Study regulations of the
FH Bachelor Degree

Industrial Engineering and Management

To obtain the academic degree

Bachelor of Science,
abbreviated B.Sc.

as an appendix to the statutes of the FH Kufstein Tirol

Organizational form: Full-time
Duration: 6 Semesters
Scope: 180 ECTS
Places for beginners per academic year: 30 Full-time

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1 JOB PROFILES

1.1 Occupational fields

Due to their wide-ranging technical and economic training, graduates of the Bachelor degree program in Industrial Engineering and Management have a multitude of career opportunities at the interface of technology and business.

The graduates find employment opportunities in the following regional core industries:

- Construction industry
- Chemical and pharmaceutical industry
- Electrical engineering and electronics companies
- Energy industry
- Equipment manufacturers
- Timber industry
- Production of consumer and industrial goods
- Mechanical and plant engineering
- Public sector
- Transport and traffic industry

Within these sectors, graduates can work in the following professional fields, for example:

(1) Product management
Product management tasks include market studies to identify economic and technical trends, the translation of these findings into market and customer requirements and derived technical requirements, support in product development, production, market launch, sales and after sales. In a different organizational structure in terms of functional specialization, this corresponds to the occupational fields of innovation and technology management, as well as product marketing.

(2) Production planning, production control & production logistics
Logistics and supply chain management, which have meanwhile developed into a cross-sectional discipline, as well as the close integration of logistics with production planning and control, offer industrial engineers a broad field of activity thanks to their interface competence and versatility. Tasks in this area are:
- **Production program planning**, materials management, scheduling and capacity planning, production control and order monitoring. Analysis and optimization of transport structures with regard to costs and deadlines.
- **Materials management/purchasing** with a focus on the required materials for production, auxiliary, operating and additive materials. Operational and strategic mechanisms for storage and procurement have to be applied. In this context, article requirements and cost developments must be analyzed and ongoing optimization measures must be undertaken (e.g. towards warehouse management, component standardization, procurement strategies, supplier selection).
- **Supply chain management/logistics,** in particular, the planning of the flow of goods and information with special consideration of technical and economic conditions. In addition to tasks relating to planning, simulation and control, this also includes controlling and quality management for the entire value chain.

(3) Work preparation/cost planning
The work preparation during the product development ensures economic manufacturing/production and, as an interface task, also constitutes a core competence of an industrial engineer. The tasks include the design of the workflow and the work system. The

focus is thus on the question of internal or external services, the production steps with specified times depending on the general conditions, the planning of operations, testing and costs, etc. In large companies, the cost planning role is a separate function due to its cost significance.

(4) Project management

Nowadays, interdisciplinary and international project teams are standard in all company areas. Project management with the various tasks from planning to control is one of the core tasks of industrial engineers due to their expertise in a wide range of fields and their ability to handle the technical/economic interface.

(5) Information management & IT support

The support of business processes through information management and modern IT systems is an essential aspect for business success. Industrial engineers can use their applied knowledge to identify requirements, evaluate the selection of IT tools and support the implementation ..

(6) Product marketing

Development and implementation of strategies for sales promotion via product price, customer communication and distribution channels based on customer/market analyses.

(7) Quality and process management

Planning and organization of all measures to improve products, processes and services of a company as well as management of processes during product development. This includes maintenance or requirement management for the construction of production facilities or the topic of occupational safety.

(8) Procurement

Selecting, evaluating and appointing a supplier requires a technical and economic understanding and knowledge of the product development processes. A successful decision can only be made through a global view (economic/technical). In addition to the analysis/observation of the procurement market, the tasks include the assessment of technologies/concepts, the evaluation of suppliers and the negotiation. In addition to the physical scope, this also includes the procurement of services as part of product development, e.g. development services.

(9) Product development / design

Collaboration in the development of new products and product design, from development through the transition to production to production itself. Research into components and materials for product development and design, in particular with computer-aided tools using rapid prototyping technologies.

(10) Management consultants

Management consultants offer their advice as a service. As a rule, the management of the client (or clients) is the object of the consultation. Alternatively, consulting services can also be offered for technical decisions and changes or problem solving for specific economic-technical questions.

Entry positions for graduates of the Bachelor degree program in the above-mentioned areas are usually positions with no management responsibility (administration, project work, assistance) or trainee positions. After appropriate professional experience and depending on personal performance, there are career prospects for management tasks.

1.2 Qualification profile

The qualification goals and learning outcomes of the Bachelor degree program *Industrial Engineering and Management* correspond both to the academic and vocational requirements and to the *ISCED level*

0788[1] International Standard (Classification of Education). The contents conveyed qualify the graduates for the professional fields of activity mentioned in the previous chapters.

The qualification goals and learning outcomes of the Bachelor degree program in Industrial Engineering and Management meet both professional and academic requirements. The contents taught qualify the graduates for the above-mentioned professional fields of activity. On completion of the Bachelor degree program, the following **competences** are acquired on the basis of a cross-industry and cross-company qualification profile:

Technical competence (Scientific competence)
The graduates recognize and understand basic technical problems and can solve tasks with the existing methods and tools. They master basic approaches and methods, which are generally necessary for the accomplishment of technical problems in the area of mechanical engineering and automation based on it. In detail, the graduates are able to:

- Classify and understand basic technical contexts and technical terms.
- Classify and understand scientific fundamentals.
- Classify and understand the basic interrelationships of mechanical engineering.
- Solve technical tasks by using the knowledge from the basic subjects such as mathematics, statics and strength theory, machine elements etc.
- Identify and understand the basic technical structure of machines and plants.
- Understand and classify technical principles and laws for solving technical problems.
- Analyze technical tasks and on this basis to develop proposals for a suitable procedure (requirement, concept, draft, development) incl. suitable tools/methods, to select and implement a proposal.

The following **modules** and **courses** serve to acquire the technical competence. (Note "E" for English-language courses):

Module: "Formal Sciences" (FWW):
- Mathematics 1
- Mathematics 2

Module: "Engineering Sciences" (ING):
- Statics and Strength Theory
- Dynamics & Hydromechanics
- Thermodynamics

Module: "Electrical Engineering" (ELT):
- Electrical Engineering (VO)
- Electrical Engineering (UE)
- Automation Technology (VO)
- Automation Technology (UE)

Module: "Mechanical engineering" (MAB):
- Technical Drawing / CAX
- Machine Elements I

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[1] *Example 4: A program consisting of 40% engineering (071), 30 % business (041) and 30 % languages (023) should be classified as 0788 ("Inter-disciplinary programs and qualifications involving engineering, manufacturing and construction") as no field predominates but 07 is the leading broad field. If engineering and business were equally important and greater than languages (e.g. 40 %, 40 % and 2 0%), the program would be classified as either 0788 or 0488 depending on which program, engineering (071) or business (041), is listed first in the program title (or, if not in the title, in the curriculum or syllabus).*

- Machine Elements II
- Mechanical and plant engineering

Module: "Information Technology" (INF):
- Fundamentals of Data Management (E)
- Introduction to Programming
- Fundamentals of Information Systems (E)

Module: "Product & Production Fundamentals" (GPP)
- Digital Product Creation
- Manufacturing Technology and Materials Engineering

Module: "Semester Abroad Engineering" (ATE)
Courses from the following two areas are recommended:
- Higher engineering science (e.g. fluid mechanics, heat transfer, machine dynamics, multi-body dynamics, modelling and simulation, etc.)
- Product development (e.g. mechatronic systems, internal combustion engines, drive and control technology, thermal turbomachinery, hydraulic fluid machines, robotics, plant design, systems engineering, etc.)

Business / management competence (scientific competence)
The graduates recognize and understand basic economic problems and can solve tasks with the existing methods and tools. They master basic approaches and methods that are necessary to cope with economic challenges. In detail, the graduates are able to:
- Understand and classify economic/legal technical vocabulary
- Understand and classify basic economic relationships
- Understand and classify basic contents/principles of management
- Understand tasks, methods and procedures in the key functional areas of companies, in particular marketing, finance and accounting, human resources and organization.
- Analyze and classify corporate organizations and strategies.
- Describe and explain relevant tasks, processes and tools/instruments on a strategic and operational level.
- Identify requirements and framework conditions based on an initial situation and derive goals.
- Based on these goals, derive a suitable approach and develop, evaluate and select alternative solutions.
- Understand and explain the management cycle (objectives, planning, execution, control) in the respective area.

The following **module** and **courses** contribute to the achievement of the basic business/management competence. (Note "E" for English-language courses):

Module: "Economics" (WIR):
- Fundamentals of Economics (E)
- Investment & Financing (E)
- Introduction to Law
- Introduction to Accounting

Module: "Management" (MGM):
- Project Management (E)
- Marketing & Sales (E)
- Supply Chain Management (E)

- Innovation Management & Product Development (E)

Module: "Semester Abroad Economics/Management" (AWM)
Courses from the following four areas are recommended:
- Management (e.g. Strategic Management, Competitive Strategies, Management of Multinational Corporations, Organizational Theory, Corporate Behavior, Corporate Culture, Knowledge Management, Quality Management etc.)
- Marketing/Sales (e.g. Advanced Marketing Management, Consumer Behavior, Customer Service Excellence, Global Marketing, Sales Management, Sales Techniques etc.)
- Accounting/Finance/Controlling/Procurement (e.g. Financial Management, Portfolio Management, Options and Futures, International Finance, Global buying, Buying, E-Procurement etc.)
- Law (e.g. Patent Law, Product Identification, Product Liability etc.)

Product development competence (optional) (Scientific competence)
The graduates recognize and understand fundamental problems in the field of product development and are able to solve them on a task-specific basis. They possess the basic approaches and methods necessary to meet research and development challenges. In detail, the graduates are able to:

- Name and apply the fundamentals and methods of design in product development.
- Optimize product development processes through system support and apply modern methods.
- Analyze and evaluate product data and prepare it for transfer to production.
- Identify current trends in development and describe their impact on development.
- Recognize the current challenges of the market and implement them in product development.
- Identify the process and tools for cost management in product development.
- Define and track goals in product development using suitable key figures.
- Analyze core processes in the development area and derive measures against the background of networking and interpret their effects.

The following **modules and courses** serve to acquire the core competence "Product Development" (Note "E" for English-language courses):

Module: "Product Development" (PEE):
- Design Project - Product Development
- Information systems in product development
- R&D Management (E)
- Trends in R&D (E)

Production competence (Scientific competence)
The graduates recognize and understand fundamental problems in the field of product development and are able to solve them on a task-specific basis. They possess the basic approaches and methods necessary to meet research and development challenges. In detail, the graduates are able to:
- Name and apply the fundamentals and methods of design in production (for machines).
- Optimize production processes through system support and apply modern methods.
- Identify current trends in production and describe their impact on production.
- Recognize the current challenges of the market and implement the production requirements.
- Identify current trends in production and describe their impact on production.
- Define and track targets in production using suitable key figures.
- Identify and derive new, global production methods and identify the effects on innovative production.

The following **modules and courses** serve to achieve the application competence "Production" (note "E" for English-language courses):

Module: "Production" (PEP):
- Design project - Production
- Information systems in production
- Production Management (E)
- Trends in Production (E)

Practical transfer competence (Scientific competence)
The graduates are able to:
- Adapt or apply theoretical knowledge to practical tasks.
- Think in an integrated and interdisciplinary way in terms of practical theory reflection.
- Present and communicate results in a structured and appropriate way, apply formal and content-related requirements of academic work, especially when writing Bachelor theses.

The following **modules and courses ensure the acquisition of competence:**

Module: "Practical Projects" (PRA):
- Practical Project 1
- Practical Project 2

Module: "Bachelor Thesis and Bachelor Thesis Seminar" (BAS):
- Bachelor Thesis Seminar

Module: Internship (BPR) at least 12 weeks
- Internship

Competence Individual, social and methodological skills (Personal and social competence)
In addition to the subject-related core competences, a series of **individual, methodological and social skills** is taught for mastering team-related and leadership-related tasks with a view to being successful in interactive and intercultural situations. In addition, the students gain valuable practical experience through the practical application of what they have learned.

The graduates are able to:
- Communicate in confident English. (Working in English-speaking teams, reading and writing documentation).
- Recognize social conflicts, develop and implement conflict solutions and develop the ability to recognize, treat and avoid conflicts.
- Use basic mediation techniques.

The following **modules and courses ensure the acquisition of competence:**

Module: "Languages" (SPR)
- Foreign Language I-III

Module: "Individual and Social Skills" (ISK)
- Presentation Techniques and Communication
- Problem Solving in a Team
- Academic Research

Module: Semester abroad Individual and Social Skills (AIS)
The following types of courses are recommended:
- Business Communication, Negotiation and Conflict Resolution, International Business Communication, Bargaining Behavior etc.

Competence description:

Occupational field of activity	Competence description (selection)	Competence	Modules
• Construction and Design • Information Management	• Understands basic technical contexts and technical terms • Understands academic Fundamentals • Understands the fundamental interrelationships of mechanical engineering • Can solve technical problems by using knowledge from the basic subjects • Understands the basic technical structure of machines and systems • Can analyze technical tasks and develop proposals for a suitable approach based on them	Technology	• Formal Sciences • Engineering Sciences • Electrical Engineering • Mechanical Engineering • Information Technology • Product & Production Fundamentals • Semester Abroad Technology
• Work preparation • Cost planning • Product marketing • Procurement	• Understands economic/legal technical vocabulary • Understands basic economic relationships • Understands the basic contents/principles of management • Understands tasks, methods and procedures in the essential functional areas of companies. • Can identify requirements and framework conditions from an initial situation, derive goals and develop alternative solutions	Economy & Management	• Economic • Management • Semester Abroad Economics & Management
• Product Management	• Can apply design fundamentals and methods in product development	Product development	• Product Development

	• Can analyze product data and prepare it for transfer to production • Can identify current trends in development • Understands the process and tools for cost management in product development		
• Production planning / control • Logistics	• Can apply design fundamentals and methods in production • Can optimize production processes through system support • Can identify current trends in production • Knows new, global methods of production	Production	• Production
•	• Can apply theoretical knowledge to practical tasks • Can think in an integrated and interdisciplinary way in terms of reflection on practice and theory • Can present and communicate results in a structured and appropriate way • Can apply formal and substantive requirements of academic work in particular to the preparation of Bachelor theses	Practical Transfer	• Practical Projects • Bachelor Thesis and Bachelor Thesis Seminar • Internship
• Project Management	• Can communicate in confident English • Recognizes social conflicts • Can develop and implement conflict solutions and develop the ability to recognize, deal with and avoid conflicts	Individual, social and methodical skills	• Languages • Individual and Social Skills • Semester abroad Individual and Social Skills

2 CURRICULUM

2.1 Curriculum Data

Curriculum data (Depending on how the course of studies is organized, "FT" or "PT" or "FT"+"PT" must be filled out.)			
	FT	**PT**	**Comment if applicable**
First year of study (YYY/YY$_{+1}$)	2023/24		
Standard duration of study (number of semesters)	6		
Obligatory WSH (Total number for all sem.)	81.5		In the FT program, a semester abroad with weekly semester hours of the respective partner universities takes place within the specified weekly semester hours.
Course weeks per semester (number of weeks)	15		
Obligatory LVS (Total for all sem.)	1792.5		In the full-time program, a semester abroad with contact hours of the respective partner universities takes place within the specified weekly semester hours.
Obligatory ECTS (Total for all sem.)	180		
WS start (Date, comm.: poss. CW)	CW 40		
WS end (Date, comm.: poss. CW)	CW 5		
SS start (Date, comm.: poss. CW)	CW 11		
SS end (Date, comm.: poss. CW)	CW 28		
WS weeks	15		
SS weeks	15		
Obligatory semester abroad (semester specification)	5th semester		
Course language (specify)	German/English		The percentage of English-language specialist courses is currently 21%
Internship (semester information, duration in weeks per semester)	6th semester, 12 weeks		
Resulting from the merging of the study programs or from the separation from the study program (StgKz; to be specified only for merging or separation)			

2.2 Curriculum matrix

The following description of the courses does not include the work involved in supervising Bachelor theses. 0.2 weekly semester hours are planned per supervised thesis, i.e. for 30 students an additional 6 thesis weekly semester hours, which are incurred in the 6th semester. In total, an AWSH sum of 125.5 AWSH is achieved over all 6 semesters.

1. Semester

Course no.	Course title	LV-Typ	T	E	eLV	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
SPR1	Foreign Language I	ILV			15 %	4.5	2	9.0	135.0	SPR	6
vzELT1	Electrotechnology	VO	X		20 %	2	1	2	30	ELT	3
vzELT2	Electrotechnology	UE	X		20 %	1.5	2	3.0	45.0	ELT	3
vzFWW1	Mathematics 1	ILV	X		0 %	2	1	2	30	FWW	3
vzING1	Statics and Strength Theory	ILV	X		20 %	4	1	4	60	ING	6
vzISK1	Problem Solving in a Team	ILV			0 %	1.5	2	3.0	45.0	ISK	2
vzMAB1	Technical Drawing / CAX	ILV	X		15 %	4	2	8	120	MAB	5
vzMAB2	Machine Elements 1	VO			15 %	1.5	1	1.5	22.5	MAB	2
Total line:						21.0		32.5	487.5		30
Course hours = Total WSH x course weeks						315.0					

2. Semester

Course no.	Course title	LV-Typ	T	E	eLV	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
SPR2	Foreign Language II	ILV			15 %	4.5	2	9.0	135.0	SPR	6
vzFWW2	Mathematics 2	ILV	X		15 %	3	1	3	45	FWW	4
vzGPP1	Manufacturing Technology and Materials Engineering	ILV	X		15 %	2.5	1	2.5	37.5	GPP	4
vzINF1	Introduction to Programming	ILV	X		15 %	2	2	4	60	INF	3
vzING2	Dynamics and Hydromechanics	ILV	X		15 %	2.5	1	2.5	37.5	ING	4
vzISK2	Presentation Techniques and Communication	ILV			0 %	1.5	2	3.0	45.0	ISK	2
vzISK3	Academic Research	ILV			20 %	1	1	1	15	ISK	1.5
vzMAB3	Machine Elements II	ILV	X		20 %	2.5	2	5.0	75.0	MAB	4
vzMGM2	Project Management	ILV		X	10 %	1	1	1	15	MGM	1.5
Total line:						20.5		31.0	465.0		30.0
Course hours = Total WSH x course weeks						307.5					

3. Semester

Course no.	Course title	LV-Typ	T	E	eLV	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
FWW.3	Mathematics 3	ILV	X		15 %	3	1	3	45	FWW	4
vzELT3	Automation techniques	VO	X		20 %	2	1	2	30	ELT	3
vzELT4	Automation techniques	UE	X		20 %	1.5	3	4.5	67.5	ELT	3
vzINF2	Fundamentals of Data Management (E)	ILV	X	X	15 %	1	2	2	30	INF	1.5
vzING3	Thermodynamics	ILV	X		20 %	3	1	3	45	ING	4.5
vzMAB4	Mechanical and plant engineering	VO	X		20 %	2	1	2	30	MAB	3
vzPEE1	Design Project - Product Development (WP) (WP)*	ILV	X		0 %	2	1	2	30	PEE	3
vzPEP1	Construction Project - Production (WP)*	ILV	X		0 %	2	1	2	30	PEP	3
vzPRA1	Practical Project I	PT			20 %	2	4	8	120	PRA	4
vzWIR2	Basic Accounting	ILV			30 %	2.5	1	2.5	37.5	WIR	4
Total line:						19.0		29.0	435.0		30.0
Course hours = Total WSH x course weeks						285.0					

*Advanced modules: choose one of the 2 possible advanced modules.

4. Semester

Course no.	Course title	LV-Typ	T	E	eLV	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
vzGPP2	Digital Product Creation	VO	X		15 %	2	1	2	30	GPP	3
vzINF3	Fundamentals of Information Systems (E)	ILV	X	X	10 %	1	1	1	15	INF	1.5
vzMGM2	Marketing and Sales (E)	ILV		X	10 %	1.5	1	1.5	22.5	MGM	2
vzMGM3	Supply Chain Management (E)	ILV		X	10 %	1.5	1	1.5	22.5	MGM	2
vzMGM4	Innovation Management & Product Development (E)	ILV		X	15 %	2	1	2	30	MGM	3
vzPEE2	Information Systems in Product Development (WP) (WP)*	ILV			15 %	2	1	2	30	PEE	2.5
vzPEE3	R&D Management (WP)(E) (WP)*	ILV		X	15 %	1.5	1	1.5	22.5	PEE	2
vzPEE4	Trends in R&D (WP)(E) (WP)*	VO		X	0 %	1	1	1	15	PEE	1.5
vzPEP2	Information Systems in Production (WP) (WP)*	ILV			15 %	2	1	2	30	PEP	2.5
vzPEP3	Production Management (WP)(E) (WP)*	ILV		X	15 %	1.5	1	1.5	22.5	PEP	2
vzPEP4	Trends in Production (WP)(E) (WP)*	VO		X	0 %	1	1	1	15	PEP	1.5
vzPRA2	Practical Project 2	PT			20 %	2	4	8	120	PRA	4
vzWIR1	Fundamentals to Economics (E)	ILV		X	30 %	4	1	4	60	WIR	5
vzWIR3	Investment and Financing (E)	ILV		X	10 %	1	1	1	15	WIR	1.5
vzWIR4	Introduction to Law	VO			0 %	1	1	1	15	WIR	2
Total line:						20.5		26.5	397.5		30.0
Course hours = Total WSH x course weeks						307.5					

*Consolidation modules: from the 6 possible consolidation modules, three modules of 6 ECTS must be chosen

5. Semester

Course no.	Course title	LV-Typ	T	E	eLV	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
vzAIS	Semester Abroad: Individual and Social Skills	ILV			0 %	0	1	0	0	AIS	5
vzATE	Semester Abroad: Technology	ILV			0 %	0	1	0	0	ATE	15
vzAWM	Semester Abroad: Economics & Management	ILV			0 %	0	1	0	0	AWM	10
Total line:						0		0	0		30
Course hours = Total WSH x course weeks						0					

6. Semester

Course no.	Course title	LV-Typ	T	E	eLV	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
vzBAS1	Bachelor Thesis Seminar 2:	SE			0 %	0.5	1	0.5	7.5	BAS	10
vzBPR	Internship	PT			0 %	0	1	0	0	BRP	20
Total line:						0.5		0.5	7.5		30
Course hours = Total WSH x course weeks						7.5					

Abbreviations	
eLV	E-learning proportion of course in percent
E	Lecture in English language
ECTS	ECTS – Credit points
LV	Course
LVS	Course hour(s)
WSH	Weekly semester hour(s)
T	Lecture with technical background
WP	Elective subject

Summary of curriculum data

Description	WSH	ASWS	ALVS	ECTS
Total number of courses over all semesters	81.5	119.5	1792.5	180
Total number of courses in 1st year of study	41.5	63.5	952.5	60
Total number of courses in 2nd year of study	39.5	55.5	832.5	60
Total number of courses in 3rd year of study	0.5	0.5	7.5	60
Total number of technical events over all semesters	43.5			65.5
Percentage of technical courses over all semesters based on WSH / ECTS	53.37 %			36.39 %
Total number of courses in English over all semesters	15.5			21.5
Proportion of courses in English over all semesters based on WSH / ECTS	21.38 %			12.8 %
Proportion of eLearning units over all semesters based on WSH / ECTS	15.52 %			10.47 %

2.3 Modularization

The course program is divided into 18 coordinated modules. The following abbreviations are used for the following module descriptions. These are also included in the names of the individual courses.

Module designations	Competence areas (*Number of ECTS and % of total volume)	
1. Formal Sciences (FWW)		Technical competence (total 79.5 ECTS or 44%*)
2. Engineering Sciences (ING)		
3. Electrical Engineering (ELT)		
4. Mechanical Engineering (MAB)		
5. Information Technology (INF)		
6. Product & Production Fundamentals (GPP)		
7. Semester Abroad Engineering (ATE)		
8. Economics (WIR)		Business and Management Competence (total 31 ECTS or 17%*)
9. Management (MGM)		
10. Semester Abroad Economics & Management (AWM)		
11. Product Development (PEE)		Product Development Competence (total 9 ECTS or 5%*)
12. Production (PEP)		Production Competence (total 9 ECTS or 5%*)
13. Practical Projects (PRA)		Practical Transfer Competence (total 38 ECTS or 21%*)
14. Bachelor Thesis and Bachelor Thesis Seminar (BAS)		
15. Internship (BPR)		
16. Languages (SPR)		Competence in Personal and Social Skills (total 22.5 ECTS or 13%*)
17. Individual, Social and Methodological Competence (ISK)		
18. Semester abroad Individual and Social Skills (AIS)		

Module number:	Engineering		Scope:	
MAB			14	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	1. Semester			
	2. Semester			
	3. Semester			
Level	1. Semester: First cycle, Bachelor / 2. Semester: First cycle, Bachelor / 3. Semester: First cycle, Bachelor			
Previous knowledge	1. Semester: not applicable / 2. Semester: not applicable / 3. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Machine Elements 1 /VO / LV-Nr: vzMAB2 / 1.Semester / ECTS: 2 • Dobler, et al. (2007): Fachkunde Metall, 55. Aufl., Europa Lehrmittelverlag Haan • Wittel, et al. (2009): Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung, 19. Aufl., Vieweg+Teubner Verlag Wiesbaden • Frischherz (2006): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener NeudorfKünne (2007): Köhler/Rögnitz Maschinenteile 1 und 2, 10. Aufl., Vieweg+Teubner Verlag Wiesbaden			
	Machine Elements II /ILV / LV-Nr: vzMAB3 / 2.Semester / ECTS: 4 • Wittel, et al. (2009): Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung, 19. Aufl., Vieweg+Teubner Verlag Wiesbaden • Frischherz (1987): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf • Raich (2005): Metalltechnik / Konstruktionsgrundlagen für Metalltechnik, Jugend & Volk Verlag Wiener Neudorf • Künne (2007): Köhler/Rögnitz Maschinenteile 1 und 2, 10. Aufl., Vieweg+Teubner Verlag Wiesbaden			
	Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 3 Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan Dubbel (2001): Taschenbuch für den Maschinenbau, 20. Aufl., Springer Verlag Berlin Franzke (1990): Einführung in die Maschinen- und Anlagentechnik Band 1 & 2, Springer Verlag Berlin Hering (2002): Grundwissen des Ingenieurs, 13. Aufl., Fachbuchverlag Leipzig Kalide (2010): Energieumwandlung in Kraft- und Arbeitsmaschinen, 10. Aufl., Carl Hanser Verlag München Koether (2007): Fertigungstechnik für Wirtschaftsingenieure, 3. Aufl., Carl Hanser Verlag München			
	Technical Drawing / CAX /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 5 • Dobler, et al. (2007): Fachkunde Metall, 55. Aufl., Europa Lehrmittelverlag Haan • Frischherz (1987): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf			
Acquisition of skills	Machine Elements 1 /VO / LV-Nr: vzMAB2 / 1.Semester / ECTS: 2 The students are able to: • Analyze, select and apply tolerances and fits • Analyze and calculate simple static and dynamic component loads. • Design simple components for shape and fatigue strength. • Identify and calculate stresses in simple adhesive, solder, weld, rivet and screw connections. • Design and dimension simple adhesive, solder, weld, rivet and bolt connections. • Select, design and dimension simple shaft-hub connections.			
	Machine Elements II /ILV / LV-Nr: vzMAB3 / 2.Semester / ECTS: 4 he students are able to: • Identify the structure and function of axes and shafts, dimension them and support them in rolling and plain bearings. • Knowing the design and function of rolling bearings and hydrodynamic plain bearings, as well as select and dimension them. • Know the design and function of different sealing elements, select and dimension them.			

	• Know the design and mode of operation of elastic springs, select and dimension them. • Know the design and mode of operation of clutches and brakes, select and dimension them accordingly. • Know the design and function of belt drives, select and dimension them. • Know the design and mode of operation of gear units, select and dimension them. • Analyze and calculate dimensional tolerances and fits. • Read and interpret form and position tolerances. • Distinguish and calculate stress types on machine parts. • Determine static and dynamic strength values. • Calculate detachable and non-detachable connections such as adhesive, soldered, welded, screw, stud and pin connections. • Solve dimensioning problems for shaft-hub connections, axles and shafts. • Design springs and spring systems. • Apply the basic terms of bearing technology and calculate the bearings • Calculate belt and gear drives
Acquisition of skills	**Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 3** Students are able to: · differentiate fundamental functioning between power generating machinery and work machines, give examples and identify the important application areas. · identify the fundamental structure of machines and plants, categorise fundamen-tal interpretations, if necessary calculate, and identify the strengths and weak-nesses of the variants. · analyse and assess practical examples. · know companies from the machine and plant construction industry.
	Technical Drawing / CAX /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 5 The students are able to: • Read standard-compliant workpiece drawings and correctly interpret display and dimension details. • Create basic part drawings of simple bodies manually. • Independently extract information from table books and apply it to their own drawing representations. • Independently present machine elements in accordance with the applicable standards. • Model 3D models based on 2D representations of different machine components. • Configure a functional assembly from self-constructed components and parts from standard parts libraries. • Use 3D CAD software in such a way that they can carry out complete design projects. • Generate production-ready 2D drawing derivations.
Course contents	**Machine Elements 1 /VO / LV-Nr: vzMAB2 / 1.Semester / ECTS: 2** Tolerances and fits: • Basic concepts of tolerances and fits • Tolerance and fit selection, tolerance systems Fundamentals of the calculation methods: • Simple stress types: Tensile and compressive stress, surface pressure, bending and torsion • Static and dynamic stress types • Durability and design strength, permissible stresses and safety Connecting elements in mechanical engineering: • Functions and design variants of bolts, pins, screws and rivets • Fundamentals of soldering, gluing and welding connections • Design rules and calculation bases for feather keys, spline shafts, polygon connections, serrations, press fits, clamping and spline connections, clamping element connections
	Machine Elements II /ILV / LV-Nr: vzMAB3 / 2.Semester / ECTS: 4 EElements for supporting and carrying machine components and for torque transmission: • Functions and design rules as well as calculation bases for axes and shafts • Design fundamentals and calculation bases of hydrodynamic plain bearings • Bearing types, areas of application, bearing concepts and calculation bases for rolling bearings Elements for sealing machine components Elastic springs: • Spring types, design rules and calculation bases for springs Clutches and brakes: • Design, functions, mode of operation and calculation bases of selected clutch and brake types Belt drives: • Design principles and calculation bases for flat and V-belt drives and timing belt drives Gear drives:

	• Gear types and design, gearing law, design and calculation bases for straight, helical, bevel and helical gears
	Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 3 • Power and working machines, classification and history • Hydropower plants: Low, medium and high pressure plants, Hydropower machines • Pumps: Displacement, centrifugal and vacuum pumps. Pump systems • Thermal plants: Steam generators, steam and gas turbines, power plant construction forms • Compressors: Compressors with displacement effect, turbo compressors • Internal combustion engines: Two-stroke and four-stroke, petrol and diesel engines. • Conveying systems: Lifting machines (winches, cranes, elevators), continuous conveyors and floor conveyors
	Technical Drawing / CAX /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 5 Fundamentals of technical communication: • Preparation of workpiece drawings with standard-compliant view arrangement, cuts, dimensions, surface and tolerance specifications, workpiece details • Creation of parts lists and interpretation of exploded drawings • Standard-compliant representation of basic machine elements: • Representation of threads, countersinks • Representation of screw, bolt and pin connections • Representation of shaft-hub connections, bearings, gear wheels CAX: • Function structure of the menu bars • Sketch mode, dimensions and relationships • Volume features such as rotation, extrusion, discharging • Patterns, chamfers, curves, walls etc. • Assembly design, links • Integration of local standard parts libraries and parts from online catalogs • Hands-on practical examples • Standard-compliant drawing derivations
Teaching and learning methods	**Machine Elements 1 /VO / LV-Nr: vzMAB2 / 1.Semester / ECTS: 2** Lecture
	Machine Elements II /ILV / LV-Nr: vzMAB3 / 2.Semester / ECTS: 4 integrated Lecturer
	Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 3 Integrated course
	Technical Drawing / CAX /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 5 Integrated course
Evaluation Methods Criteria	**Machine Elements 1 /VO / LV-Nr: vzMAB2 / 1.Semester / ECTS: 2** written exam
	Machine Elements II /ILV / LV-Nr: vzMAB3 / 2.Semester / ECTS: 4 Written exam
	Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 3 final presentation and written exam
	Technical Drawing / CAX /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 5 Assignment, written exam

Module number:	Electrical engineering		Scope:	
ELT			**12**	**ECTS**
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	1. Semester			
	3. Semester			
Level	1. Semester: First cycle, Bachelor / 3. Semester: First cycle, Bachelor			
Previous knowledge	1. Semester: not applicable / 3. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Automation techniques /UE / LV-Nr: vzELT4 / 3.Semester / ECTS: 3 • Stiller, Christoph (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag Herzogenrath • Orlowski, Peter (2011): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 9. Aufl., Springer Verlag Berlin			
	Automation techniques • Stiller, Christoph (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag Herzogenrath • Orlowski, Peter (2011): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 9. Aufl., Springer Verlag Berlin			
	Electrotechnology /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 3 • Hagmann (2006): Grundlagen der Elektrotechnik, 12. Aufl., AULA-Verlag Graz • Bieneck (2005): Elektro T, Grundlagen der Elektrotechnik, Lehrbuch: Informations- und Arbeitsbuch für Schüler und Studenten der elektrotechnischen Berufe, Holland & Josenhans Stuttgart • Orlowski (2008): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 7. Aufl., Springer Verlag Berlin • Stiller (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag München			
	Electrotechnology /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3 • Hagmann (2006): Grundlagen der Elektrotechnik, 12. Aufl., AULA-Verlag Graz • Bieneck (2005): Elektro T, Grundlagen der Elektrotechnik, Lehrbuch: Informations- und Arbeitsbuch für Schüler und Studenten der elektrotechnischen Berufe, Holland & Josenhans Stuttgart • Orlowski (2008): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 7. Aufl., Springer Verlag Berlin • Stiller (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag München			
Acquisition of skills	Automation techniques /UE / LV-Nr: vzELT4 / 3.Semester / ECTS: 3 The students are able to: • Use various measuring instruments for measuring non-electrical quantities correctly and safely. • Use sensors, positioning elements and actuators. • Carry out programming for automation. • Modify bus systems (networks). • Operate robot systems.			
	Automation techniques The students are able to: • Assign the corresponding positioning elements to the actuators. • Explain the function of the sensors (capacitive, inductive, optical and magnetic proximity switches, limit switches). • Explain binary, digital and analog signals. • Explain the structure and function of a programmable logic controller (PLC). • Explain the basic rules of control design. • Apply basic logic functions in control engineering. • Evaluate control systems and regulations. • The control engineering terms: Explain step response, controlled variable, manipulated variable, reference variable, disturbance variable, dynamic behavior. • Classify bus systems.			

	• Compare robotic systems.
	Electrotechnology /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 3 The students are able to: • Use common electrical measuring instruments (e.g. digital multimeters, oscilloscopes, ...) correctly and safely. • Understand electrical or electronic circuit diagrams. • Measure and evaluate current, voltage and resistance in electrical circuits. • Identify basic laws of electrical engineering. • Construct and analyze electrical and electronic circuits according to circuit diagrams. • Demonstrate the behavior of capacitor and coil in the AC circuit. • Distinguish and select electronic components. • Identify and select circuits for electrical machines (e.g. three-phase asynchronous motors).
Acquisition of skills	**Electrotechnology /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3** The students are able to: • Explain electrical quantities and units. • Describe the basic laws of electrical engineering. • Read electrical or electronic circuit diagrams. • Calculate currents, voltages and resistances in electrical circuits. • Explain the difference between direct current, alternating current and three-phase current. • Describe the operation of electrical systems and machines. • Distinguish between electrical protective measures. • Explain electronic components.
Course contents	**Automation techniques /UE / LV-Nr: vzELT4 / 3.Semester / ECTS: 3** • Design of pneumatic, electropneumatic and hydraulic circuits • Recording measured values • Measurement of non-electrical quantities such as temperature, pressure, speed, sound level, frequency • Measured value transmission • Programming of control units (SPS) • Structure of control transmission elements • Industrial bus systems and robot systems **Automation techniques** • Positioners and actuators in pneumatics, electropneumatics, hydraulics and electrical engineering • Path-step diagram (state diagram) • Sensor technology and data acquisition • Measuring non-electrical quantities • Binary, digital and analog signals • Basic knowledge of digital control technology (SPS) • Control design • Disjunctive and conjunctive normal form • Basic logical functions • Basic knowledge of control engineering and control algorithms • Concepts and applications of bus systems • Principle of automation technology • Overview of robotic systems **Electrotechnology /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 3** • Measurement of current, voltage and resistance • Interpretation of the fundamental electrotechnical laws • Series and parallel connection • Capacitor and coil in AC circuit • Use and switching of electrical equipment and electrical machines • Structure of basic logic functions with integrated circuits (IC) • Electronic components **Electrotechnology /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3** Introduction and basic terms • Basic laws of electrical engineering • Sources of voltage and current

	• Basic circuits • Electric field and capacitor • Magnetic field and coil • Circuit technology • Alternating current and three-phase current technology • Electrical installations and machines • Protective measures • Fundamentals of electronic components
Teaching and learning methods	Automation techniques /UE / LV-Nr: vzELT4 / 3.Semester / ECTS: 3 Exercise
	Automation techniques Lecture
	Electrotechnology /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 3 Exercise
	Electrotechnology /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3 Lecturer
Evaluation Methods Criteria	Automation techniques /UE / LV-Nr: vzELT4 / 3.Semester / ECTS: 3 Report, final paper
	Automation techniques Presentation, written exam
	Electrotechnology /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 3 Written exam
Evaluation Methods Criteria	Electrotechnology /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3 Written exam, presentation

Module number:	Languages		Scope:	
SPR			12	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	1. Semester			
	2. Semester			
Level	1. Semester: A1-A2, B1-B2, B2-C1, C1-C2 (CEFR) depending on the module / 2. Semester: A1-A2, B1-B2, B2-C1, C1-C2 (CEFR) depending on the module			
Previous knowledge	1. Semester: - Modules at levels A1-A2: No prior knowledge of the target language and a secure B2 level in English - Modules at levels B1-B2: Secure A2 level in the target language or recommendation of support measures and secure B2 level in English - Modules at levels B2-C1: Secure B1 level in English or recommendation of support measures - Modules at levels C1-C2: Secure B2 level in English / 2. Semester: - Modules at levels A1-A2: Foreign Language I in the target language at levels A1-A2 and a secure B2 level in English - Modules at levels B1-B2: Foreign Language I in the target language at levels B1-B2 and a secure B2 level in English - Modules at levels B2-C1: Foreign Language I in the target language at levels B1-B2 - Modules at levels C1-C2: Foreign Language I in the target language at levels C1-C2			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6			
	Coursebook - by arrangement; authentic materials, e.g., journals (including specialist journals), newspapers, and online media in the target language			
	Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6			
	Coursebook - by arrangement; authentic materials, e.g., journals (including specialist journals), newspapers, and online media in the target language			
Acquisition of skills	Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6			
	The modules are designed according to the Common European Framework of Reference for Languages (CEFR). Within the framework of the modules, the students will acquire the language and communication skills required for business-oriented professional or academic activity. The following competencies are taught according to the CEFR, i.e., after completion of the module, successful graduates will have mastered the following skills in the target language: A1-A2 Basic communication skills B1-B2 Advanced use of the language and communication skills B2-C1 Independent language use to expert communication skills C1-C2 Expert language skills to fluent, competent communication skills			
	Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6			
	The modules are designed according to the Common European Framework of Reference for Languages (CEFR). Within the framework of the modules, the students will acquire the language and communication skills required for business-oriented professional or academic activity. The following competencies are taught according to the CEFR, i.e., after completion of the module, successful graduates will have mastered the following skills in the target language: A1-A2 Basic communication skills B1-B2 Advanced use of the language and communication skills B2-C1 Independent language use to expert communication skills C1-C2 Expert language skills to fluent, competent communication skills			
Course contents	Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6			
	The language modules integrated into the degree program curriculum are designed according to the methodological principles of a communicative, action-oriented approach. The competence levels of the modules are based on the Common European Framework of Reference for Languages (CEFR), and a central objective is that students increase their communication skills by at least one level. In addition, there is a clear focus on acquiring academic and business-oriented skills in the target			

	language. • A1-A2 Basic communication skills • B1-B2 Advanced use of the language and communication skills • B2-C1 Independent language use to expert communication skills • C1-C2 Expert language skills to fluent, competent communication skills
	Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6 The language modules integrated into the degree program curriculum are designed according to the methodological principles of a communicative, action-oriented approach. The competence levels of the modules are based on the Common European Framework of Reference for Languages (CEFR), and a central objective is that students increase their communication skills by at least one level. In addition, there is a clear focus on acquiring academic and business-oriented skills in the target language. • A1-A2 Basic communication skills • B1-B2 Advanced use of the language and communication skills • B2-C1 Independent language use to expert communication skills
Course contents	• C1-C2 Expert language skills to fluent, competent communication skills
Teaching and learning methods	Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6 Blended Learning
	Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6 Blended Learning
Evaluation Methods Criteria	Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6 Portfolio with various components: • Various assessments (reading comprehension, listening comprehension, written expression, oral expression) • Various tasks and documentation of achievements, including contributions to group work, course units, and critical reflection on learning outcomes
	Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6 Portfolio with various components: • Various assessments (reading comprehension, listening comprehension, written expression, oral expression) • Various tasks and documentation of achievements, including contributions to group work, course units, and critical reflection on learning outcomes

Module number:	Individual and social skills		Scope:	
ISK			5.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	1. Semester			
	2. Semester			
Level	1. Semester: First cycle, Bachelor / 2. Semester: First cycle, Bachelor			
Previous knowledge	1. Semester: not applicable / 2. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Academic Research /ILV / LV-Nr: vzISK3 / 2.Semester / ECTS: 1.5 • Sandberg (2013): Wissenschaftliches Arbeiten von Abbildung bis Zitat, 2. Aufl., Oldenbourg Verlag München • Bänsch (2003): Wissenschaftliches Arbeiten: Seminar- und Diplomarbeiten, 8.Aufl., Oldenbourg Verlag München • Chalmers (2007): Wege der Wissenschaft: Einführung in die wissenschaftstheorie, 6. Aufl., Springer Verlag Berlin • Eco (2010): Wie man eine wissenschaftliche Abschlussarbeit schreibt, 13. Aufl., UTB Facultas Universitätsverlag Stuttgart • Karmasin, Ribing (2010): Die Gestaltung wissenschaftlicher Arbeiten, 5. Aufl., UTB Facultas Universitätsverlag Stuttgart • Leopold-Wildburger, Schütz (2010): Verfassen und Vortragen: Wissenschaftliche Arbeiten und Vorträge leicht gemacht, 2. Aufl., Springer Verlag Berlin • Rössl (Hg.) (2008): Die Diplomarbeit in der Betriebswirtschaftslehre: Ein Leitfaden zur Erstellung einer Laureatsarbeit, Bachelorarbeit, Diplomarbeit, Masterarbeit, Dissertation, 4. Auflage, Facultas WUV Universtiätsverlag Wien			
	Presentation Techniques and Communication /ILV / LV-Nr: vzISK2 / 2.Semester / ECTS: 2 • Berkun (2010): Bekenntnisse eines Redners – oder die Kunst, gehört zu werden, 1. Aufl., O'Reilly Verlag • Gallo (2011): Überzeugen wie Steve Jobs: Das Erfolgsgeheimnis seiner Präsentationen, 1. Aufl., Ariston Verlag • Thiele (2010): Präsentieren ohne Stress: Wie Sie Lampenfieber in Auftrittsfreude verwandeln, 1. Aufl., Frankfurter Allgemeine Buch • Tracy, Scheelen (2008): Speak to Win – Wie Sie zu einem ausgezeichneten Redner werden vor großem und kleinem Publikum, 1. Aufl., GABAL Verlag • Schulz von Thun (2010): Miteinander reden, Rowohlt Verlag Leibzig • Rosenberg (2012): Gewaltfreie Kommunikation: Eine Sprache des Lebens, 10. Aufl., Junfermann Verlag Paderborn			
	Problem Solving in a Team /ILV / LV-Nr: vzISK1 / 1.Semester / ECTS: 2 • Hillmer (2007): Schlüsselkompetenzen für Ingenieure & Naturwissenschaftler: Kapitel – Gestaltung von Teamprozessen von Christof Fink, 1. Aufl., Studia Universitätsbuchhandlung Innsbruck • Hillmer (2007): Schlüsselkompetenzen für Ingenieure & Naturwissenschaftler: Kapitel – Gesprächsführung und Verhandlungstechnik von Christof Fink, 1. Aufl., Studia Universitätsbuchhandlung Innsbruck • Lencioni (2008): Mein Traum-Team: oder die Kunst, Menschen zu idealer Zusammenarbeit zu führen, 1. Aufl., Campus Verlag Frankfurt/Main • Schweizer (2008): Systematisch Lösungen finden: Eine Denkschule für Praktiker, 3. Aufl., vdf Hochschulverlag Zürich • Sell, Schimweg (2013): Probleme lösen: In komplexen Zusammenhängen denken, 6. Aufl., Springer Verlag Berlin • Fischer, Pfeffel (2013): Systematische Problemlösung in Unternehmen: Ein Ansatz zur strukturierten Analyse und Lösungsentwicklung, 2. Aufl., Springer Gabler Verlag Wiesbaden			
Acquisition of skills	Academic Research /ILV / LV-Nr: vzISK3 / 2.Semester / ECTS: 1.5 Students are able to: • formulate research questions in an appropriate manner. • plan methodical approaches to answering research questions. • research, evaluate and quote from specialist literature. • plan and carry out a relatively short piece of academic writing of medium complexity. Presentation Techniques and Communication /ILV / LV-Nr: vzISK2 / 2.Semester / ECTS: 2			

	The students are able to: • Use voice, body language and wording confidently during presentation. • Select and use presentation structures in a targeted manner. • Prepare and implement a good introduction and conclusion. • Speak freely in front of a group and present content.
	Problem Solving in a Team /ILV / LV-Nr: vzISK1 / 1.Semester / ECTS: 2 The students are able to: • Perceive and understand group and team processes and work on team problems in practice in a solution-oriented way. • Understand team roles, assess team members and deploy them according to individual strengths. • Take responsibility for the group or the team, delegate and communicate tasks efficiently for team members. • Solve conflicts within the team in a structured way.
Acquisition of skills	• Understand, select and apply team-building methods for use in companies and organizations. • Analyze problems and, building on this, select and apply a suitable approach with tools/methods.
Course contents	Academic Research /ILV / LV-Nr: vzISK3 / 2.Semester / ECTS: 1.5 • In the introductory course on academic research, the main aim is to familiarize students with the special features, rules and principles of science and academic research. The focus here is on learning hermeneutic text analysis to control team processes; basic elements of moderation • Students are prepared to write seminar papers independently and at a high academic level. This preparation includes a focus on dealing with literature as well as discussions about the quality of academic research - especially the concepts of intellectual honesty and intersubjective comprehensibility.
	Presentation Techniques and Communication /ILV / LV-Nr: vzISK2 / 2.Semester / ECTS: 2 • Presentation and lecture techniques • Structure and arrangement of presentations • Use of media for presentations • Exercises and video analysis
	Problem Solving in a Team /ILV / LV-Nr: vzISK1 / 1.Semester / ECTS: 2 • Presentation and lecture techniques • Structure and arrangement of presentations • Use of media for presentations • Exercises and video analysis
Teaching and learning methods	Academic Research /ILV / LV-Nr: vzISK3 / 2.Semester / ECTS: 1.5 Lecture
	Presentation Techniques and Communication /ILV / LV-Nr: vzISK2 / 2.Semester / ECTS: 2 Integrated course
	Problem Solving in a Team /ILV / LV-Nr: vzISK1 / 1.Semester / ECTS: 2 Integrated course
Evaluation Methods Criteria	Academic Research /ILV / LV-Nr: vzISK3 / 2.Semester / ECTS: 1.5 Final presentation, final exam
	Presentation Techniques and Communication /ILV / LV-Nr: vzISK2 / 2.Semester / ECTS: 2 Term papers, final presentation
	Problem Solving in a Team /ILV / LV-Nr: vzISK1 / 1.Semester / ECTS: 2 project report

Module number:	Formal Sciences		Scope:	
FWW			**11**	**ECTS**
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	1. Semester			
	2. Semester			
	3. Semester			
Level	1. Semester: First cycle, Bachelor / 2. Semester: First cycle, Bachelor / 3. Semester: First cycle bachelor			
Previous knowledge	1. Semester: not applicable / 2. Semester: not applicable / 3. Semester: none			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4 • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 1, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 2, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 3, 6. Auflage.- Vieweg+Teubner Verlag Wiesbaden • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 1: Grundlagen, 13. Aufl., NWB Verlag Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 2: Differenzial- und Integralrechnung, 13. Aufl., NWB Verlag Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 3: Lineare Algebra, Lineare Optimierung und Graphentheorie, 13. Aufl., NWB Verlag Herne • Schwarze (2003): Mathematik für Wirtschaftswissenschaftler – Elementare Grundlagen für Studienanfänger, Kapitel 1 bis 10, 7. Aufl., NWB Verlag Herne • Stingl (2009): Mathematik für Fachhochschulen: Technik und Informatik, 8. Aufl., Carl Hanser Verlag München • Tietze (2000): Einführung in die Angewandte Wirtschafts-Mathematik, 9. Aufl., Vieweg+Teubner Verlag Wiesbaden • Janssen, Laatz (2007): Statistische Datenanalyse mit SPSS für Windows, 6. Aufl., Springer Verlag Berlin • Brosius (2002): SPSS 11, Verlag Moderne Industrie Bonn • Bourier (2014): Beschreibende Statistik: Praxisorientierte Einführung, 12. Aufl., Springer Gabler Verlag Wiesbaden • Jeske (2003): Spaß mit Statistik: Aufgaben, Lösungen und Formeln für Statistik, 4. Aufl., Oldenbourg Wissenschaftsverlag München • Mosler, Schmid (2008): Wahrscheinlichkeitsrechnung und schließende Statistik, 3. Aufl., Springer Verlag Berlin • Mosler, Schmid (2009): Deskriptive Statistik und Wirtschaftsstatistik, 4. Aufl., Springer Verlag Berlin Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3 Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 1, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 2, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 3, 6. Auflage.- Vieweg+Teubner Verlag Wiesbaden Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 1: Grundla-gen, 13. Aufl., NWB Verlag Herne Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 2: Differenzi-al- und Integralrechnung, 13. Aufl., NWB Verlag Herne Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 3: Lineare Algebra, Lineare Optimierung und Graphentheorie, 13. Aufl., NWB Verlag Herne Schwarze (2003): Mathematik für Wirtschaftswissenschaftler – Elementare Grund-lagen für Studienanfänger, Kapitel 1 bis 10, 7. Aufl., NWB Verlag Herne Stingl (2009): Mathematik für Fachhochschulen: Technik und Informatik, 8. Aufl., Carl Hanser Verlag München Tietze (2000): Einführung in die Angewandte Wirtschafts-Mathematik, 9. Aufl., Vieweg+Teubner Verlag Wiesbaden Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4

	• Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 1, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 2, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 3, 6. Auflage.- Vieweg+Teubner Verlag Wiesbaden • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 1: Grundlagen, 13. Aufl., NWB Verlag Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 2: Differenzial- und Integralrechnung, 13. Aufl., NWB Verlag Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 3: Lineare Algebra, Lineare Optimierung und Graphentheorie, 13. Aufl., NWB Verlag Herne • Schwarze (2003): Mathematik für Wirtschaftswissenschaftler – Elementare Grundlagen für Studienanfänger, Kapitel 1 bis 10, 7. Aufl., NWB Verlag Herne • Stingl (2009): Mathematik für Fachhochschulen: Technik und Informatik, 8. Aufl., Carl Hanser Verlag München • Tietze (2000): Einführung in die Angewandte Wirtschafts-Mathematik, 9. Aufl., Vieweg+Teubner Verlag Wiesbaden
Literature recommendation	• Janssen, Laatz (2007): Statistische Datenanalyse mit SPSS für Windows, 6. Aufl., Springer Verlag Berlin • Brosius (2002): SPSS 11, Verlag Moderne Industrie Bonn • Bourier (2014): Beschreibende Statistik: Praxisorientierte Einführung, 12. Aufl., Springer Gabler Verlag Wiesbaden • Jeske (2003): Spaß mit Statistik: Aufgaben, Lösungen und Formeln für Statistik, 4. Aufl., Oldenbourg Wissenschaftsverlag München • Mosler, Schmid (2008): Wahrscheinlichkeitsrechnung und schließende Statistik, 3. Aufl., Springer Verlag Berlin • Mosler, Schmid (2009): Deskriptive Statistik und Wirtschaftsstatistik, 4. Aufl., Springer Verlag Berlin
Acquisition of skills	Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4 In simple cases, to estimate mathematical models in engineering taking into account the associated uncertainties that are inevitable due to lack of data, knowledge and natural variability. Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3 Students are able to translate an economic or engineering problem into the language of mathematics in simple cases. To draw conclusions from the mathematical models obtained with suitable mathematical methods and finally to translate these conclusions back into statements about the original problem formulated in everyday language. Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4 Students are able to translate an economic or engineering problem into the language of mathematics in simple cases. To draw conclusions from the mathematical models obtained with suitable mathematical methods and finally to translate these conclusions back into statements about the original problem formulated in everyday language.
Course contents	Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4 Statistics: Descriptive Statistics: Characteristics, frequency, mean values, scatter measures, regression, correlation, time series Inductive statistics: Elements of probability theory, random variables and their distribution, forecasting, estimation methods, hypothesis tests Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3 • Equations: linear, quadratic, system of linear equations, matrices and determinants • Functions: Linear functions, polynomials, trigonometric functions, exponential functions and logarithms • Vector calculus • Differential calculus in a variable: Derivation rules, curve discussions, extreme value tasks, Taylor series, Newton methods • Integral calculation in one variable: Fundamental theory of integral calculus, integration techniques Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4 Differential calculus in several variables: Extreme value tasks with and without constraints technical applications, nonauthentic integrals, numerical integration Complex numbers and functions

	Important differential equations (DGI): General information about linear and nonlinear DGI, DGI 1st order with separated variables, linear DGI 1st order with constant coefficients and technical applications, linear DGL 2nd order with constant coefficients and vibration problems
Teaching and learning methods	Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4 ILV
	Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3 Integrated Course
	Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4 Integrated course
Evaluation Methods Criteria	Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4 final exam
	Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3 Written exam
	Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4 Written exam

Module number:	Mathematics I		Scope:	
ING			14.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	1. Semester			
	2. Semester			
	3. Semester			
Level	1. Semester: First cycle, Bachelor / 2. Semester: First cycle, Bachelor / 3. Semester: First cycle, Bachelor			
Previous knowledge	1. Semester: not applicable / 2. Semester: not applicable / 3. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4 • Assmann (2010): Technische Mechanik Bd. 3 T: Kinematik und Kinetik, Oldenbourg Wissenschaftsverlag München • Böswirth (2007): Technische Strömungslehre: Lehr- und Übungsbuch, 7. Aufl., Vieweg+Teubner Verlag Wiesbaden • Bohl, Elmendorf (2008): Technische Strömungslehre, 14. Aufl., Vogel Business Media Würzburg • Böge (2011): Technische Mechanik: Statik – Dynamik – Fluidmechanik – Festigkeitslehre, 29. Aufl., Vieweg+Teubner Verlag Wiesbaden • Junge (2011): Einführung in die Technische Strömungslehre, Fachbuchverlage Leipzig Mayr (2012): Technische Mechanik: Statik – Kinematik – Kinetik – Schwingungen – Festigkeitslehre, 7. Aufl., Carl Hanser Verlag München • Richard, Sander (2008): Technische Mechanik. Dynamik – effektive und anwendungsnah, Vieweg+Teubner Verlag Wiesbaden			
	Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 6 • Assmann (2009): Technische Mechanik Bd. 1: Statik, 19. Aufl., Oldenbourg Verlag München • Assmann (2013): Technische Mechanik Bd. 2: Festigkeitslehre, 18. Aufl., Oldenbourg Verlag München • Böge (2013): Technische Mechanik: Statik – Reibung – Dynamik – Festigkeitslehre - Fluidmechanik, 30. Aufl., Springer Vieweg Verlag Wiesbaden • Böge (2013): Aufgabensammlung Technische Mechanik, 21. Aufl., Springer Vieweg Verlag Wiesbaden • Gross (2013): Technische Mechanik 1: Statik, 12. Aufl., Springer Vieweg Verlag Wiesbaden • Gross (2014): Technische Mechanik 2: Elastostatik, 12. Aufl., Springer Vieweg Verlag Wiesbaden			
	Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 4.5 Cerbe, Wilhelms (2013): Technische Thermodynamik: Theoretische Grundlagen und praktische Anwendungen, 17. Aufl., Carl Hanser Verlag München Baehr (2005): Thermodynamik: Grundlagen und technische Anwendungen, 12. Aufl., Springer Vieweg Verlag Wiesbaden Doering, Schedwill, Dehli (2012): Grundlagen der technischen Thermodynamik, 7. Aufl., Springer Vieweg Verlag Wiesbaden Berties (1996): Übungsbeispiele aus der Wärmelehre, 20. Aufl., Fachbuchverlag Leipzig			
Acquisition of skills	Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4 Through the "Dynamics" component, the students are able to: • Analyze physical problems in the field of dynamics independently, • Develop solution methods and devise solutions. • Reduce technical systems of a mechanical nature to the underlying physical principles. • Apply mathematical methods to solve physical problems. • Independently identify problems in technical systems, develop physical models for solutions and estimate the feasibility of physical processes. • Describe, present and pass on knowledge gained. Through the "Hydromechanics" component, the students are able to: • Describe the essential material properties of liquids. • Determine and calculate the forces acting on geometric surfaces due to hydrostatic pressure. • Calculate the momentum of simple geometric bodies. • Apply and calculate the continuity and energy equations to simple hydraulic systems.			

	• Analyze simple systems of pipe hydraulics and calculate the occurring pressure losses, volume flows and flow velocities. • Apply the impulse and twist laws to simple hydraulic systems and calculate the force effect of flowing fluids. • Apply similarity laws to simple hydraulic systems.
	Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 6 The students are able to: • Analyze systems of forces and calculate unknown forces by size and direction. • To apply the equilibrium conditions in statically determined systems. • Determine the existing internal forces in members, beams and frames. • Examine the level of framework and determine the magnitude of the bar forces. • Investigate friction between machine parts. • Differentiate between shear and normal stresses and identify vulnerable areas in machine components. • To apply the basic relationships of strength theory to simple machine parts and to perform cross-sectional dimensioning. • Make essential statements on strength hypotheses.
Acquisition of skills	
	Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 4.5 The students are able to: • Explain the basic principles and laws of thermodynamics. • Understand the use of principles and laws for the design of machinery and equipment. • Explain the procedure for the evaluation and comparison of real processes on the basis of comparison processes. • Apply the principles and laws of thermodynamics to concrete problems (evaluation/design). • Apply the principles and laws to machines and plants. • Mathematically analyze and evaluate real processes on the basis of comparative processes.
Course contents	**Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4** Dynamics component: • Kinematics of the mass point; description of the movement of the mass point, velocity, acceleration, relative movement • Kinetics of the mass point; Newtonian law, momentum theorem, spin theorem, energy conservation theorem • Kinematics and kinetics of the rigid body: Kinematics of the general motion of a rigid body, mass moment of inertia, impulse theorem, twist theorem, energy conservation theorem, systems of rigid bodies • Impact processes; straight central impact, eccentric impact • Vibrations; classification of vibrations, free and forced vibrations, damped and undamped vibrations, resonance Hydromechanics component: • Substance properties of liquids and gases • Hydrostatic pressure • Buoyancy • Equation of continuity • Energy equation • Pipe hydraulics • Outflow from containers • Principle of linear momentum • Principle of angular momentum • Laws of similarity
	Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 6 • Power systems and balance on the rigid body • Bearing reactions, focus • Rod, beam, frame - internal forces • Level framework • Adhesion and friction on machine parts • Stress types: Tension/compression, shear, surface pressure, moment of area and resistance, bending, torsion • Change of shape • General information about forces; breakdown, resultant, reduction, moment of a force, distributed forces • Cutting methods, equilibrium in central and general force groups

	• Coulomb friction • Center of gravity & area torques • Internal forces on rod and beam • Stress state, principal stresses, Hooke's law • Tensile/compressive stresses, shear stresses, bending stresses, torsion, deformations • Strength hypotheses, composite loading
	Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 4.5 • Main theorems of thermodynamics • Equation of state and change of state of ideal gases • Cyclic processes • Water and steam • Thermal machines • Heat transfer, combustion
Teaching and learning methods	Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4 Integrated course
	Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 6 integrated Lecture
	Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 4.5 integrated Lecture
Evaluation Methods Criteria	Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4 Assignment, presentation and written exam
	Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 6 written exam
Evaluation Methods Criteria	Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 4.5 Final presentation (20 %) and final exam (80 %)

Module number:	Information Technology		Scope:	
INF			**6.0**	**ECTS**
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	2. Semester			
	3. Semester			
	4. Semester			
Level	2. Semester: First cycle, Bachelor / 3. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor			
Previous knowledge	2. Semester: not applicable / 3. Semester: not applicable / 4. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Fundamentals of Data Management (E) /ILV / LV-Nr: vzINF2 / 3.Semester / ECTS: 1.5 - Bocij, Greasley, Hickie (2008): Business Information Systems, 5th Ed. , Pearson Studium Munich. - Wagner, Hüttel, Backin (2012) Einführung Wirtschaftsinformatik: IT-Grundwissen für Studium und Praxis, Springer, Gabler Verlag - Laudon, Schoder (2009): Wirtschaftsinformatik, eine Einführung, 2rd Ed. Pearson Studium München. - Gronwald (2015) Integrierte Business-Informationssysteme: ERP, SCM, CRM, BI, Big Data Analytics - Prozesssimulation, Rollenspiel, Serious Gaming (eXa-men.press), Springer Vieweg Verlag. - Alpar, Alt (2014), Anwendungsorientierte Wirtschaftsinformatik: Strategische Pla-nung, Entwicklung und Nutzung von Informationssystemen, 7. Aufl.Springer Verlag - Chamoni, Gluchowski (2010): Analytische Informationssysteme: Business Intelligence-Technologien und –Anwendungen, Springer Verlag Berlin und Heidelberg - Tanenbaum, Goodman (2005): Computerarchitektur: Fundamentals of Information Systems (E) /ILV / LV-Nr: vzINF3 / 4.Semester / ECTS: 1.5 · Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München · Frick (2007): Grundkurs SAP ERP: Geschäftsprozessorientierte Einführung Mit Durchgehendem Fallbeispiel, Vieweg+Teubner Verlag Wiesbaden · Gronau (2010): Enterprise Resource Planning: Architektur, Funktionen und Ma-nagement von ERP-Systemen, Oldenbourg Wissenschaftsverlag München · Kurbel (2010): Enterprise Resource Planning und Supply Chain Management in der Industrie, Oldenbourg Wissenschaftsverlag München · Scheer (1998): ARIS vom Geschäftsprozess zum Anwendungssystem, 3. Aufl., Springer Verlag Berlin Introduction to Programming /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 3 • Braun, Esswein, Greifenberg (2006): Einführung in die Programmierung; Springer • Herold, Wurz, Wohlrad, Hopf (2017): Einführung in die Informatik; Person • Wolf (2016): Grundkurs C, 2. Auflage, Rheinwerk				
Acquisition of skills	Fundamentals of Data Management (E) /ILV / LV-Nr: vzINF2 / 3.Semester / ECTS: 1.5 The students are able to: • Understand the history and fundamentals of information systems. • Classify and categorize computer systems. • Recognize and analyze the specifics and requirements of today's companies. • Identify technologies, products and trends of information systems. • Know ERP, SCM, CRM and be able to differentiate between them. • Apply the fundamentals of data security. • Obtain an overview of networks, the Internet and the cloud and analyze them. • Classify information systems and the integration of mobile devices. • Identify and differentiate interfaces. • Understand and classify the use of sensors. • Differentiate between different programming languages. Fundamentals of Information Systems (E) /ILV / LV-Nr: vzINF3 / 4.Semester / ECTS: 1.5 e students are able to: • Understand the history and fundamentals of information systems, analyze and recognize the specifics of today's companies. • Classify them through a broad knowledge of different information systems. • Understand the technical structure of an information system and be able to classify it on the basis of certain advantages and disadvantages. • Classify and analyze ERP lifecycles.				

	• Specify a broad overview of requirements to perform the selection of an ERP system using tools and methods learned. • Understand quality requirements and test an ERP system. • Identify ERP enterprise architecture and terminology and transfer them to a company. • Understand the complexity of an integrated ERP system and the most important interfaces.
	Introduction to Programming /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 3 The students are able to: • Read software programs • Program and test simple software on their own • Understand the software development process • Understand the importance of software for product development and production
Course contents	Fundamentals of Data Management (E) /ILV / LV-Nr: vzINF2 / 3.Semester / ECTS: 1.5 • Fundamentals of information systems incl. economic aspect • Understanding and differentiating the structure of information systems • Identification of interfaces to mobile devices as well • Cloud computing • Technical structure and history; networks, interfaces • Structure and logical structure of programs and overview of programming languages e.g. web programming • Data security • Hardware software components • Reporting • Permissions • Testing • Technical design of systems, sensors and mobile terminals
	Fundamentals of Information Systems (E) /ILV / LV-Nr: vzINF3 / 4.Semester / ECTS: 1.5 • ERP lifecycle management • ERP enterprise resource planning • SCM supply chain management • CRM (customer relation management) • Production planning and control • Application integration, long-term archiving • PDM (Product data management) • PLM (Product Lifecycle Management)
	Introduction to Programming /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 3 • Introduction to programming languages (classification, principles, history) • Teaching skills for procedural and object-oriented programming using C# as an example • Structure of programs, data types, operators • Structured programming, functions, file handling, modularization • Aspects of the software development process (conception, implementation, test, introduction) • References to industrial engineering-specific application fields (e.g. programmable control and regulation systems)
Teaching and learning methods	Fundamentals of Data Management (E) /ILV / LV-Nr: vzINF2 / 3.Semester / ECTS: 1.5 Lecture, case studies, exercises
	Fundamentals of Information Systems (E) /ILV / LV-Nr: vzINF3 / 4.Semester / ECTS: 1.5 integrated Lecture
	Introduction to Programming /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 3 Integrated course
Evaluation Methods Criteria	Fundamentals of Data Management (E) /ILV / LV-Nr: vzINF2 / 3.Semester / ECTS: 1.5 final exam, term paper
	Fundamentals of Information Systems (E) /ILV / LV-Nr: vzINF3 / 4.Semester / ECTS: 1.5 final Exam
	Introduction to Programming /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 3 Written exam

Module number:	Basics Product & Production	Scope:	
GPP		7	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	2. Semester		
	4. Semester		
Level	2. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	2. Semester: not applicable / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3 • Heufler (2012): Design Basics, 4th Edition, Verlag Niggli AG Sulgen • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag Munich • Hauschildt, Salomo (2007): Innovationsmanagement, 4th edition, Vahlen Verlag Munich • Blasy (2008): Reverse Engineering im CAD-Prozess, 1st Edition, VDM Verlag Dr. Müller Saarbrücken • Teutsch (2007): Model-based Analysis and Evaluation of Point Sets from Optical 3D Laser Scanners, 1st Edition, Shaker Verlag Herzogenrath • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag Munich • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, softcover, 15th Edition, Europa Lehrmittelverlag Haan • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin		
	Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4 • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan • Schmid, et al. (2013): Produktionsorganisation: Qualitätsmanagement und Produktpolitik, 8. Aufl., EUROPA Lehrmittelverlag Haan • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München		
Acquisition of skills	Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3 The students are able to: • Understand the entire process of digital product creation and its individual elements. • Depending on the requirements of the product to be developed, combine the elements of product creation into a meaningful process. • Have an overview of the technologies so as to be able to solve the problem in the individual process steps.		
	Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4 The students are able to: • Identify modern manufacturing processes with advantages/disadvantages and limitations. • Optimize the cutting parameters during machining. • Analyze and define the use of handling technology. • Identify procedures and methods of quality assurance/improvement and apply selected methods. • Draw up work plans for production.		
Course contents	Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3 • Tools for industrial design • Innovation management • Reverse engineering / surface reconstruction • Rapid prototyping, rapid tooling, rapid manufacturing		

	• CAD (computer aided design) • PDM (Product data management) • Simulation and analysis technologies • CAM (computer aided manufacturing) • Interfaces in the manufacturing process • Quality assurance
	Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4 Production engineering: • Overview of manufacturing processes in the fields of prototyping, forming, separating, joining, changing material properties and coating • Machining: Turning, milling, drilling, grinding • Beam cutting by oxy-fuel flame cutting, plasma beam, electron beam, laser beam and water beam cutting • Cutting with cutting tools with progressive and complete cutting tools • Prototypes: Casting with lost molds and with permanent molds, sintering
Course contents	• Forming: Forging, rolling, sheet metal working by bending, deep drawing, bending • Joining: Welding, soldering and adhesive technology • Changing substance properties: Annealing, hardening, tempering and tempering • Basic design of machine tools and manufacturing equipment for different machining processes • Practically relevant determination of key production figures for various manufacturing processes • Metrology Production engineering: • Manual and automated handling technology in the production area, in the special construction, programming and application areas of industrial robots • Fundamentals of fixture construction: Positioning, clamping devices and additional functions of turning, milling, drilling and welding devices • Processes and methods for increasing productivity by optimizing the cutting values • Procedures and methods for quality assurance and improvement as well as for ongoing quality control in the production area • Work planning: • Tasks of work planning • Schedule creation • Materials engineering: • Internal structure of metallic materials and plastics • Basic principles of alloy formation and description using phase diagrams • Properties of iron and iron alloys and of selected non-ferrous metals • Properties, characteristics and applications of important steel groups, non-ferrous metals and plastics • Methods of static and dynamic material testing
Teaching and learning methods	Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3 integrated Lecture Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4 integrated Lecturer
Evaluation Methods Criteria	Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3 final presentation Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4 Written exam

Module number:	Management		Scope:	
MGM			8.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	2. Semester			
	4. Semester			
Level	2. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor			
Previous knowledge	2. Semester: not applicable / 4. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 3 • Anthony, et al. (2008): The Innovator's guide to growth, Harvard Business Press • Anthony (2012): The little black book of innovation, Harvard Business School Publishing • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag München • Hauschildt, Salomo (2007): Innovationsmanagement, 4. Aufl., Vahlen Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Gudehus (2012): Logistik 1: Grundlagen, Verfahren und Strategien, 4. Aufl., Springer Verlag Berlin • Gudehus (2012): Logistik 2: Netzwerke, Systeme und Lieferketten, 4. Aufl., Springer Verlag Berlin • Ehrlenspiel, Meerkamm (2013): Integrierte Produktentwicklung: Denkabläufe, Methodeneinsatz, Zusammenarbeit, 5. Aufl, Carl Hanser Verlag München • Lindemann (2009): Methodische Entwicklung technischer Produkte: Methoden flexibel und situationsgerecht anwenden, 3. Aufl., Springer Verlag Berlin • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3. Aufl., Carl Hanser Verlag München Marketing and Sales (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 2 • Kotler, Armstrong, Wong, Saunders (2010): Grundlagen des Marketing (Fundamentals of Marketing), 5th edition, Pearson Education • Kotler, Keller, Bliemel (2007): Marketing-Management, Strategien für wertschaf-fendes Handeln, 12th edition, Pearson Education • Homburg (2012): Marketingmanagement: Strategie-Instrumente-Umsetzung-Unternehmensführung, 4th Edition, Springer Gabler Publisher Wiesbaden • Meffert, Burmann, Kirchgeorg: Marketing, Grundlagen marktorientierter Unternehmensführung. Konzepte – Instrumente - Praxisbeispiele, 11th Edition, Springer Gabler Publisher Wiesbaden • Sander (2011): Marketing-Management: Märkte, Marktinformationen und Markt-bearbeitung, 2nd edition, UTB Stuttgart Project Management /ILV / LV-Nr: vzMGM2 / 2.Semester / ECTS: 1.5 • Gareis (2005): Happy Projects!: Project and programme management. Project portfolio management. Management of the project-oriented organization. Management in the project-oriented society, 1. Aufl., MANZ Verlag Wien • Patzak, Rattay (2014): Projektmanagement: Leitfaden zum Management von Projekten, Projektportfolios und projektorientierten Unternehmen, 6. Aufl., Linde Verlag Wien Supply Chain Management (E) /ILV / LV-Nr: vzMGM3 / 4.Semester / ECTS: 2 • Gudehus (2012): Logistics 1: Grundlagen, Verfahren und Strategien, 4th Edition, Springer Verlag Berlin • Gudehus (2012): Logistics 2: Netzwerke, Systeme und Lieferketten, 4th Edition, Springer Verlag Berlin • Cohen, Roussel (2006): Strategisches Supply Chain Management, 1st edition, Springer Verlag Berlin • Kummer, Grün, Jammernegg (2013): Grundzüge der Beschaffung, Produktion und Logistik, 3rd edition, Pearson • Pfohl (2010): Logistiksysteme: Betriebswirtschaftliche Grundlagen, 8th Edition, Springer Verlag Berlin • Erlach(2010): Wertstromdesign: Der Weg zur schlanken Fabrik, 2nd Edition, Springer Verlag Berlin			

Acquisition of skills	**Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 3** The students are able to: • Determine the innovation needs of a company and develop an innovation strategy. • Structure the innovation needs and define suitable processes with methods for further processing. • Apply creativity methods. • Analyze the most important framework conditions for product development and define requirements for the product development process. • Design product development processes in line with the requirements. • Apply product development methods
	Marketing and Sales (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 2 The students are able to: • Identify market-oriented management. • Develop marketing concepts or a marketing plan based on an identified problem. • Apply instruments of the marketing mix. • Present basic market research methods.
Acquisition of skills	**Project Management /ILV / LV-Nr: vzMGM2 / 2.Semester / ECTS: 1.5** The students are able to: • Understand the importance of project management for a company. • Describe generic project phases and project results. • Use methods to define project goals, define project scope and plan tasks, duration and resource requirements. • Identify roles and participants in a project. • Understand the importance of communication in projects. • Apply methods to manage projects. • Understand the reasons for the failure of projects and the corresponding measures. • Understand the difference between single and multi-project management.
	Supply Chain Management (E) /ILV / LV-Nr: vzMGM3 / 4.Semester / ECTS: 2 Students are able to: - identify remits and contents of logistics. - explain the meaning of processing time and stock. - identify key figures to measure the logistics performance, logistics costs and flexibility. - describe concepts, their potential use and their advantages / disadvantages and limits. - define targets based on key requirements and select adequate concepts for them. - work on basic tasks of logistics on their own.
Course contents	**Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 3** • Strategic relevance of innovation (competitiveness) • Structured handling of innovations (innovation-promoting organizational forms, corporate culture, management forms) • Importance of product development for companies • Scope and integration of product development in companies • Design forms of the product development process and organizational forms • Approaches in product development with regard to concept, concept and elaboration such as functional analysis, QFD, specification, FMEA, concept evaluation (quality approaches) and production transition • Variant management and approaches for the representation of external complexity • Management of target costs
	Marketing and Sales (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 2 • Importance and tasks of marketing in the 21st century • Fundamentals of capital goods, consumer goods and services marketing • Marketing plan • Market research • Market segmentation/positioning • Strategic marketing • Marketing mix
	Project Management /ILV / LV-Nr: vzMGM2 / 2.Semester / ECTS: 1.5 • Presentation of the specifics of the project organization and the organizational integration into, impact on, or resulting problems in companies. • Imparting basic project management methods, such as

	• Planning of goals, structure, time, costs and organization • Performing environment, risk and interdependency analyses or project controlling/communication in the various phases of projects (start, implementation/controlling, conclusion) on the basis of a selected project management standard. • Addressing the relevant social skills for successful project work and the mediation of successful practical projects and typical pitfalls. • Classification of the terms project management, program management and multi-project management.
	Supply Chain Management (E) /ILV / LV-Nr: vzMGM3 / 4.Semester / ECTS: 2 The course aims to introduce the subject of logistics, the scope, areas and value of which cover the globalized and networked economy on a strategic and operational level. • Goals and conflicting goals in logistics against the background of the following framework conditions • Levels of logistics (functional service function, coordination, flow rationing, supply chain) • Storage/warehousing • Demand planning • Internal and external transport • ABC/XYZ analysis • Approaches like Kanban, JIT/JIS, value stream analysis • Order picking • Types of order control • Procurement, production, distribution and disposal logistics • Supply chain management • Procurement, production, distribution and disposal logistics • Supply chain management
Teaching and learning methods	Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 3 integrated Lecture
	Marketing and Sales (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 2 Integrated course
Teaching and learning methods	Project Management /ILV / LV-Nr: vzMGM2 / 2.Semester / ECTS: 1.5 Lecture
	Supply Chain Management (E) /ILV / LV-Nr: vzMGM3 / 4.Semester / ECTS: 2 Lecture
Evaluation Methods Criteria	Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 3 Final presentation and final exam
	Marketing and Sales (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 2 final presentation and final written exam
	Project Management /ILV / LV-Nr: vzMGM2 / 2.Semester / ECTS: 1.5 Written exam
	Supply Chain Management (E) /ILV / LV-Nr: vzMGM3 / 4.Semester / ECTS: 2 final presentation and written exam

Module number:	Practical projects		Scope:	
PRA			8	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	3. Semester			
	4. Semester			
Level	3. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor			
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4			
	In accordance with the specific task			
	Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4			
	In accordance with the specific task			
Acquisition of skills	Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4			
	The students are able to: • Carry out a project on the basis of professional project management. • Master the systematic, technically sound and on-schedule handling of projects. • Identify the specific roles within a project. • Assess the importance of project communication in all directions (conversations, documentation, descriptions, presentations) and act accordingly. • Use expertise to solve specific problems.			
	Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4			
	The students are able to: • Carry out a project on the basis of professional project management. • Master the systematic, technically sound and on-schedule handling of projects. • Identify the specific roles within a project. • Assess the importance of project communication in all directions (conversations, documentation, descriptions, presentations) and act accordingly. • Use expertise to solve specific problems.			
Course contents	Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4			
	Building on the experience gained in the practical project I and on the further knowledge and skills acquired in specialist teaching events, the students have the opportunity to apply their acquired knowledge to real projects - above all, the competences in the area of project and quality management, as well as the subject-specific problem-solving competence, are to be consolidated and made applicable in this way. In cooperation with companies or other institutions, problems from the areas of the study course are dealt with within the framework of projects. The planning, implementation, budgeting and evaluation of the projects are carried out independently - both the formation of the project team and the implementation of quality management are carried out by the students themselves in order to promote decision-making competence and communicate real consequences. Practical project I or II must process a technical topic.			
	Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4			
	To prepare the students optimally for problems in working life, practical tasks are worked on in groups, preferably on the basis of commissions from partners from industry or public institutions, or field experiences are obtained under the guidance of the course leader. The students contribute their acquired knowledge and compare it with observations and experiences in the context of the practical project. While students can deepen and improve their subject-specific competences, complementary competences such as social competence, risk management, budgeting competence and economically responsible decision-making competence are also solidified. Based on a client briefing (by the course instructor or external partners such as associations and companies), the students work on the presented projects independently, only guided by the course			
Teaching and learning methods	Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4			
	Project work			

	Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4
	Project work and presentation
Evaluation Methods Criteria	Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4
	Project documentation and presentation
	Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4
	Project report and presentation

Module number:	Product development		Scope:	
PEE			9.0	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	3. Semester			
	4. Semester			
Level	3. Semester: 1. Study cycle, Bachelor / 4. Semester: 1.study cycle bachelor / 4. Semester: k.A			
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Design Project - Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 3			
	* Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag München * Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3. Aufl., Carl Hanser Verlag München * Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan * Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München * Hauschildt, Salomo (2007): Innovationsmanagement, 4. Aufl., Vahlen Verlag München * Hoenow, Meissner (2010): Entwerfen und Gestalten im Maschinenbau, Carl Han-ser Verlag München * Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag München * Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press * Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin * Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München * Vogel, Ebel (2009): Pro/Engineer und Pro/Mechanica: Konstruieren und Berech-nen mit Wildfire 4, 5. Aufl., Carl Hanser Verlag München			
	Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5			
	• Sendler, Wawer (2011): Von PDM zu PLM, 3. Aufl., Carl Hanser Verlag München • Gudehus (2012): Logistik 1: Grundlagen, Verfahren und Strategien, 4. Aufl., Springer Verlag Berlin • Gudehus (2012): Logistik 2: Netzwerke, Systeme und Lieferketten, 4. Aufl., Springer Verlag Berlin • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München • Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München			
	R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 2			
	- Hahn, Häusler, Große Austing (2013): Quantitatives Entwicklungsmanagement, Springer Verlag Berlin - Reinertsen (2009): The Principles of Product Development Flow: Second Generation Lean Product Development, Celeritas Publishing - Ries (2011): The Lean Startup: How Constant Innovation Creates Radically Successful Businesses, Portfolio Penguin - Brown, Tim: The Lean Startup: How Constant Innovation Creates Radically Successful Businesses - Reinertsen (1997): Managing the Design Factory, Free Press - McGrath (2004): Next Generation Product Development: How to Increase Productivity, Cut			
	Trends in R&D (WP)(E) (WP)* /VO / LV-Nr: vzPEE4 / 4.Semester / ECTS: 1.5			

	To determine depending on the established trend
Acquisition of skills	Design Project - Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 3 The students are able to: • Understand the fundamentals of the design process and be able to apply them. • Evaluate and analyze design methods. • Plan, clarify and design a product using the relevant • requirements analysis, concept development, evaluation of solutions and designs • Develop a product in a structured manner and according to standards and norms, taking safeguards into account. • Decide on and evaluate special features for individual and mass production, taking production, assembly and costs into account. • Create the complete documentation for a design (e.g. specifications, functional analysis, specifications, parts lists, technical drawing, assembly instructions, documentation). Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: The students are able to: • Analyze and structure business processes of product development. • Record actual data and identify interfaces. • Check best practices. • Verify organizational forms and data in the system.
Acquisition of skills	• Optimize product development processes through system support and apply modern methods. • Evaluate and analyze product data and prepare it for transfer to production. • Classify the basic functions of production data management. • Identify interfaces to other systems (e.g. CAD, Office, assemblies, ...). • and analyze them. • Evaluate CAx (computer-aided) data. • Understand the introduction of a PDM system. R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 2 The students are able to: • Analyze core processes in the development area and assess their status. • Define goals using suitable key figures and follow them up using methods and tools (QM approaches). • Derive measures against the background of networking core processes and interpret their effects. Trends in R&D (WP)(E) (WP)* /VO / LV-Nr: vzPEE4 / 4.Semester / ECTS: 1.5 The students are able to: • Identify current trends in development. • Describe the impact of these trends on development. • Recognize the current challenges of the market and implement them in product development. • Analyze current trends with regard to their impact on products and define measures. • Identify and derive new marketing opportunities for products and identify their impact on product development. • Define requirements for new products and develop concept proposals using methods learned.
Course contents	Design Project - Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 3

	Practical design and calculation exercises using practical examples, in particular for the design of simple connecting elements, axles and shafts, as well as sliding and rolling bearing technology, shaft-hub connections, couplings, belt drives and gear drives, elements for supporting, carrying machine components and torque transmission: • Functions and design rules as well as calculation bases for axes and shafts • Design fundamentals and calculation bases of hydrodynamic plain bearings • Bearing types, areas of application, bearing concepts and calculation bases for rolling bearings • Elements for sealing machine components • Elastic springs: Spring types, design rules and calculation bases for springs • Clutches and brakes: Design, functions, mode of operation and calculation bases of selected clutch and brake types • Belt drives: Design principles and calculation bases for flat and V-belt drives and timing belt drives • Gear drives: Gear types and design, gearing law, design and calculation bases for straight, helical, bevel and helical gears
	Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5 • Best practice processes and KPIs for product development • Authorization concept • Product lifecycle management • Product data management (PDM) - various systems • Interfaces CAD, PDM, PLM and ERP • Product development system, Windchill • Production planning and control • Support through ERP Enterprise resource planning systems • Special features of SCM Supply Chain Management during product development • Influence of customers on product development viewed under consideration of Customer Relation Management (CRM) • Effects of integration and networking on product development (smart products) • Application integration, long-term archiving
	R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 2 • Core processes in the development area • Challenges in the development area against the background of existing market requirements • Levels of development management (strategic, tactical, operational) • Management of the development area with qualitative and quantitative approaches (Lean Engineering, Model Based System Engineering). QM etc.)
	Trends in R&D (WP)(E) (WP)* /VO / LV-Nr: vzPEE4 / 4.Semester / ECTS: 1.5 • Methods of structured development of products using modern tools • Product development process and effects on it through global requirements • Changes in the product development process through new integrated, global networks, technical developments (e.g. sensor technology, web, mobile devices, smart devices, ...) • State of the art methods of product development • Fundamentals of innovation in product development • Current, influential trends in product development are presented and discussed in this course. This ensures that the students have their finger on the pulse of the times with their respective specialization.
Teaching and learning methods	Design Project - Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 3 Integrated course
	Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: integrated lecture
Teaching and learning methods	R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 2 Integrated course

	Trends in R&D (WP)(E) (WP)* /VO / LV-Nr: vzPEE4 / 4.Semester / ECTS: 1.5
	Lecture
Evaluation Methods Criteria	Design Project - Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 3
	final presentation
	Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS:
	Project documentation and final presentation, final report
	R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 2
	Final presentation and final exam
	Trends in R&D (WP)(E) (WP)* /VO / LV-Nr: vzPEE4 / 4.Semester / ECTS: 1.5
	project documentation

Module number:	Production		Scope:	
PEP			**9.0**	**ECTS**
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	3. Semester			
	4. Semester			
Level	3. Semester: 3. Semester / 4. Semester: First cycle, Bachelor			
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Construction Project - Production (WP) (WP)* /ILV / LV-Nr: vzPEP1 / 3.Semester / ECTS: 3 • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag München • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3. Aufl., Carl Hanser Verlag München • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan • Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München • Hauschildt, Salomo (2007): Innovationsmanagement, 4. Aufl., Vahlen Verlag München • Hoenow, Meissner (2010): Entwerfen und Gestalten im Maschinenbau, Carl Hanser Verlag München • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München • Vogel, Ebel (2009): Pro/Engineer und Pro/Mechanica: Konstruieren und Berech-nen mit Wildfire 4, 5. Aufl., Carl Hanser Verlag München Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzPEP2 / 4.Semester / ECTS: 2.5 • Gudehus (2012): Logistics 1: Grundlagen, Verfahren und Strategien, 4th Edition, Springer Verlag Berlin • Gudehus (2012): Logistics 2: Netzwerke, Systeme und Lieferketten, 4th Edition, Springer Verlag Berlin • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD and PDM: Prozessoptimierung durch Integration, 2nd Edition, Carl Hanser Publisher Munich • Gebhardt (2007): Generative Fertigungsverfahren, 3rd Edition, Carl Hanser Publisher Munich Production Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEP3 / 4.Semester / ECTS: 2			

	• Gummersbach, et al. (2012): Produktionsmanagement: Lehr- und Nachschlage-werk, 5th edition, Verlag Handwerk und Technik Hamburg • Schmid, et al. (2013): Produktionsorganisation: Qualitätsmanagement und Produktpolitik, 8th Edition, Europa Lehrmittelverlag Haan • Voigt (2008): Industrielles Management: Industriebetriebslehre aus prozessorientierter Sicht, 1st Edition, Springer Verlag Berlin • Schuh, Schmidt (2014): Produktionsmanagement: Handbuch Produktion und Management 5, 2nd Edition, Springer Vieweg Verlag Wiesbaden • Kiener, et al. (2012): Produktions-Management: Grundlagen der Produktionsplanung und –steuerung, 10th edition, Oldenbourg Verlag Munich • Abele, Kluge (2010): Handbuch globale Produktion, 2nd Edition, Carl Hanser Publisher Munich
	Trends in Production (WP)(E) (WP)* /VO / LV-Nr: vzPEP4 / 4.Semester / ECTS: 1.5 To determine depending on the established trend
Acquisition of skills	Construction Project - Production (WP) (WP)* /ILV / LV-Nr: vzPEP1 / 3.Semester / ECTS: 3 The students are able to: • Know the fundamentals of the design process and apply them. • Evaluate and analyze the design methods. • Differentiate machines and plants. • Construct plants also as a union of machine groups under consideration of additional requirements like e.g. conveyor systems and conveying aids. • The special features of a plant take into account the interaction of components, service and assembly. • Plan, define and design an entire plant and plant components or machine groups. Consider and document the respective work step (e.g. requirement determination, concept development, evaluation of solutions, design). • Develop a plant in a structured manner and in accordance with standards and norms, taking safety into account. • Consider and evaluate the possibility of variants as well as set-ups and conversions, taking into account production, assembly and costs. • Create the complete documentation for the entire design in interaction (e.g. requirement specification, functional analysis, requirements specification, parts lists, technical drawing, assembly instructions, documentation).
	Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzPEP2 / 4.Semester / ECTS: 2.5 The students are able to:
Acquisition of skills	• Analyze and structure business processes in production. • Record actual data and identify interfaces. • Verify best practices in production processes. • Verify organizational forms and data in the system. • Optimize processes through system support and apply modern methods (e.g. Lean, Kanban, ...) with system support. • Identify, analyze and classify interfaces internally and externally. • Record data structures. • Ensure quality requirements during implementation. • Be familiar with the advantages and disadvantages of different providers.
	Production Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEP3 / 4.Semester / ECTS: 2 The students are able to: • Analyze core processes in the production area and assess their status. • Define goals using suitable key figures and follow them up using methods and tools (QM approaches). • Derive measures against the background of networking core processes and interpret their effects.
	Trends in Production (WP)(E) (WP)* /VO / LV-Nr: vzPEP4 / 4.Semester / ECTS: 1.5

	The students are able to: • Understand the history of the product processes and the current status (PLM, PPS, CIM, etc.). • Recognize the current challenges of the market and be able to implement production requirements. • Analyze current trends with regard to their impact on production (automation, networking). • Identify and derive new, global methods of production and identify the effects on innovative production. • Identify current trends in production. • Describe the impact of these trends on production. • Define actions regarding these trends.
Course contents	Construction Project - Production (WP) (WP)* /ILV / LV-Nr: vzPEP1 / 3.Semester / ECTS: 3 • Practical design and calculation exercises using practical examples, in particular for the design of connecting elements, conveyor systems, machine components as well as axles, shafts and bearings; connections and couplings and gears. For the interaction, particular emphasis should be placed on elements for supporting, carrying machine components, torque transmission and conveying: • Types, functions and design rules as well as calculation bases for axes, shafts, bearings and springs. • Elements for sealing machine components • All elements which are also relevant for connections and conveyor technology: • Clutches and brakes: Design, functions, mode of operation and calculation bases of selected clutch and brake types • Belt drives: Design principles and calculation bases for flat and V-belt drives and timing belt drives • Gear drives: Gear types and design, gearing law, design and calculation bases for straight, helical, bevel and helical gears Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzPEP2 / 4.Semester / ECTS: 2.5 • Best practice processes and KPIs for production • Authorization concept • Product lifecycle management • Production planning and control • Enterprise structures and master data structures. • Support through ERP (Enterprise Resource Planning) systems • Integration of SCM (Supply Chain Management) and CRM (Customer Relationship Management) with the production process • Support methods for optimizing production through information systems, including web applications and mobile devices. • Reporting • Design and customizing of the system to ensure quality and integration • Application integration, long-term archiving Production Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEP3 / 4.Semester / ECTS: 2 • Core processes in the production area • Challenges in the production area against the background of existing market requirements • Levels of production management (strategic, tactical, operational) such as location decision, in-house and external production, order management, work system design, production planning and control (PPS), personnel management • Lean management • Management of the production area with qualitative and quantitative approaches (QM approaches) Trends in Production (WP)(E) (WP)* /VO / LV-Nr: vzPEP4 / 4.Semester / ECTS: 1.5 • Current, influential trends in production will be presented and discussed during this course. This ensures that the students have their finger on the pulse of the times with their respective specialization. • Best practices in production • Production process and impact of global requirements • Changes in the production process through new integrated global networks, technical developments (e.g. automated Lean, Kanban, ...) • KPIs in modern production • Methods and modern tools in production

Teaching and learning methods	Construction Project - Production (WP) (WP)* /ILV / LV-Nr: vzPEP1 / 3.Semester / ECTS: 3 Integrated course
Teaching and learning methods	Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzPEP2 / 4.Semester / ECTS: 2.5 Integrated course
	Production Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEP3 / 4.Semester / ECTS: 2 Integrated course
	Trends in Production (WP)(E) (WP)* /VO / LV-Nr: vzPEP4 / 4.Semester / ECTS: 1.5 Lecture
Evaluation Methods Criteria	Construction Project - Production (WP) (WP)* /ILV / LV-Nr: vzPEP1 / 3.Semester / ECTS: 3 final presentation
	Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzPEP2 / 4.Semester / ECTS: 2.5 Project documentation and final presentation, final report
	Production Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEP3 / 4.Semester / ECTS: 2 final presentation and written final exam
	Trends in Production (WP)(E) (WP)* /VO / LV-Nr: vzPEP4 / 4.Semester / ECTS: 1.5 final written Exam

Module number:	Economics		Scope:	
WIR			12.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the curriculum	3. Semester			
	4. Semester			
Level	3. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor			
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Basic Accounting /ILV / LV-Nr: vzWIR2 / 3.Semester / ECTS: 4 • Coenenberg, et al. (2014): Jahresabschluss und Jahresabschlussanalyse: Aufgaben und Lösungen, 15th edition, Schäffer-Poeschel Verlag Stuttgart • Buchholz (2015): Internationale Rechnungslegung: Die wesentlichen Vorschriften nach IFRS und HGB, 12th edition, Erich Schmidt Verlag Berlin • Bähr, Fischer-Winkelmann, List (2006):Buchführung und Jahresabschluss, 9th edition, Gabler Verlag Wiesbaden • Coenenberg, et al. (2014): Jahresabschluss und Jahresabschlussanalyse: Betriebswirtschaftliche, handelsrechtliche, steuerrechtliche und internationale Grundlagen, 23rd edition, Schäffer-Poeschel Verlag Stuttgart • Döring, Buchholz (2013): Buchhaltung und Jahresabschluss, 13th edition, Erich Schmidt Verlag Berlin • German Commercial Code (HGB) in the latest version. • Küting, Weber (2015): Die Bilanzanalyse, 11th edition, Schäffer-Poeschel Verlag Stuttgart • Wöhe, Döring (2013): Einführung in die Allgemeine Betriebswirtschaftslehre, 25th edition, Vahlen Verlag Munich • Wöhe, Kußmaul (2015): Grundzüge der Buchführung und Bilanztechnik, 9th edition, Vahlen Verlag Munich Fundamentals to Economics (E) /ILV / LV-Nr: vzWIR1 / 4.Semester / ECTS: 5 • Vahs, Schäfer-Kunz (2012): Einführung in die Betriebswirtschaftslehre, 6.Auflage, Schäffer-Poeschel Verlag Stuttgart • Mankiw (2012): Grundzüge der Volkswirtschaftslehre, 5. Aufl., Schäffer-Poeschel Verlag Stuttgart • Mankiw (2003): Makroökonomik, 5. Aufl., Schäffer-Poeschel Verlag Stuttgart • Blanchard (2008): Macroeconomics, 5. Aufl., Pearson Education • Pindyck, Rubinfeld (2012): Microeconomics, 8. Aufl., Pearson Education • Varian (2010): Intermediate Microeconomics, 8. Aufl., Norton & Company Introduction to Law /VO / LV-Nr: vzWIR4 / 4.Semester / ECTS: 2 • Czernich, Hofstädter (2003): Vertragswissen leicht gemacht, Redline Wirtschaft Verlag München • Czernich, et al. (2011): Vertragsrecht für Unternehmen: Leitfaden zur sicheren Vertragsgestaltung, Linde Verlag Wien • Poduschka (2012): Vertragsrecht für jedermann, Verlag Österreich Wien • Mader (2014): Kapitalgesellschaften, 9. Aufl., LexisNexis Wien • Schummer (2013): Personengesellschaften, 8. Aufl., LexisNexis Wien • Haybäck (2014): Marken- und Immaterialgüterrecht, 4. Aufl., LexisNexis Wien • Borchardt (2011): Das ABC der Europäischen Union: Die Grundwerte der Europäischen Union, Dictus Publishing Saarbrücken • Internetplattformen: RIS (www.ris.bka.gv.at), EUR-Lex, gesetze-im-internet.de, internet4jurists.at, RDB (www.rdb.at) Investment and Financing (E) /ILV / LV-Nr: vzWIR3 / 4.Semester / ECTS: 1.5			

	• Däumler, Grabe (2013).: Betriebliche Finanzwirtschaft, 10th edition, nwb Verlag Herne • Grill, Perczynski, Grill (2014): Wirtschaftslehre des Kreditwesens,Bildungsverlag Eins Troisdorf • Warnecke, et al. (1996): Wirtschaftlichkeitsrechnung für Ingenieure, 3rd Edition, Carl Hanser Publisher Munich • Däumler, Grabe (2014): Grundlagen der Investitions- und Wirtschaftlichkeitsrech-nung, nwb Verlag Herne • Kruschwitz (2011): Investitionsrechnung, 13th Edition, Oldenbourg Publishers Munich • Bestmann (2008): Kompendium der Betriebswirtschaftslehre, 11th ed., Oldenbourg Verlag Munich • Wöhe, Döring (2013): Einführung in die Allgemeine Betriebswirtschaftslehre, 25th edition, Vahlen Verlag Munich
Acquisition of skills	Basic Accounting /ILV / LV-Nr: vzWIR2 / 3.Semester / ECTS: 4 The students are able to: External accounting: • Know the fundamentals of mapping business decisions in the accounting system. • Know and understand the basic concepts and subareas of accounting. • Understand the technology and internal structure of double-entry bookkeeping. • Can assess the structure of an accounting system and the characteristics of different types of accounts. • Make simple business postings to balance sheet and profit and loss accounts and create posting records. • Recognize the significant effects of business transactions on the balance sheet and income statement.
	• Can differentiate between the terms payments - disbursements, income - expenses, income - expenses • Can describe the organizational structure of a cost accounting system and explain its main features. • Know the systems of cost accounting (partial and full cost accounting)
Acquisition of skills	Fundamentals to Economics (E) /ILV / LV-Nr: vzWIR1 / 4.Semester / ECTS: 5 The students are able to: Introduction to Business Administration component: • Identify the different business subareas • Understand the fundamentals of marketing • Understand the fundamentals of personnel management • Understand the structure of an enterprise and typical operational processes and they are familiar with the basic constitutive factors of an enterprise • Recognize relationships in the sense of the various relationships between the business functions • Clearly differentiate between central business terms • Identify the most important constitutional and functional corporate decisions Applied Economics component: • name the essential components of a market model and discuss the market equilibrium as an interaction of supply and demand. • identify the determinants of consumer demand and explain how they respond to external factors such as changes in income. • explain both the potentials and the limitations of market models based on real-world markets, for example the housing or labor market, and to buttress abstract models with real-life examples. • understand production decisions in companies and interpret the influences of market structures on price setting. • examine and critically evaluate current developments on the basis of models. • name the essential components and institutions of a national economy and explain how they function. • identify macroeconomic indicators such as gross domestic product or consumer price index and explain their meaning. • conduct independent research on indicators important for economic growth and inflation and to present current developments in this regard. Introduction to Law /VO / LV-Nr: vzWIR4 / 4.Semester / ECTS: 2

	The students are able to: • Identify and classify legal problems (e.g. private, commercial, European law, etc.) in practice. • Find legal sources and research information independently. • Differentiate legal problems and be able to find a solution independently. • Analyze frequent problem cases from practice on the basis of concrete case studies. • Understand a legal topic independently and subsequently be able to explain it to others.
	Investment and Financing (E) /ILV / LV-Nr: vzWIR3 / 4.Semester / ECTS: 1.5 The students are able to: • Define the fundamentals of investment, financing and risk management and apply them in examples. • Calculate the financing requirements. • Describe the fundamentals of the lending business as well as the processing of loans and the risk limitation of credit institutions. • Assess investments from an economic point of view. • Apply the usual methods of investment calculation in everyday business.
Course contents	Basic Accounting /ILV / LV-Nr: vzWIR2 / 3.Semester / ECTS: 4 External accounting: • Structure of the accounting system • Fundamentals of operational accounting: Tasks, subareas and basic terms • Commercial accounting system: From inventory to opening balance sheet • Double-entry accounting system: Posting of business cases to balance sheet and profit and loss accounts • Organization of bookkeeping (chart of accounts, sales tax, etc.) • Principle of period specificity and accruals and deferrals Internal accounting: • Objectives and basic concepts of cost and revenue accounting • Fundamentals of cost and revenue accounting: Tasks, components and subareas • Structure of cost accounting (cost elements, cost centers, cost objects) • Contribution margin accounting
	Fundamentals to Economics (E) /ILV / LV-Nr: vzWIR1 / 4.Semester / ECTS: 5 Introduction to Business Administration component: • Overview and context analysis of the most important subareas in business administration • Subject and fundamentals of business administration: • Operational functional areas • Business decision theory • Fundamentals of management and ethics • Fundamentals of personnel and organization • Marketing Fundamentals • Fundamentals of: • Constitutive company decisions such as legal forms, location decisions, types of mergers and acquisitions and choice of business segment. • Functional business decisions: Materials management, production management, marketing. • Fundamentals of business value creation processes and functions (value creation architecture and

Course contents	structure). • Fundamentals of market, process and strategy oriented management. Applied Economics component: • Economic thinking and marginal analysis • Efficient allocation of scarce resources • The market model and market equilibrium • Macroeconomic variables (GDP, inflation, and unemployment) and their interrelationships Selected macroeconomics issues: • Elasticity and welfare • Cost functions and optimal corporate production • Price setting and market structures • Short-term macroeconomic fluctuations: The business cycle • Money, the ECB, and inflation
	Introduction to Law /VO / LV-Nr: vzWIR4 / 4.Semester / ECTS: 2 • Fundamentals of law • History of law, significance of law, structure of the legal system, classification of law • General private law • Classification of private law, legal entities and legal objects, time, introduction to property law, legal transaction, contract law • Commercial law • Entrepreneur status, company register, forms of enterprise, establishment of an enterprise • European law • EU institutions, EU legal sources, fundamental freedoms of the internal market • Technology law • CE marking, intellectual property (IP) law • Access to legal information systems
	Investment and Financing (E) /ILV / LV-Nr: vzWIR3 / 4.Semester / ECTS: 1.5 • Introduction to financial management • Economic business processes (investment, financing and risk management) • Differences in financing needs for: Enterprises, public budgets and private budgets • Structure and legal basis of the credit business of credit institutions • Supply of credit to the credit markets • The European Central Bank • Execution and processing of credit transactions, e.g. credit types • Company assessment and analysis • Collateral, credit agreement and credit decisions • Introduction to investment calculation • Goals and tasks of a modern investment calculation • Fundamentals of business investment decisions • Static methods of investment calculation • Dynamic methods of investment calculation
Teaching and learning methods	**Basic Accounting /ILV / LV-Nr: vzWIR2 / 3.Semester / ECTS: 4** Integrated course
	Fundamentals to Economics (E) /ILV / LV-Nr: vzWIR1 / 4.Semester / ECTS: 5 integrated Lecture
	Introduction to Law /VO / LV-Nr: vzWIR4 / 4.Semester / ECTS: 2 Lecture
	Investment and Financing (E) /ILV / LV-Nr: vzWIR3 / 4.Semester / ECTS: 1.5 Integrated course
Evaluation Methods Criteria	**Basic Accounting /ILV / LV-Nr: vzWIR2 / 3.Semester / ECTS: 4** Final written Exam
	Fundamentals to Economics (E) /ILV / LV-Nr: vzWIR1 / 4.Semester / ECTS: 5 Final written Exam
	Introduction to Law /VO / LV-Nr: vzWIR4 / 4.Semester / ECTS: 2 Application, project work or written exam

	Investment and Financing (E) /ILV / LV-Nr: vzWIR3 / 4.Semester / ECTS: 1.5 final written Exam

Module number:	Semester abroad Individual & social competence	Scope:	
AIS		**5**	**ECTS**
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the	5. Semester		
Level	5. Semester: First cycle, Bachelor		
Previous knowledge	5. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5 Depending on selected course		
Acquisition of skills	Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5 The students practice the acquisition of knowledge during the semester abroad at a partner university. They deepen their individual and social competence in a foreign language, thereby enhancing their language skills (technical vocabulary).		
Course contents	Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5 Consolidation through courses such as Business Communication, Negotiation and Conflict Resolution, International Business Communication, Bargaining Behavior.		
Teaching and learning methods	Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5 The teaching and learning methods are based on the curricula or specifications of the partner universities concerned.		
Evaluation Methods Criteria	Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5 The evaluation methods and evaluation criteria are based on the curricula or specifications of the partner universities concerned.		

Module number:	Semester abroad technology		Scope:	
ATE			15	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time			
Position in the	5. Semester			
Level	5. Semester: First cycle, Bachelor			
Previous knowledge	5. Semester: not applicable			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15 Depending on the subject focus of the respective elective subjects			
Acquisition of skills	Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15 The students practice the acquisition of knowledge during the semester abroad at a partner university. They deepen their individual and social competence in a foreign language, thereby enhancing their language skills (technical vocabulary).			
Course contents	Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15 Consolidation through courses in the following two areas: 1. Higher engineering science (e.g. fluid mechanics, heat transfer, machine dynamics, multi-body dynamics, modelling and simulation, higher strength, quality assurance, corrosion and corrosion protection, composite materials, welding, metrology, forming technology, foundry technology, joining technology, etc.) 2. Product development (e.g. mechatronic systems, internal combustion engines, drive and control technology, thermal turbomachinery, hydraulic fluid machines, robotics, plant simulation, etc.)			
Teaching and learning methods	Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15 Depending on selected courses			
Evaluation Methods Criteria	Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15 Depending on selected courses			

Module number:	Semester Abroad Business & Management	Scope:	
AWM		**10**	**ECTS**
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the	5. Semester		
Level	5. Semester: First cycle, Bachelor		
Previous knowledge	5. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Semester Abroad: Economics & Management /ILV / LV-Nr: vzAWM / 5.Semester / ECTS: 10 Depending on selected courses		
Acquisition of skills	Semester Abroad: Economics & Management /ILV / LV-Nr: vzAWM / 5.Semester / ECTS: 10 The students practice the acquisition of knowledge during the semester abroad at a partner university. They deepen their individual and social competence in a foreign language, thereby enhancing their language skills (technical vocabulary).		
Course contents	Semester Abroad: Economics & Management /ILV / LV-Nr: vzAWM / 5.Semester / ECTS: 10 Consolidation through courses in the following three areas: 1. Management (e.g. Strategic Management, Competitive Strategies, Management of Multinational Corporations, Organizational Theory, Corporate Behavior, Corporate Culture, Knowledge Management, Management of Innovations, Business Ethics, Corporate Governance, Managerial Decision Behavior, HRM, Leadership, Quality, etc.) 2. Marketing/Sales (e.g. Advanced Marketing Management, Consumer Behavior, Customer Service Excellence, Global Marketing, Sales Management, Sales Techniques etc.) 3. Accounting/Finance/Controlling/Purchasing (e.g. Financial Management, Portfolio Management, Options and Futures, International Finance, Global buying, Buying, E-Procurement etc.) 4. Law (e.g. patent law, product labelling, product liability, etc.)		
Teaching and learning methods	Semester Abroad: Economics & Management /ILV / LV-Nr: vzAWM / 5.Semester / ECTS: 10 Depending on selected courses		
Evaluation Methods Criteria	Semester Abroad: Economics & Management /ILV / LV-Nr: vzAWM / 5.Semester / ECTS: 10 Depending on selected courses		

Module number:	Bachelor thesis and bachelor thesis seminar	Scope:	
BAS		10	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the	6. Semester		
Level	6. Semester: First cycle, Bachelor		
Previous knowledge	6. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 10 - Sandberg (2013): Wissenschaftliches Arbeiten von Abbildung bis Zitat, 2. Aufl., Oldenbourg Verlag München - Bänsch (2003): Wissenschaftliches Arbeiten: Seminar- und Diplomarbeiten, 8.Aufl., Oldenbourg Verlag München - Chalmers (2007): Wege der Wissenschaft: Einführung in die wissenschaftstheorie, 6. Aufl., Springer Verlag Berlin - Eco (2010): Wie man eine wissenschaftliche Abschlussarbeit schreibt, 13. Aufl., UTB Facultas Universitätsverlag Stuttgart - Karmasin, Ribing (2010): Die Gestaltung wissenschaftlicher Arbeiten, 5. Aufl., UTB Facultas Universitätsverlag Stuttgart - Leopold-Wildburger, Schütz (2010): Verfassen und Vortragen: Wissenschaftliche Arbeiten und Vorträge leicht gemacht, 2. Aufl., Springer Verlag Berlin - Rössl (Hg.) (2008): Die Diplomarbeit in der Betriebswirtschaftslehre: Ein Leitfaden zur Erstellung einer Laureatsarbeit, Bachelorarbeit, Diplomarbeit, Masterarbeit, Dissertation, 4. Auflage, Facultas WUV Universtiätsverlag Wien		
Acquisition of skills	Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 10 The students are able to: Scientifically prepare a topic from the faculty of industrial engineering and to develop a central question independently. The students' self-organization and time management skills are encouraged. The students learn the ability to apply theoretical knowledge from their studies in the Bachelor theses. The students have analytical and academic reflection skills for company-specific problems. They also learn how to present academic papers to a research community. Self-organization		
Course contents	Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 10 • Writing an outline for the Bachelor thesis • Setting up the structure for the Bachelor thesis • Research of relevant literature for the selected topic of the Bachelor thesis (physical and digital literature search) • Development and implementation of a research design • Writing an academically oriented Bachelor thesis		
Teaching and learning methods	Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 10 Seminar		
Evaluation Methods Criteria	Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 10 Bachelor thesis		

Module number:	Internship	Scope:	
BRP		20	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the	6. Semester		
Level	6. Semester: First cycle, Bachelor		
Previous knowledge	6. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20 Brenner, D. (2007): Schön, dass Sie da sind!: Karrierestart nach dem Studium, BW Verlag Nürnberg		
Acquisition of skills	Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20 The students are able to: • Apply their acquired knowledge in professional practice. • Understand processes in the professional environment. • Solve problems and implement solutions within the framework of professional projects (practical competence). • Work out and further develop arguments, problem solutions and strategies independently (problem solving competence). • Deepen, further develop and profitably implement the knowledge of communication with superiors, employees and colleagues (social competence).		
Course contents	Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20 • Supplementing the theoretical knowledge of the students with practical activities and questions of commercial law in practice. • At least 600 working hours at an external company with full employment. • The internship ensures that the students navigate their way into their professional life and gain confidence in the implementation of their acquired knowledge through the experience they have already gained. • Processes, workflows and situations in the professional environment should be learned and understood. • Support of the students during their internship: Reflection, discussion of problems and success stories.		
Teaching and learning methods	Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20 Internship		
Evaluation Methods Criteria	Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20 final report		

2.4 Internship

The students choose an internship independently. They can draw on the extensive range of internship advertisements offered by the Kufstein University of Applied Sciences. The Director of Studies checks the professional correspondence of the internship activities with the contents of the course and the qualification profiles of the course of studies. Subsequently, the Director of Studies checks whether the internship corresponds to the training objectives of the program and whether the student can be employed according to his/her level of qualification. If these requirements are met, the organizational processing is carried out by the International Relations Office (IRO). A detailed internship guide supports students in organizing their internship semester; students can also contact the IRO and the Director of Studies if they have any questions or need support.

Students must apply for the internship using the form (= job description). The form contains the central data of the student and the internship supervision as well as the goals and the tasks/activities in the company providing the internship. The internship is confirmed or approved by the signatures of the Director of Studies and the internship supervisor.

The student must reflect, document and present the experiences and findings gathered and evaluate the internship. Conversely, the internship supervisor must evaluate the students. The student must prepare an interim report, a final report and a presentation and complete an evaluation form. At the beginning of the internship, he/she will receive an internship guide which lists the points to be worked on. A key requirement is to compare the agreed objectives with the achieved ones. The documentation prepared by the student and the supervisor is evaluated by the Director of Studies. If the achievement of the goals and the adaptation to the qualification level of the student are not guaranteed, the corresponding internship position is excluded for the future. A list and reports on the internships are available to subsequent students via the Moodle teaching platform.

2.5 Semester Abroad

The students complete a "semester abroad" in the 5th semester at a partner university of the Kufstein University of Applied Sciences. A total workload of 30 ECTS must be demonstrated at the partner university in question.

In the course of preparation for their studies abroad, students of the Industrial Engineering and Management degree program are given selected institutions which are particularly suitable for the degree program. The list of institutions is based on many years of historical experience. Care is taken to ensure that the institutions offer sufficient technical subjects.

This ensures that students are given an in-depth knowledge of the relevant subjects so that the desired competences can be developed. Intercultural and linguistic competences, which are highly relevant in practice, are also developed during the studies abroad. Students are also encouraged to organize most of their stay abroad independently (e.g. search for accommodation, registration with the partner university, obtaining the necessary documents for registration and travel to the country in question, etc.).

The allocation of the study places themselves takes place in the ranking order of the grade average. First, the first preference is assigned to the student with the lowest average grade. Subsequently by the

student with the second lowest grade average etc. If the first preference of a student cannot be assigned (because it is already occupied by a student with a lower grade average), the second preference is assigned. If this preference has already been assigned, the third preference is assigned. If this is also already assigned, this student will be placed in a second round.

The International Relations Office (IRO) is available for all information, questions and concerns relating to studying abroad; agreements are made in agreement with the Director of Studies (STGL).

3 ADMISSION REQUIREMENTS

The admission requirements at the FH Kufstein Tirol are regulated according to the following terms:

1. The general admission requirements are regulated by § 4 FHG as amended; it applies to **persons with a general university entrance qualification**.

2. **Persons without a school-leaving certificate** must take a **university entrance examination** according to § 64 a UG 2002 as amended. These persons acquire the general university entrance qualification for Bachelor studies in a specialization group by passing the university entrance examination in accordance with an ordinance issued by the Rector's Office of a University. The successful completion of the university entrance examination thus entitles the holder to admission to all studies in the specialization group for which the university entrance qualification was acquired. The university entrance examination can be obtained for certain groups of subjects in accordance with an ordinance of the Rector's Office of a university, whereby the following group of subjects is relevant for the FH Kufstein:
Social and economic studies (e.g. Business Administration, Economic Education, Statistics, Sociology).

Applicants who have completed a 3-year **vocational, middle school**, a **training in the dual system** or a **subject-relevant German advanced technical college certificate** obtain the entitlement to study at the FH Kufstein Tirol through additional examinations in the subjects German, English and Mathematics. In the case of the German advanced technical college certificate, the additional examination must only be taken in those of the three subjects in which the grade is "inadequate" or worse. All additional examinations must be passed before the start of the third semester.

3. For **individuals with relevant dual training** the **apprenticeship certificate** in one of the following **special fields** according to the respectively valid announcement of the Federal Ministry of Economics, Family and Youth is valid as an admission requirement:
• Construction and building services
• Office, Administration, Organization
• Chemistry and Plastics
• Electrical Engineering, Electronics
• Trade
• Information and Communication Technology
• Metal Technology and Mechanical Engineering
• Media Design and Photography
• Paper Production, Paper Processing, Printing
• Transport and Storage

4. **Persons with a degree** from one of the relevant **vocational middle schools** listed below may also be admitted:
• Commercial, technical and arts and crafts colleges
• Vocational schools for economic professions
• Secondary school for economic professions
• Secondary school for technical professions
• Commercial schools

Newly emerging apprenticeships in similar fields must be recognized accordingly.

The **group of persons under numbers 3. and 4.** must complete **additional examinations** by the beginning of the third semester as an entry requirement and, if necessary, take appropriate preparatory courses. This is possible at the FH Kufstein.

The following additional examinations are required for this group of people:
- German
- English
- Mathematics

Below is an overview of which subject area of the German FOS/BOS is the relevant admission requirement. Here, additional examinations must be taken within the first semesters in the subjects Mathematics, German and English (if a grade of "poor" or worse was achieved in these subjects).

	WING Bvz
FOS	
- Technology	X
- Economics & Administration	X
- Social Welfare	X
- Agriculture, Biotechnology and Environmental Technology	X
- Design	X
- Health	X
- International Business Studies	X
BOS	
- Technology	X
- Economics & Administration	X
- Social Welfare	X
- Agriculture, Biotechnology and Environmental Technology	X
- Health	X
- International Business Studies	X
In the case of relevant internships (marketing, trade, administration), other disciplines can also be accepted (after consultation with the Director of Studies).	