Ethereum
2. The Value Proposition of Blockchain Technology
2.1 Strengths and Weaknesses of Blockchain Technology
2.2 Identifying Business Opportunities in the Blockchain Space
3. Blockchain Use Cases in Different Business Areas
3.1 Use Cases of Blockchain: Introduction & Marketing
3.2 Use Cases of Blockchain: Finance Industry
3.3 Use Cases of Blockchain: Automotive Industry
3.4 Use Cases of Blockchain: Supply Chains & IoT
3.5 Use Cases of Blockchain: Vocational Education Training
4. A Differentiated Perspective on Blockchain: Legal, Societal, and Ecological Aspects of Blockchain

Teaching Material / Reading

Communicated by lecturer.

Internationality (content-related)

internationally relevant topics

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Communicated by lecturer.	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Practical Phase

Internship

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	PS	Mandatory	30

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Location of the company / organization	Determined by place and company of the practical phase	One Semester	Offered each semester	

Module Convenor	Professor / Lecturer
Prof. Dr. Kris Dalm	

Prerequisites*

Successful completion of all modules of study section 1 and German level B2.2
*** Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
Applicability in the further course of studies: Successful completion of the internship semester is a prerequisite for registration for the bachelor's thesis. University-wide applicability: The usability in other study programmes must be checked in each individual case.	Pactical phase	Effort for internship: Duration 20 weeks in the company with a working time usual in the company for full-time work.

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Students have gained insight into a company's value creation processes through independent work in planning, organisation or control tasks or participation in projects.
- Students have applied and reflected on knowledge, methods and procedures which have been taught in the theoretic studies.

Course Content

- Independent work on projects and problems, the topics of which are closely related to the completed studies or represent a valuable addition.
- Application and deepening of knowledge, methods and procedures already gained, which are taught and conveyed in the theoretic studies.

Teaching Material / Reading

- Guideline for the practical study semester for the Bachelor's degree programmes of the Faculty of Industrial Engineering and Healthcare
- Training plan for the practical semester in the Bachelor's degree programmes of the Faculty of Industrial Engineering and Healthcare

Documents available at: https://www.oth-aw.de/myoth/studiengangsdokumente

Internationality (content-related)

Students who have acquired their university entrance qualification outside Germany are recommended to complete the internship in Germany, ideally in a company with an international orientation.
German students are recommended to complete the internship in a non-German speaking country.

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Internship report	Internship report with the rating "passed" (the report is reviewed by the supervisors of the internship).	The internship report is used to assess the overall learning content and competency profiles.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.

Bachelor Thesis

Bachelor Thesis

Classification	Module ID	Kind of Module	Number of Credits (ECTS)
	BA	Mandatory	10

Location	Language	Duration of Module	Frequency of Module	Max. Number of Participants
Not location-bound	English or German	Refer to SER	According to study progress	1

Module Convenor	Professor / Lecturer
Exam committee chair	First and second supervisor or first reviewer

Prerequisites*

Cf. Programme and Examination Regulations, General Examination Regulations.
Furthermore, the guidelines of the Faculty of Industrial Engineering and Healthcare "Wissenschaftliches Arbeiten: Preparation of a Thesis" must be observed. The current version is available on the OTH_Homepage under myOTH.

* **Note: Please also note the prerequisites according to the examination regulations in the respective valid SPO version.**

Usability	Teaching Methods	Workload
Bachelor Thesis in the study programme Diogital Technology and Management. The usability in other study programmes must be checked in each individual case.	Bachelor Thesis	300 h

Learning Outcomes
Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

- Independent methodical elaboration of a practice-relevant, definable (sub-)project in a study programmeme-related environment and written documentation in the form of a scientific paper.

Course Content

Depending on the task

Teaching Material / Reading

Own research

Internationality (content-related)

choice of an internationally relevant topic and/or company

Method of Assessment (if applicable, notes on multiple choice as form of examination - APO §9a)

Form of Examination*1)	Type/Scope incl. Weighting *2)	Learning Objectives/Competencies to be Assessed
Bachelor Thesis	The final thesis is to be written after individual consultation with the first examiner. Regulations for processing are contained in the study programme and examination regulations as well as in the general examination regulations. The guidelines of the Faculty of Industrial Engineering and Healthcare "Scientific work: Preparation of a Thesis" must be observed. The current version is provided on the OTH homepage under myOTH.	Depending on the specific task, the above-mentioned competencies are tested via the bachelor thesis.

*1) Please refer to the applicable overview of the forms of examination at the OTH Amberg-Weiden
*2) Please provide additional information on the weighting (in % share) and, if applicable, explain the bonus system.