

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*

0788¹ 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

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 20%), 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
<ul style="list-style-type: none"> • Construction and Design • Information Management 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Formal Sciences • Engineering Sciences • Electrical Engineering • Mechanical Engineering • Information Technology • Product & Production Fundamentals • Semester Abroad Technology
<ul style="list-style-type: none"> • Work preparation • Cost planning • Product marketing • Procurement 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Economic Management • Semester Abroad & Economics Management
<ul style="list-style-type: none"> • Product Management 	<ul style="list-style-type: none"> • Can apply design fundamentals and methods in product development • Can analyze product data and prepare it for transfer to production 	Product development	<ul style="list-style-type: none"> • Product Development

	<ul style="list-style-type: none"> • Can identify current trends in development • Understands the process and tools for cost management in product development 		
<ul style="list-style-type: none"> • Production planning / control • Logistics 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Production
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Practical Projects • Bachelor Thesis and Bachelor Thesis Seminar • Internship
<ul style="list-style-type: none"> • Project Management 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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)	2020/21		
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.

1st semester

Course no.	Course title	Course type	T	E	eLV	WSH	No. of groups	AWSH	ALVS	MODULE	ECTS
vzELT1	Electrical Engineering	VO	X		20 %	2	1	2	30	ELT	3
vzELT2	Electrical Engineering	UE	X		20 %	1.5	2	3.0	45.0	ELT	3
vzFWW1	Mathematics 1	ILV	X		0 %	4	1	4	60	FWW	6
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 I	VO			15 %	1.5	1	1.5	22.5	MAB	2
vzSPR1	Foreign Language	ILV			15 %	2	2	4	60	SPR	3
Total line:						20.5		29.5	442.5		30
LVS = Total WSH * LV weeks						307.5					

2nd semester

Course no.	Course title	Course type	T	E	eLV	WSH	No. of groups	AWSH	ALVS	MODULE	ECTS
vzFWW2	Mathematics 2	ILV	X		15 %	4	1	4	60	FWW	5
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 & 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 (E)	ILV		X	10%	1	1	1	15	MGM	1.5
vzSPR2	Foreign Language	ILV			15 %	4	2	8	120	SPR	5
Total line:						21.0		31.0	465.0		30.0
LVS = Total WSH * LV weeks						315.0					

3rd semester

Course no.	Course title	Course type	T	E	eLV	WSH	No. of groups	AWSH	ALVS	MODULE	ECTS
vzELT3	Automation Technology	VO	X		20 %	2	1	2	30	ELT	3
vzELT4	Automation Technology	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 (O)*	ILV	X		0 %	2	1	2	30	PEE	3
vzPEP1	Design project - Production (O)*	ILV	X		0 %	2	1	2	30	PEP	3
vzPRA1	Practical Project 1	PT			20 %	2	4	8	120	PRA	4
vzSPR3	Foreign Language	ILV			15 %	3	2	6	90	SPR	4
vzWIR2	Basic Accounting	ILV			30%	2.5	1	2.5	37.5	WIR	4
Total line:						19.0		32.0	480.0		30.0
LVS = Total WSH * LV weeks						285.0					

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

4th semester

Course no.	Course title	Course type	T	E	eLV	WSH	No. of groups	AWSH	ALVS	MODULE	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)*	ILV			15 %	2	1	2	30	PEE	2.5
vzPEE3	R&D Management (WP)(E)*	ILV		X	15 %	1.5	1	1.5	22.5	PEE	2
vzPEE4	Trends in R&D (WP)(E)*	VO		X	0 %	1	1	1	15	PEE	1.5
vzPEP2	Information Systems in Production (WP)*	ILV			15 %	2	1	2	30	PEP	2.5
vzPEP3	Production Management (WP)(E)*	ILV		X	15 %	1.5	1	1.5	22.5	PEP	2
vzPEP4	Trends in Production (WP)(E)*	VO		X	0 %	1	1	1	15	PEP	1.5
vzPRA2	Practical Project 2	PT			20 %	2	4	8	120	PRA	4
vzWIR1	Fundamentals of 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
LVS = Total WSH * LV weeks						307.5					

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

5th semester

Course no.	Course title	Course type	T	E	eLV	WSH	No. of groups	AWSH	ALVS	MODULE	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
LVS = Total WSH * LV weeks						0					

6th semester

Course no.	Course title	Course type	T	E	eLV	WSH	No. of groups	AWSH	ALVS	MODULE	ECTS
vzBAS1	Bachelor Thesis Seminar	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
LVS = Total WSH * LV weeks						7.5					

Abbreviations

LV	Course
LVS	Course hour(s)
ALVS	Offered LVS
WSH	Weekly semester hour(s)
AWSH	Offered WSH
ECTS	ECTS credits
E	English-language course
eLV	Courses with eLearning

Summary of curriculum data

Description	WSH	AWSH	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	60.5	907.5	60
Total number of courses in 2nd year of study	39.5	58.5	877.5	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	15.15 %			10.22 %

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)		

Formal Sciences (FWW)

Module number:		Scope:	
FWW	Formal Sciences	11	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	1st semester		
	2nd semester		
Level	1st semester: 1. Study cycle, Bachelor / 2nd semester: 1. Study cycle, Bachelor		
Previous knowledge	None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Math 1 /ILV / Course no: vzFWW1 / 1st semester / ECTS: 6</u> <ul style="list-style-type: none"> • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Vol 1, 13th Edition, Vieweg+Teubner Publisher Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Vol 2, 13th Edition, Vieweg+Teubner Publisher Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Vol 3, 6th edition.- Vieweg+Teubner Publisher Wiesbaden • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Vol 1: Grundlagen, 13th Edition, NWB Publisher Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Vol 2: Differenzi-al- und Integralrechnung, 13th Edition, NWB Publisher Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Vol 3: Lineare Algebra, Lineare Optimierung und Graphentheorie, 13th Edition, NWB Publisher Herne • Schwarze (2003): Mathematik für Wirtschaftswissenschaftler – Elementare Grundlagen für Studienanfänger, Chapters 1 to 10, 7th Edition, NWB Publisher Herne • Stingl (2009): Mathematik für Fachhochschulen: Technik und Informatik, 8th Edition, Carl Hanser Publisher Munich • Tietze (2000): Einführung in die Angewandte Wirtschafts-Mathematik, 9th Edition, Vieweg+Teubner Publisher Wiesbaden 		
		<u>Math 2 /ILV / Course no: vzFWW2 / 2nd semester / ECTS: 5</u> <ul style="list-style-type: none"> • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Vol 1, 13th Edition, Vieweg+Teubner Publisher Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Vol 2, 13th Edition, Vieweg+Teubner Publisher Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Vol 3, 6th edition.- Vieweg+Teubner Publisher Wiesbaden • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Vol 1: Grundlagen, 13th Edition, NWB Publisher Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Vol 2: Differenzial- und Integralrechnung, 13th Edition, NWB Publisher Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Vol 3: Lineare Algebra, Lineare Optimierung und Graphentheorie, 13th Edition, NWB Publisher Herne • Schwarze (2003): Mathematik für Wirtschaftswissenschaftler – Elementare Grundlagen für Studienanfänger, Chapters 1 to 10, 7th Edition, NWB Publisher Herne • Stingl (2009): Mathematik für Fachhochschulen: Technik und Informatik, 8th Edition, Carl Hanser Publisher Munich • Tietze (2000): Einführung in die Angewandte Wirtschafts-Mathematik, 9th Edition, Vieweg+Teubner Publisher Wiesbaden • Janssen, Laatz (2007): Statistische Datenanalyse mit SPSS für Windows, 6th Edition, Springer Verlag Berlin • Brosius (2002): SPSS 11, Verlag Moderne Industrie Bonn • Bourier (2014): Beschreibende Statistik: Praxisorientierte Einführung, 12th Edition, Springer Gabler Publisher Wiesbaden 	

	<ul style="list-style-type: none"> • Jeske (2003): Spaß mit Statistik: Aufgaben, Lösungen und Formeln für Statistik, 4th Edition, Oldenbourg Wissenschaftsverlag Munich • Mosler, Schmid (2008): Wahrscheinlichkeitsrechnung und schließende Statistik, 3rd Edition, Springer Verlag Berlin • Mosler, Schmid (2009): Deskriptive Statistik und Wirtschaftsstatistik, 4th Edition, Springer Verlag Berlin
Skills acquisition	<p><u>Math 1 /ILV / Course no: vzFWW1 / 1st semester / ECTS: 6</u></p> <p>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.</p> <p><u>Math 2 /ILV / Course no: vzFWW2 / 2nd semester / ECTS: 5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • To characterize, present and communicate data sets based on observations or experimental results by a few key figures. • 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.
Course contents	<p><u>Math 1 /ILV / Course no: vzFWW1 / 1st semester / ECTS: 6</u></p> <ul style="list-style-type: none"> • Equations: linear, quadratic, system of linear equations, matrices and determinants • Functions: Linear functions, polynomials, trigonometric functions, exponential functions and logarithms • Complex numbers and functions • Vector calculus • Differential calculus in a variable: Derivation rules, curve discussions, extreme value tasks, Taylor series, Newton methods • Differential calculus in several variables: Extreme value tasks with and without constraints • Integral calculation in one variable: Fundamental theory of integral calculus, integration techniques, technical applications, nonauthentic integrals, numerical integration <p><u>Math 2 /ILV / Course no: vzFWW2 / 2nd semester / ECTS: 5</u></p> <ul style="list-style-type: none"> • Important differential equations (DGI): <p>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, systems of linear DGI 2nd order with constant coefficients and coupled vibrations</p> <ul style="list-style-type: none"> • Statistics: <p>Descriptive Statistics: Characteristics, frequency, mean values, scatter measures, regression, correlation, time series</p> <p>Inductive statistics: Elements of probability theory, random variables and their distribution, forecasting, estimation methods, hypothesis tests</p>
Teaching and learning methods	<p><u>Math 1 /ILV / Course no: vzFWW1 / 1st semester / ECTS: 6</u></p> <p>Integrated course</p> <p><u>Math 2 /ILV / Course no: vzFWW2 / 2nd semester / ECTS: 5</u></p> <p>Integrated course</p>
Evaluation Methods Criteria	<p><u>Math 1 /ILV / Course no: vzFWW1 / 1st semester / ECTS: 6</u></p> <p>Final exam</p> <p><u>Math 2 /ILV / Course no: vzFWW2 / 2nd semester / ECTS: 5</u></p> <p>Final exam</p>

Engineering Science (ING)

Module number:		Scope:	
ING	Engineering Sciences	14.5	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	1st semester		
	2nd semester		
	3rd semester		
Level	1st semester: 1. Study cycle, Bachelor / 2nd semester: 1. Study cycle, Bachelor / 3rd semester: 1. Study cycle, Bachelor		
Previous knowledge	1st semester: None / 2nd semester: None / 3rd semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Statics and Strength Theory /ILV / Course no.: vzING1 / 1st semester / ECTS: 6</u> <ul style="list-style-type: none"> • Assmann (2009): Technische Mechanik vol. 1: Statik, 19th Edition, Oldenbourg Publishers Munich • Assmann (2013): Technische Mechanik vol. 2: Festigkeitslehre, 18th Edition, Oldenbourg Publishers Munich • Böge (2013): Technische Mechanik: Statik – Reibung – Dynamik – Festigkeitslehre - Fluidmechanik, 30th Edition, Springer Vieweg Verlag Wiesbaden • Böge (2013): Aufgabensammlung Technische Mechanik, 21st Edition, Springer Vieweg Verlag Wiesbaden • Gross (2013): Technische Mechanik 1: Statik, 12th Edition, Springer Vieweg Verlag Wiesbaden • Gross (2014): Technische Mechanik 2: Elastostatik, 12th Edition, Springer Vieweg Verlag Wiesbaden 		
	<u>Dynamics and Hydromechanics /ILV / Course no.: vzING2 / 2nd semester / ECTS: 4</u> <ul style="list-style-type: none"> • Assmann (2010): Technische Mechanik vol. 3 T: Kinematik und Kinetik, Oldenbourg Wissenschaftsverlag Munich • Böswirth (2007): Technische Strömungslehre: Lehr- und Übungsbuch, 7th Edition, Vieweg+Teubner Publisher Wiesbaden • Bohl, Elmendorf (2008): Technische Strömungslehre, 14th Edition, Vogel Business Media Würzburg • Böge (2011): Technische Mechanik: Statik – Dynamik – Fluidmechanik – Festigkeitslehre, 29th Edition, Vieweg+Teubner Publisher Wiesbaden • Junge (2011): Einführung in die Technische Strömungslehre, Fachbuchverlage Leipzig Mayr (2012): Technische Mechanik: Statik – Kinematik – Kinetik – Schwingungen – Festigkeitslehre, 7th Edition, Carl Hanser Publisher Munich • Richard, Sander (2008): Technische Mechanik. Dynamik – effektive und anwendungsnahe, Vieweg+Teubner Verlag Wiesbaden 		
	<u>Thermodynamics /ILV / Course no.: vzING3 / 3rd semester / ECTS: 4.5</u> <ul style="list-style-type: none"> • Cerbe, Wilhelms (2013): Technische Thermodynamik: Theoretische Grundlagen und praktische Anwendungen, 17th Edition, Carl Hanser Publisher Munich • Baehr (2005): Thermodynamik: Grundlagen und technische Anwendungen, 12th Edition, Springer Vieweg Verlag Wiesbaden • Doering, Schedwill, Dehli (2012): Grundlagen der technischen Thermodynamik, 7th Edition, Springer Vieweg Publisher Wiesbaden • Berties (1996): Übungsbeispiele aus der Wärmelehre, 20th Edition, Fachbuchverlag Leipzig 		
Skills acquisition	Statics and Strength Theory /ILV / Course no.: vzING1 / 1st semester / ECTS: 6		

	<p>The students are able to:</p> <ul style="list-style-type: none"> 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. <hr/> <p><u>Dynamics and Hydromechanics /ILV / Course no.: vzING2 / 2nd semester / ECTS: 4</u></p> <p>Through the "Dynamics" component, the students are able to:</p> <ul style="list-style-type: none"> 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. <p>Through the "Hydromechanics" component, the students are able to:</p> <ul style="list-style-type: none"> 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. <hr/> <p><u>Thermodynamics /ILV / Course no: vzING3 / 3rd semester / ECTS: 4.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> 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.
<p>Course contents</p>	<p><u>Statics and Strength Theory /ILV / Course no.: vzING1 / 1st semester / ECTS: 6</u></p> <ul style="list-style-type: none"> 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

	<ul style="list-style-type: none"> • 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 <p><u>Dynamics and Hydromechanics /ILV / Course no.: vzING2 / 2nd semester / ECTS: 4</u></p> <p>Dynamics component:</p> <ul style="list-style-type: none"> • 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 <p>Hydromechanics component:</p> <ul style="list-style-type: none"> • 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 <p><u>Thermodynamics /ILV / Course no: vzING3 / 3rd semester / ECTS: 4.5</u></p> <ul style="list-style-type: none"> • 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	<p><u>Statics and Strength Theory /ILV / Course no.: vzING1 / 1st semester / ECTS: 6</u> Integrated course</p> <p><u>Dynamics and Hydromechanics /ILV / Course no.: vzING2 / 2nd semester / ECTS: 4</u> Integrated course,</p> <p><u>Thermodynamics /ILV / Course no: vzING3 / 3rd semester / ECTS: 4.5</u> Integrated course</p>
Evaluation Methods Criteria	<p><u>Statics and Strength Theory /ILV / Course no.: vzING1 / 1st semester / ECTS: 6</u> Final exam</p> <p><u>Dynamics and Hydromechanics /ILV / Course no.: vzING2 / 2nd semester / ECTS: 4</u> Project documentation and final presentation, final report</p> <p><u>Thermodynamics /ILV / Course no: vzING3 / 3rd semester / ECTS: 4.5</u> Final presentation (20 %) and final exam (80 %)</p>

Electrical Engineering (ELT)

Module number:			Scope:
ELT	Electrical Engineering	12	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	1st semester 3rd semester		
Level	1st semester: 1. Study cycle, Bachelor / 3rd semester: 1. Study cycle, Bachelor		
Previous knowledge	1st semester: None / 3rd semester: None / 3rd semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<p><u>Electrotechnology /VO / Course no.: vzELT1 / 1st semester / ECTS: 3</u></p> <ul style="list-style-type: none"> Hagmann (2006): Grundlagen der Elektrotechnik, 12th Edition., AULA Publisher 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, 7th Edition, Springer Verlag Berlin Stiller (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Publisher Munich <p><u>Electrotechnology /UE / Course no.: vzELT2 / 1st semester / ECTS: 3</u></p> <ul style="list-style-type: none"> Hagmann (2006): Grundlagen der Elektrotechnik, 12th Edition., AULA Publisher 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, 7th Edition, Springer Verlag Berlin Stiller (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Publisher Munich <p><u>Automation techniques /VO / Course no.: vzELT3 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> Stiller, Christoph (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag Herzogenrath Orlowski, Peter (2011): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 9th Edition, Springer Verlag Berlin <p><u>Automation techniques /UE / Course no.: vzELT4 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> Stiller, Christoph (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag Herzogenrath Orlowski, Peter (2011): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 9th Edition, Springer Verlag Berlin 		
Skills acquisition	<p><u>Electrotechnology /VO / Course no.: vzELT1 / 1st semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> 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. 		

	<ul style="list-style-type: none"> • Distinguish between electrical protective measures. • Explain electronic components. <p><u>Electrotechnology /UE / Course no.: vzELT2 / 1st semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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). <p><u>Automation techniques /VO / Course no.: vzELT3 / 3rd semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <p><u>Automation techniques /UE / Course no.: vzELT4 / 3rd semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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.
Course contents	<p><u>Electrotechnology /VO / Course no.: vzELT1 / 1st semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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 <p><u>Electrotechnology /UE / Course no.: vzELT2 / 1st semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • Measurement of current, voltage and resistance • Interpretation of the fundamental electrotechnical laws • Series and parallel connection

	<ul style="list-style-type: none"> • 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
	<p><u>Automation techniques /VO / Course no.: vzELT3 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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 <p><u>Automation techniques /UE / Course no.: vzELT4 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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
Teaching and learning methods	<p><u>Electrotechnology /VO / Course no.: vzELT1 / 1st semester / ECTS: 3</u> Lecture</p> <p><u>Electrotechnology /UE / Course no.: vzELT2 / 1st semester / ECTS: 3</u> Tutorial</p> <p><u>Automation techniques /VO / Course no.: vzELT3 / 3rd semester / ECTS: 3</u> Lecture</p> <p><u>Automation techniques /UE / Course no.: vzELT4 / 3rd semester / ECTS: 3</u> Tutorial</p>
Evaluation Methods Criteria	<p><u>Electrotechnology /VO / Course no.: vzELT1 / 1st semester / ECTS: 3</u> Final presentation and final exam</p> <p><u>Electrotechnology /UE / Course no.: vzELT2 / 1st semester / ECTS: 3</u> Final presentation</p> <p><u>Automation techniques /VO / Course no.: vzELT3 / 3rd semester / ECTS: 3</u> Final presentation, final presentation</p> <p><u>Automation techniques /UE / Course no.: vzELT4 / 3rd semester / ECTS: 3</u> Final report</p>

Mechanical Engineering (MAB)

Module number:			Scope:
MAB	Mechanical Engineering	14	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	1st semester		
	2nd semester		
	3rd semester		
Level	1st semester: 1. Study cycle, Bachelor / 2nd semester: 1. Study cycle, Bachelor / 3rd semester: 1. Study cycle, Bachelor		
Previous knowledge	None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Technical Drawing / CAX /ILV / Course no.: vzMAB1 / 1st semester / ECTS: 5</u> <ul style="list-style-type: none"> • Dobler, et al. (2007): Fachkunde Metall, 55th Aufl., Europa Lehrmittelverlag Haan • Frischherz (1987): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf 		
	<u>Machine elements I /VO / Course no.: vzMAB2 / 1st semester / ECTS: 2</u> <ul style="list-style-type: none"> • Dobler, et al. (2007): Fachkunde Metall, 55th Aufl., Europa Lehrmittelverlag Haan • Wittel, et al. (2009): Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung, 19th Edition, Vieweg+Teubner Publisher Wiesbaden • Frischherz (2006): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf • Künne (2007): Köhler/Rögnitz Maschinenteile 1 und 2, 10th Edition, Vieweg+Teubner Publisher Wiesbaden 		
	<u>Machine elements II /ILV / Course no.: vzMAB3 / 2nd semester / ECTS: 4</u> <ul style="list-style-type: none"> • Wittel, et al. (2009): Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung, 19th Edition, Vieweg+Teubner Publisher 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, 10th Edition, Vieweg+Teubner Publisher Wiesbaden 		
	<u>Mechanical and plant engineering /ILV / Course no.: vzMAB4 / 3rd semester / ECTS: 3</u> <ul style="list-style-type: none"> • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, softcover, 15th Edition, Europa Lehrmittelverlag Haan • Dubbel (2001): Taschenbuch für den Maschinenbau, 20th Edition, Springer Verlag Berlin • Franzke (1990): Einführung in die Maschinen- und Anlagentechnik Volume 1 & 2, Springer Verlag Berlin • Hering (2002): Grundwissen des Ingenieurs, 13th Edition, Fachbuchverlag Leipzig • Kalide (2010): Energieumwandlung in Kraft- und Arbeitsmaschinen, 10th Edition, Carl Hanser Publisher Munich • Koether (2007): Fertigungstechnik für Wirtschaftsingenieure, 3rd Edition, Carl Hanser Publisher Munich 		
Skills acquisition	<u>Technical Drawing / CAX /ILV / Course no.: vzMAB1 / 1st semester / ECTS: 5</u> The students are able to: <ul style="list-style-type: none"> • 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. 		

	<ul style="list-style-type: none"> 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.
	<p><u>Machine elements I /VO / Course no.: vzMAB2 / 1st semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> 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.
	<p><u>Machine elements II /ILV / Course no.: vzMAB3 / 2nd semester / ECTS: 4</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> 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
	<p><u>Mechanical and plant engineering /ILV / Course no.: vzMAB4 / 3rd semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> Differentiate between power and working machines in their basic function, give examples and know the most important areas of application. Know the basic structure of machines and plants, be able to determine the basic design, and calculate it if necessary and know the strengths and weaknesses of the variants. Analyze and evaluate practical examples. Identify companies from the mechanical and plant engineering industry.
<p>Course contents</p>	<p><u>Technical Drawing / CAX /ILV / Course no.: vzMAB1 / 1st semester / ECTS: 5</u></p> <p>Fundamentals of technical communication:</p> <ul style="list-style-type: none"> 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

	<ul style="list-style-type: none"> • 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 <p>CAX:</p> <ul style="list-style-type: none"> • 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 <hr/> <p><u>Machine elements I /VO / Course no.: vzMAB2 / 1st semester / ECTS: 2</u></p> <p>Tolerances and fits:</p> <ul style="list-style-type: none"> • Basic concepts of tolerances and fits • Tolerance and fit selection, tolerance systems <p>Fundamentals of the calculation methods:</p> <ul style="list-style-type: none"> • 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 <p>Connecting elements in mechanical engineering:</p> <ul style="list-style-type: none"> • 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
	<p><u>Machine elements II /ILV / Course no.: vzMAB3 / 2nd semester / ECTS: 4</u></p> <p>Elements for supporting and carrying machine components and for torque transmission:</p> <ul style="list-style-type: none"> • 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 <p>Elements for sealing machine components</p> <p>Elastic springs:</p> <ul style="list-style-type: none"> • Spring types, design rules and calculation bases for springs <p>Clutches and brakes:</p> <ul style="list-style-type: none"> • Design, functions, mode of operation and calculation bases of selected clutch and brake types <p>Belt drives:</p> <ul style="list-style-type: none"> • Design principles and calculation bases for flat and V-belt drives and timing belt drives <p>Gear drives:</p> <ul style="list-style-type: none"> • Gear types and design, gearing law, design and calculation bases for straight, helical, bevel and helical gears <hr/> <p><u>Mechanical and plant engineering /ILV / Course no.: vzMAB4 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> • Internal combustion engines: Two-stroke and four-stroke, petrol and diesel engines. • Conveying systems: Lifting machines (winches, cranes, elevators), continuous conveyors and floor conveyors
Teaching and learning methods	<p><u>Technical Drawing / CAX /ILV / Course no.: vzMAB1 / 1st semester / ECTS: 5</u> Integrated course</p> <p><u>Machine elements I /VO / Course no.: vzMAB2 / 1st semester / ECTS: 2</u> Lecture</p> <p><u>Machine elements II /ILV / Course no.: vzMAB3 / 2nd semester / ECTS: 4</u> Integrated course</p> <p><u>Mechanical and plant engineering /ILV / Course no.: vzMAB4 / 3rd semester / ECTS: 3</u> Integrated course</p>
Evaluation Methods Criteria	<p><u>Technical Drawing / CAX /ILV / Course no.: vzMAB1 / 1st semester / ECTS: 5</u> Assignment, written exam</p> <p><u>Machine elements I /VO / Course no.: vzMAB2 / 1st semester / ECTS: 2</u> Final exam</p> <p><u>Machine elements II /ILV / Course no.: vzMAB3 / 2nd semester / ECTS: 4</u> Final exam</p> <p><u>Mechanical and plant engineering /ILV / Course no.: vzMAB4 / 3rd semester / ECTS: 3</u> final presentation and written exam</p>

Information Technology (INF)

Module number:			Scope:
INF	Information Technology	6.0	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	2nd semester		
	3rd semester		
	4th semester		
Level	2nd semester: 1. Study cycle, Bachelor / 3rd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor		
Previous knowledge	None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Introduction to Programming /ILV / Course no.: vzINF1 / 2nd semester / ECTS: 3</u> <ul style="list-style-type: none"> • Braun, Esswein, Greifenberg (2006): Einführung in die Programmierung; Springer • Herold, Wurz, Wohrad, Hopf (2017): Einführung in die Informatik; Person • Wolf (2016): Grundkurs C, 2nd Edition, Rheinwerk 		
	<u>Fundamentals of Data Management (E) /ILV / Course no.: vzINF2 / 3rd semester / ECTS: 1.5</u> <ul style="list-style-type: none"> • 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, 2nd Ed. Pearson Studium Munich. • Gronwald (2015) Integrierte Business-Informationssysteme: ERP, SCM, CRM, BI, Big Data Analytics - Prozesssimulation, Rollenspiel, Serious Gaming (eXamen.press), Springer Vieweg Verlag. • Alpar, Alt (2014), Anwendungsorientierte Wirtschaftsinformatik: Strategische Planung, Entwicklung und Nutzung von Informationssystemen, 7th Edition, Springer Verlag • Chamoni, Gluchowski (2010): Analytical information systems: Business Intelligence-Technologien und –Anwendungen, Springer Verlag Berlin and Heidelberg • Tanenbaum, Goodman (2005): Computer architecture: 		
	<u>Fundamentals of Information Systems (E) /ILV / Course no.: vzINF3 / 4th semester / ECTS: 1.5</u> <ul style="list-style-type: none"> • Sandler, Wawer (2007): CAD and PDM: Prozessoptimierung durch Integration, 2nd Edition, Carl Hanser Verlag Munich • Frick (2007): Grundkurs SAP ERP: Geschäftsprozessorientierte Einführung Mit Durchgehendem Fallbeispiel, Vieweg+Teubner Verlag Wiesbaden • Gronau (2010): Enterprise Resource Planning: Architektur, Funktionen und Management von ERP-Systemen, Oldenbourg Wissenschaftsverlag Munich • Kurbel (2010): Enterprise Resource Planning und Supply Chain Management in der Industrie, Oldenbourg Wissenschaftsverlag Munich • Scheer (1998): ARIS vom Geschäftsprozess zum Anwendungssystem, 3rd Edition, Springer Verlag Berlin • Hesselner, Görtz (2007): Basiswissen ERP-Systeme: Auswahl, Einführung & Einsatz betriebswirtschaftlicher Standardsoftware, W3I Verlag Dortmund 		
Skills acquisition	<u>Introduction to Programming /ILV / Course no.: vzINF1 / 2nd semester / ECTS: 3</u> The students are able to: <ul style="list-style-type: none"> • Read software programs • Program and test simple software on their own 		

	<ul style="list-style-type: none"> • Understand the software development process • Understand the importance of software for product development and production <p><u>Fundamentals of Data Management (E) /ILV / Course no: vzINF2 / 3rd semester / ECTS: 1.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <p><u>Fundamentals of Information Systems (E) /ILV / Course no.: vzINF3 / 4th semester / ECTS: 1.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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.
<p>Course contents</p>	<p><u>Introduction to Programming /ILV / Course no.: vzINF1 / 2nd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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) <p><u>Fundamentals of Data Management (E) /ILV / Course no: vzINF2 / 3rd semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> • Technical design of systems, sensors and mobile terminals
	<p><u>Fundamentals of Information Systems (E) /ILV / Course no.: vzINF3 / 4th semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • 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)
Teaching and learning methods	<p><u>Introduction to Programming /ILV / Course no.: vzINF1 / 2nd semester / ECTS: 3</u> Integrated course,</p> <p><u>Fundamentals of Data Management (E) /ILV / Course no: vzINF2 / 3rd semester / ECTS: 1.5</u> Lecture, case studies, exercises</p> <p><u>Fundamentals of Information Systems (E) /ILV / Course no.: vzINF3 / 4th semester / ECTS: 1.5</u> Integrated course</p>
Evaluation Methods Criteria	<p><u>Introduction to Programming /ILV / Course no.: vzINF1 / 2nd semester / ECTS: 3</u> Final exam</p> <p><u>Fundamentals of Data Management (E) /ILV / Course no: vzINF2 / 3rd semester / ECTS: 1.5</u> Term paper, final exam</p> <p><u>Fundamentals of Information Systems (E) /ILV / Course no.: vzINF3 / 4th semester / ECTS: 1.5</u> Final exam</p>

Product & Production Fundamentals (GPP)

Module number:			Scope:
GPP	Product & Production Fundamentals	7	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	2nd semester 4th semester		
Level	2nd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor		
Previous knowledge	None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<p><u>Manufacturing Technology and Materials Engineering /ILV / Course no: vzGPP1 / 2nd semester / ECTS: 4</u></p> <ul style="list-style-type: none"> • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, softcover, 15th Edition, Europa Lehrmittelverlag Haan • Schmid, et al. (2013): Produktionsorganisation: Qualitätsmanagement und Produktpolitik, 8th Edition, Europa Lehrmittelverlag Haan • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag Munich • 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, 3rd Edition, Carl Hanser Publisher Munich <p><u>Digital Product Creation /VO / Course no.: vzGPP2 / 4th semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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 		
Skills acquisition	<p><u>Manufacturing Technology and Materials Engineering /ILV / Course no: vzGPP1 / 2nd semester / ECTS: 4</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <p><u>Digital Product Creation /VO / Course no.: vzGPP2 / 4th semester / ECTS: 3</u></p> <p>The students are able to:</p>		

	<ul style="list-style-type: none"> • 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.
<p>Course contents</p>	<p><u>Manufacturing Technology and Materials Engineering /ILV / Course no: vzGPP1 / 2nd semester / ECTS: 4</u></p> <p>Production engineering:</p> <ul style="list-style-type: none"> • 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 • 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 <p>Production engineering:</p> <ul style="list-style-type: none"> • 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
	<p><u>Digital Product Creation /VO / Course no.: vzGPP2 / 4th semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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
<p>Teaching and learning methods</p>	<p><u>Manufacturing Technology and Materials Engineering /ILV / Course no: vzGPP1 / 2nd semester / ECTS: 4</u></p> <p>Integrated course</p>

	Digital Product Creation /VO / Course no.: vzGPP2 / 4th semester / ECTS: 3 Integrated course
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Semester Abroad Engineering (ATE)

Module number:			Scope:
ATE	Semester Abroad Technology	15	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	5th semester		
Level	5th semester: 1. Study cycle, Bachelor		
Previous knowledge	5th semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Depending on the subject focus of the respective elective subjects		
Skills acquisition	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	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	Depending on selected courses		
Evaluation Methods Criteria	Depending on selected courses		

Economics (WIR)

Module number:		Scope:	
WIR	Economic	12.5	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	3rd semester		
	4th semester		
Level	3rd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor □		
Previous knowledge	None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Fundamentals to Economics (E) /ILV / Course no.: vzWIR1 / 4th semester / ECTS: 5</u> <ul style="list-style-type: none"> • Vahs, Schäfer-Kunz (2012): Einführung in die Betriebswirtschaftslehre, 6th Edition, Schäffer-Poeschel Verlag Stuttgart • Mankiw (2012): Grundzüge der Volkswirtschaftslehre, 5th edition, Schäffer-Poeschel Verlag Stuttgart • Mankiw (2003): Makroökonomik, 5th edition, Schäffer-Poeschel Verlag Stuttgart • Blanchard (2008): Macroeconomics, 5th edition, Pearson Education • Pindyck, Rubinfeld (2012): Microeconomics, 8th edition, Pearson Education • Varian (2010): Intermediate Microeconomics, 8th edition, Norton & Company 		
	<u>Basic Accounting /ILV / Course no.: vzWIR2 / 3rd semester / ECTS: 4</u> <ul style="list-style-type: none"> • 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 		
	<u>Investment and Financing (E) /ILV / Course no.: vzWIR3 / 4th semester / ECTS: 1.5</u> <ul style="list-style-type: none"> • 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 Wirtschaftlichkeitsrechnung, nwb Verlag Herne • Kruschwitz (2011): Investitionsrechnung, 13th Edition, Oldenbourg Publishers Munich • Bestmann (2008): Kompendium der Betriebswirtschaftslehre, 11th ed., Oldenbourg Verlag Munich 		

	<ul style="list-style-type: none"> • Wöhe, Döring (2013): Einführung in die Allgemeine Betriebswirtschaftslehre, 25th edition, Vahlen Verlag Munich <p><u>Introduction to Law /VO / Course no.: vzWIR4 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • 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)
Skills acquisition	<p><u>Fundamentals to Economics (E) /ILV / Course no.: vzWIR1 / 4th semester / ECTS: 5</u></p> <p>The students are able to:</p> <p>Introduction to Business Administration component:</p> <ul style="list-style-type: none"> • 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 <p>Applied Economics component:</p> <ul style="list-style-type: none"> • Can deal with fundamental management problems from an economic point of view. • Are able to analyze decisions under uncertainty. • Can develop strategic decisions based on economic models. • Can evaluate the effects of digital technologies and products on the cost structure of a company and the development of market forms <p><u>Basic Accounting /ILV / Course no.: vzWIR2 / 3rd semester / ECTS: 4</u></p> <p>The students are able to:</p> <p>External accounting:</p> <ul style="list-style-type: none"> • 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. <p>Internal accounting:</p> <ul style="list-style-type: none"> • Are familiar with the tasks and solutions of cost and revenue accounting with its subsystems (cost element, cost center and cost unit accounting). • 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.

	<ul style="list-style-type: none"> • Know the systems of cost accounting (partial and full cost accounting) <p><u>Investment and Financing (E) /ILV / Course no.: vzWIR3 / 4th semester / ECTS: 1.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <p><u>Introduction to Law /VO / Course no.: vzWIR4 / 4th semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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.
<p>Course contents</p>	<p><u>Fundamentals to Economics (E) /ILV / Course no.: vzWIR1 / 4th semester / ECTS: 5</u></p> <p>Introduction to Business Administration component:</p> <ul style="list-style-type: none"> • 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 structure). • Fundamentals of market, process and strategy oriented management. <p>Applied Economics component:</p> <ul style="list-style-type: none"> • Microeconomics and the behavior of managers and companies • Price and product policy of the company • Elementary principles of game theory • Company organization • Market forms & market entry • Decisions under uncertainty • Behavioral economics • Economics of digitization <p><u>Basic Accounting /ILV / Course no.: vzWIR2 / 3rd semester / ECTS: 4</u></p> <p>External accounting:</p> <ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> • Organization of bookkeeping (chart of accounts, sales tax, etc.) • Principle of period specificity and accruals and deferrals <p>Internal accounting:</p> <ul style="list-style-type: none"> • 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
	<p><u>Investment and Financing (E) /ILV / Course no.: vzWIR3 / 4th semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • 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 <p><u>Introduction to Law /VO / Course no.: vzWIR4 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • 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
Teaching and learning methods	<p><u>Fundamentals to Economics (E) /ILV / Course no.: vzWIR1 / 4th semester / ECTS: 5</u> Integrated course</p> <p><u>Basic Accounting /ILV / Course no.: vzWIR2 / 3rd semester / ECTS: 4</u> Integrated course,</p> <p><u>Investment and Financing (E) /ILV / Course no.: vzWIR3 / 4th semester / ECTS: 1.5</u> Integrated course</p> <p><u>Introduction to Law /VO / Course no.: vzWIR4 / 4th semester / ECTS: 2</u> Lecture</p>
Evaluation Methods Criteria	<p><u>Fundamentals to Economics (E) /ILV / Course no.: vzWIR1 / 4th semester / ECTS: 5</u> Final exam</p> <p><u>Basic Accounting /ILV / Course no.: vzWIR2 / 3rd semester / ECTS: 4</u> Final exam</p> <p><u>Investment and Financing (E) /ILV / Course no.: vzWIR3 / 4th semester / ECTS: 1.5</u> Final exam</p> <p><u>Introduction to Law /VO / Course no.: vzWIR4 / 4th semester / ECTS: 2</u></p>

	Term paper and project documentation or final exam
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Management (MGM)

Module number:			Scope:	
MGM	Management	8.5	ECTS	
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time			
Position in the curriculum	2nd semester 4th semester			
Level	2nd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor			
Previous knowledge	None			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	<p><u>Marketing and Sales (E) /ILV / Course no.: vzMGM2 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • Kotler, Armstrong, Wong, Saunders (2010): Grundlagen des Marketing (Fundamentals of Marketing), 5th edition, Pearson Education • Kotler, Keller, Bliemel (2007): Marketing-Management, Strategien für wertschaffendes 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 Marktbearbeitung, 2nd edition, UTB Stuttgart <p><u>Project Management /ILV / Course no.: vzMGM2 / 2nd semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • Gareis (2005): Happy Projects!: Project and programme management. Project portfolio management. Management of the project-oriented organization. Management in the project-oriented society, 1st edition, MANZ Verlag Vienna • Patzak, Rattay (2014): Project management: Leitfaden zum Management von Projekten, Projektportfolios und projektorientierten Unternehmen, 6th edition, Linde Verlag Vienna <p><u>Supply Chain Management (E) /ILV / Course no.: vzMGM3 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • 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 <p><u>Innovation Management & Product Development /ILV / Course no.: vzMGM4 / 4th semester / ECTS:3</u></p> <ul style="list-style-type: none"> • 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 Munich 			

	<ul style="list-style-type: none"> • Hauschildt, Salomo (2007): Innovationsmanagement, 4th edition, Vahlen Verlag Munich • 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): Logistics 1: Grundlagen, Verfahren und Strategien, 4th Edition, Springer Verlag Berlin • Gudehus (2012): Logistics 2: Netzwerke, Systeme und Lieferketten, 4th Edition, Springer Verlag Berlin • Ehrlenspiel, Meerkamm (2013): Integrierte Produktentwicklung: Denkabläufe, Methodeneinsatz, Zusammenarbeit, 5th Edition, Carl Hanser Publisher Munich • Lindemann (2009): Methodische Entwicklung technischer Produkte: Methoden flexibel und situationsgerecht anwenden, 3rd Edition, Springer Verlag Berlin • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3rd Edition, Carl Hanser Publisher Munich
<p>Skills acquisition</p>	<p><u>Marketing and Sales (E) /ILV / Course no.: vzMGM2 / 4th semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <hr/> <p><u>Project Management /ILV / Course no.: vzMGM2 / 2nd semester / ECTS: 1.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <hr/> <p><u>Supply Chain Management (E) /ILV / Course no.: vzMGM3 / 4th semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • Identify the tasks and contents of logistics. • Explain the importance of lead time and inventory. • Describe key figures for measuring logistics performance, costs and flexibility. • Describe concepts with regard to possible applications, advantages/disadvantages and limits. • Define goals based on framework conditions and select suitable concepts. • Process basic logistical tasks independently. <hr/> <p><u>Innovation Management & Product Development /ILV / Course no.: vzMGM4 / 4th semester / ECTS:</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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

<p>Course contents</p>	<p><u>Marketing and Sales (E) /ILV / Course no.: vzMGM2 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • 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 <p><u>Project Management /ILV / Course no.: vzMGM2 / 2nd semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • 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.
	<p><u>Supply Chain Management (E) /ILV / Course no.: vzMGM3 / 4th semester / ECTS: 2</u></p> <p>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.</p> <ul style="list-style-type: none"> • 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 <p><u>Innovation Management & Product Development /ILV / Course no.: vzMGM4 / 4th semester / ECTS:3</u></p> <ul style="list-style-type: none"> • 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
<p>Teaching and learning methods</p>	<p><u>Marketing and Sales (E) /ILV / Course no.: vzMGM2 / 4th semester / ECTS: 2</u></p> <p>Integrated course</p> <p><u>Project Management /ILV / Course no.: vzMGM2 / 2nd semester / ECTS: 1.5</u></p>

	Lecture
	<u>Supply Chain Management (E) /ILV / Course no.: vzMGM3 / 4th semester / ECTS: 2</u>
	Lecture
	<u>Innovation Management & Product Development /ILV / Course no.: vzMGM4 / 4th semester / ECTS:</u>
	Integrated course
Evaluation Methods Criteria	<u>Marketing and Sales (E) /ILV / Course no.: vzMGM2 / 4th semester / ECTS: 2</u>
	Final presentation and final exam
	<u>Project Management /ILV / Course no.: vzMGM2 / 2nd semester / ECTS: 1.5</u>
	Final exam
	<u>Supply Chain Management (E) /ILV / Course no.: vzMGM3 / 4th semester / ECTS: 2</u>
	Final presentation and final exam
	<u>Innovation Management & Product Development /ILV / Course no.: vzMGM4 / 4th semester / ECTS:</u>
Final presentation and final exam	

Semester Abroad Economics & Management (AWM)

Module number:			Scope:
AWM	Semester Abroad Economics & Management	10	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	5th semester		
Level	5th semester: 1. Study cycle, Bachelor		
Previous knowledge	5th semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Depending on the subject focus of the respective elective subjects		
Skills acquisition	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	Consolidation through courses in the following three areas: <ol style="list-style-type: none"> 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	Depending on selected courses		
Evaluation Methods Criteria	Depending on selected courses		

Product Development (PEE)

Module number:			Scope:
PEE	Product Development	9	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	3rd semester		
	4th semester		
Level	3rd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor		
Previous knowledge	None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Design Project - Product Development (O) /ILV / Course no.: vzPEE1 / 3rd semester / ECTS: 3</u> <ul style="list-style-type: none"> • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag Munich • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3rd Edition, Carl Hanser Publisher Munich • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, softcover, 15th Edition, Europa Lehrmittelverlag Haan • Gebhardt (2007): Generative Fertigungsverfahren, 3rd Edition, Carl Hanser Publisher Munich • Hauschildt, Salomo (2007): Innovationsmanagement, 4th edition, Vahlen Verlag Munich • Hoenow, Meissner (2010): Entwerfen und Gestalten im Maschinenbau, Carl Hanser Verlag Munich • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag Munich • 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 • Vogel, Ebel (2009): Pro/Engineer und Pro/Mechanica: Konstruieren und Berechnen mit Wildfire 4, 5th Edition, Carl Hanser Publisher Munich 		
	<u>Information Systems in Product Development (WP) /ILV / Course no.: vzPEE2 / 4th semester / ECTS: 2.5</u> <ul style="list-style-type: none"> • Sendler, Wawer (2011): Von PDM zu PLM, 3rd Edition, Carl Hanser Publisher Munich • 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 		
	<u>R&D Management (WP)(E) /ILV / Course no.: vzPEE3 / 4th semester / ECTS: 2</u> <ul style="list-style-type: none"> • Hahn, Häusler, Große Austing (2013): Quantitatives Entwicklungsmanagement, Springer Verlag Berlin 		

	<ul style="list-style-type: none"> • 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 Costs, and Reduce Cycle Times, McGraw-Hill Education • Cooper (2002): Portfolio Management For New Products, 2nd edition, Basic Books
	<p><u>Trends in R&D (WP)(E) /VO / Course no.: vzPEE4 / 4th semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • Depending on the trend identified, identify
<p>Skills acquisition</p>	<p><u>Design Project - Product Development (O) /ILV / Course no.: vzPEE1 / 3rd semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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). <hr/> <p><u>Information Systems in Product Development (WP) /ILV / Course no.: vzPEE2 / 4th semester / ECTS: 2.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. • 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. <hr/> <p><u>R&D Management (WP)(E) /ILV / Course no.: vzPEE3 / 4th semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <hr/> <p><u>Trends in R&D (WP)(E) /VO / Course no.: vzPEE4 / 4th semester / ECTS: 1.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> 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.
<p>Course contents</p>	<p><u>Design Project - Product Development (O) /ILV / Course no.: vzPEE1 / 3rd semester / ECTS: 3</u></p> <p>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:</p> <ul style="list-style-type: none"> 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 <p><u>Information Systems in Product Development (WP) /ILV / Course no.: vzPEE2 / 4th semester / ECTS: 2.5</u></p> <ul style="list-style-type: none"> 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
	<p><u>R&D Management (WP)(E) /ILV / Course no.: vzPEE3 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> 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.) <p><u>Trends in R&D (WP)(E) /VO / Course no.: vzPEE4 / 4th semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> 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

	<ul style="list-style-type: none"> 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	<p><u>Design Project - Product Development (O) /ILV / Course no.: vzPEE1 / 3rd semester / ECTS: 3</u> Integrated course,</p> <p><u>Information Systems in Product Development (WP) /ILV / Course no.: vzPEE2 / 4th semester / ECTS: 2.5</u> Integrated course</p> <p><u>R&D Management (WP)(E) /ILV / Course no.: vzPEE3 / 4th semester / ECTS: 2</u> Integrated course</p> <p><u>Trends in R&D (WP)(E) /VO / Course no.: vzPEE4 / 4th semester / ECTS: 1.5</u> Lecture</p>
Evaluation Methods Criteria	<p><u>Design Project - Product Development (O) /ILV / Course no.: vzPEE1 / 3rd semester / ECTS: 3</u> Final presentation</p> <p><u>Information Systems in Product Development (WP) /ILV / Course no.: vzPEE2 / 4th semester / ECTS: 2.5</u> Project documentation and final presentation, final report</p> <p><u>R&D Management (WP)(E) /ILV / Course no.: vzPEE3 / 4th semester / ECTS: 2</u> Final presentation and final exam</p> <p><u>Trends in R&D (WP)(E) /VO / Course no.: vzPEE4 / 4th semester / ECTS: 1.5</u> Project documentation</p>

Production (PEP)

Module number:			Scope:
PEP	Production	9	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	3rd semester 4th semester		
Level	3rd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor		
Previous knowledge	3rd semester: None / 4th semester: None / 4th semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<p><u>Design Project - Production (O) /ILV / Course no.: vzPEP1 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag Munich Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3rd Edition, Carl Hanser Publisher Munich Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, softcover, 15th Edition, Europa Lehrmittelverlag Haan Gebhardt (2007): Generative Fertigungsverfahren, 3rd Edition, Carl Hanser Publisher Munich Hauschildt, Salomo (2007): Innovationsmanagement, 4th edition, Vahlen Verlag Munich Hoenow, Meissner (2010): Entwerfen und Gestalten im Maschinenbau, Carl Hanser Verlag Munich Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag Munich Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press 		

	<ul style="list-style-type: none"> • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sandler, Wawer (2007): CAD and PDM: Prozessoptimierung durch Integration, 2nd Edition, Carl Hanser Publisher Munich • Vogel, Ebel (2009): Pro/Engineer und Pro/Mechanica: Konstruieren und Berechnen mit Wildfire 4, 5th Edition, Carl Hanser Publisher Munich <p><u>Information Systems in Production (WP) /ILV / Course no.: vzPEP2 / 4th semester / ECTS: 2.5</u></p> <ul style="list-style-type: none"> • 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 • Sandler, Wawer (2007): CAD and PDM: Prozessoptimierung durch Integration, 2nd Edition, Carl Hanser Publisher Munich • Gebhardt (2007): Generative Fertigungsverfahren, 3rd Edition, Carl Hanser Publisher Munich <p><u>Production Management (WP)(E) /ILV / Course no.: vzPEP3 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • Gummersbach, et al. (2012): Produktionsmanagement: Lehr- und Nachschlagewerk, 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 <p><u>Trends in Production (WP)(E) /VO / Course no.: vzPEP4 / 4th semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • Depending on the trend identified, identify
<p>Skills acquisition</p>	<p><u>Design Project - Production (O) /ILV / Course no.: vzPEP1 / 3rd semester / ECTS: 3</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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).

	<p><u>Information Systems in Production (WP) /ILV / Course no.: vzPEP2 / 4th semester / ECTS: 2.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <p><u>Production Management (WP)(E) /ILV / Course no.: vzPEP3 / 4th semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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. <p><u>Trends in Production (WP)(E) /VO / Course no.: vzPEP4 / 4th semester / ECTS: 1.5</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> • 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	<p><u>Design Project - Production (O) /ILV / Course no.: vzPEP1 / 3rd semester / ECTS: 3</u></p> <ul style="list-style-type: none"> • 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 <p><u>Information Systems in Production (WP) /ILV / Course no.: vzPEP2 / 4th semester / ECTS: 2.5</u></p> <ul style="list-style-type: none"> • Best practice processes and KPIs for production • Authorization concept • Product lifecycle management • Production planning and control

	<ul style="list-style-type: none"> • 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
	<p><u>Production Management (WP)(E) /ILV / Course no.: vzPEP3 / 4th semester / ECTS: 2</u></p> <ul style="list-style-type: none"> • 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) <p><u>Trends in Production (WP)(E) /VO / Course no.: vzPEP4 / 4th semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> • 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	<p><u>Design Project - Production (O) /ILV / Course no.: vzPEP1 / 3rd semester / ECTS: 3</u> Integrated course,</p> <p><u>Information Systems in Production (WP) /ILV / Course no.: vzPEP2 / 4th semester / ECTS: 2.5</u> Integrated course</p> <p><u>Production Management (WP)(E) /ILV / Course no.: vzPEP3 / 4th semester / ECTS: 2</u> Integrated course</p> <p><u>Trends in Production (WP)(E) /VO / Course no.: vzPEP4 / 4th semester / ECTS: 1.5</u> Lecture</p>
Evaluation Methods Criteria	<p><u>Design Project - Production (O) /ILV / Course no.: vzPEP1 / 3rd semester / ECTS: 3</u> Final presentation</p> <p><u>Information Systems in Production (WP) /ILV / Course no.: vzPEP2 / 4th semester / ECTS: 2.5</u> Project documentation and final presentation, final report</p> <p><u>Production Management (WP)(E) /ILV / Course no.: vzPEP3 / 4th semester / ECTS: 2</u> Final presentation and final exam</p> <p><u>Trends in Production (WP)(E) /VO / Course no.: vzPEP4 / 4th semester / ECTS: 1.5</u> Final report</p>

Practical Projects (PRA)

Module number:		Scope:	
PRA	Practical Projects	8	ECTS

Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time
Position in the curriculum	3rd semester 4th semester
Level	3rd semester: 1. Study cycle, Bachelor / 4th semester: 1. Study cycle, Bachelor
Previous knowledge	3rd semester: None / 4th semester: None
Blocked	no
Participant group	A-levels and/or corresponding previous training, beginners
Literature recommendation	<u>Practical Project 1 /PT / Course no.: vzPRA1 / 3rd semester / ECTS: 4</u> Depending on the specific task <u>Practical Project 2 /PT / Course no.: vzPRA2 / 4th semester / ECTS: 4</u> Depending on the specific task
Skills acquisition	<u>Practical Project 1 /PT / Course no.: vzPRA1 / 3rd semester / ECTS: 4</u> The students are able to: <ul style="list-style-type: none"> • 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. <u>Practical Project 2 /PT / Course no.: vzPRA2 / 4th semester / ECTS: 4</u> The students are able to: <ul style="list-style-type: none"> • 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	<u>Practical Project 1 /PT / Course no.: vzPRA1 / 3rd semester / ECTS: 4</u> 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 instructor if necessary: Planning, coordination, budgeting, control, evaluation and final reporting are in the hands of the students. The role of the course leader is focused on project coaching. Practical project I or II must process a technical topic. <u>Practical Project 2 /PT / Course no.: vzPRA2 / 4th semester / ECTS: 4</u> 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.
Teaching and learning methods	<u>Practical Project 1 /PT / Course no.: vzPRA1 / 3rd semester / ECTS: 4</u> Project documentation and final presentation

	Practical Project 2 /PT / Course no.: vzPRA2 / 4th semester / ECTS: 4 Project documentation
Evaluation Methods Criteria	Practical Project 1 /PT / Course no.: vzPRA1 / 3rd semester / ECTS: 4 Project documentation and final presentation
	Practical Project 2 /PT / Course no.: vzPRA2 / 4th semester / ECTS: 4 Project documentation and final presentation

Bachelor Thesis and Bachelor Thesis Seminar (BAS)

Module number:			Scope:
BAS	Bachelor Thesis and Bachelor Thesis Seminar	10	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	6th semester		
Level	6th semester: 1. Study cycle, Bachelor		
Previous knowledge	6th semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Bachelor Thesis Seminar /SE / Course no.: vzBAS1 / 6th semester / ECTS: 10</u> <ul style="list-style-type: none"> • Sandberg (2013): Wissenschaftliches Arbeiten von Abbildung bis Zitat, 2. Edition, Oldenbourg Publishers Munich • Bänisch (2003): Wissenschaftliches Arbeiten: Seminar- und Diplomarbeiten, 8.Aufl., Oldenbourg Verlag Munich • Chalmers (2007): Wege der Wissenschaft: Einführung in die wissenschaftstheorie, 6th Edition, Springer Verlag Berlin • Eco (2010): Wie man eine wissenschaftliche Abschlussarbeit schreibt, 13th edition., UTB Facultas Universitätsverlag Stuttgart • Karmasin, Ribing (2010): Die Gestaltung wissenschaftlicher Arbeiten, 5th edition., UTB Facultas Universitätsverlag Stuttgart • Leopold-Wildburger, Schütz (2010): Verfassen und Vortragen: Wissenschaftliche Arbeiten und Vorträge leicht gemacht, 2nd Edition, Springer Verlag Berlin • Rössl (Ed.) (2008): Die Diplomarbeit in der Betriebswirtschaftslehre: Ein Leitfaden zur Erstellung einer Laureatsarbeit, Bachelorarbeit, Diplomarbeit, Masterarbeit, Dissertation, 4th edition, Facultas WUV Universitätsverlag Vienna 		
Skills acquisition	<u>Bachelor Thesis Seminar /SE / Course no.: vzBAS1 / 6th semester / ECTS: 10</u> 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	<u>Bachelor Thesis Seminar /SE / Course no.: vzBAS1 / 6th semester / ECTS: 10</u> <ul style="list-style-type: none"> • 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	<u>Bachelor Thesis Seminar /SE / Course no.: vzBAS1 / 6th semester / ECTS: 10</u> Seminar		
Evaluation Methods Criteria	<u>Bachelor Thesis Seminar /SE / Course no.: vzBAS1 / 6th semester / ECTS: 10</u>		

	Bachelor Thesis
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Internship (BPR)

Module number:			Scope:	
BRP	Internship	20	ECTS	
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time			
Position in the curriculum	6th semester			
Level	6th semester: 1. Study cycle, Bachelor			
Previous knowledge	6th semester: None			
Blocked	no			
Participant group	A-levels and/or corresponding previous training, beginners			
Literature recommendation	<u>Internship /PT / Course no.: vzBPR / 6th semester / ECTS: 20</u> <ul style="list-style-type: none"> • Brenner, D. (2007): Schön, dass Sie da sind!: Karrierestart nach dem Studium, BW Verlag Nuremberg 			
Skills acquisition	<u>Internship /PT / Course no.: vzBPR / 6th semester / ECTS: 20</u> The students are able to: <ul style="list-style-type: none"> • 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	<u>Internship /PT / Course no.: vzBPR / 6th semester / ECTS: 20</u> <ul style="list-style-type: none"> • 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	<u>Internship /PT / Course no.: vzBPR / 6th semester / ECTS: 20</u> Internship			
Evaluation Methods Criteria	<u>Internship /PT / Course no.: vzBPR / 6th semester / ECTS: 20</u> Final report			

Languages (SPR)

Module number:			Scope:
SPR	Foreign languages	12	ECTS
Degree program	University of Applied Sciences Bachelor Programme - Web Business & Technology Full-time		
Position in the curriculum	1st semester		
	2nd semester		
	3rd semester		
Level	1st semester: A1 to C2 (GER) / 2nd semester: A1 to C2 (GER) / 3rd semester: A1 to C2 (GER)		
Previous knowledge	<p>1st semester: French, Italian, Spanish Module with objective A2: no previous knowledge allowed Module with objective B2: Previous knowledge required</p> <p>Chinese, Russian Module with objective A2: no previous knowledge allowed</p> <p>English, German Module with objective B2: Level B1 (GER) or English advanced course required Module with objective C1: Level B2 (GER) required Module with objective C2: Level C1 (GER) required</p> <p>2nd semester: French, Italian, Spanish Module with objective A2: no previous knowledge allowed Module with objective B2: Previous knowledge required</p> <p>Chinese, Russian Module with objective A2: no previous knowledge allowed</p> <p>English, German Module with objective B2: Level B1 (GER) or English advanced course required Module with objective C1: Level B2 (GER) required Module with objective C2: Level C1 (GER) required</p> <p>3rd semester: French, Italian, Spanish Module with objective A2: no previous knowledge allowed Module with objective B2: Previous knowledge required</p> <p>Chinese, Russian Module with objective A2: no previous knowledge allowed</p> <p>English, German Module with objective B2: Level B1 (GER) or English advanced course required Module with objective C1: Level B2 (GER) required Module with objective C2: Level C1 (GER) required</p>		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Foreign Language I /ILV / Course no.: SPR1 / 1st semester / ECTS: 3</u> All modules and levels: Course book - by arrangement; authentic materials, e.g. from English language journals (including specialist journals), newspapers and online media		
	<u>Foreign Language II /ILV / Course no.: SPR2 / 2nd semester / ECTS: 5</u> All modules and levels: Course book - by arrangement; authentic materials, e.g. from English language journals (including specialist journals), newspapers and online media		
	<u>Foreign Language III /ILV / Course no.: SPR3 / 3rd semester / ECTS: 4</u> All modules and levels: Course book - by arrangement; authentic materials, e.g. from English language journals (including specialist journals), newspapers and online media		
Skills acquisition	<u>Foreign Language I /ILV / Course no.: SPR1 / 1st semester / ECTS: 3</u> The modules are designed according to the Common European Framework of Reference for Languages (CEFR). In the modules, students will acquire the language skills and develop the skills necessary for a business-oriented professional or academic activity.		

	<p>The following competences are taught according to CEFR, i.e. after completion of the module, successful graduates will have mastered the following activities:</p>
Skills acquisition	<p>A1 - Beginner Can understand and use familiar everyday expressions and very simple sentences aimed at satisfying specific needs. Can introduce him/herself and others and ask other people questions about him/herself - e.g. where he/she lives, people he/she knows or things he/she has - and can answer questions of this kind. Can communicate in a simple way if the interlocutors speak slowly and clearly and are willing to help.</p> <p>A2 - Basic knowledge Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. personal and family information, shopping, work, local area). Can communicate in simple, routine situations involving a simple and direct exchange of information on familiar and common matters. Can describe with simple language his/her own background and education, immediate environment and things related to immediate needs.</p> <p>B1 - Advanced language use Can understand the main points when clear standard language is used and when it comes to familiar matters from work, school, leisure, etc. Can cope with most situations encountered when travelling in the area where the language is spoken. Can express himself/herself simply and coherently on familiar topics and personal areas of interest. Can report on experiences and events, describe dreams, hopes and goals and give brief reasons or explanations for plans and views.</p> <p>B2 - Independent use of language Can understand the main contents of complex texts on concrete and abstract topics; also understands technical discussions in his/her own special field. Can communicate so spontaneously and fluently that a normal conversation with native speakers is possible without much effort on both sides. Can express himself/herself clearly and in detail on a wide range of topics, explain a point of view on a topical issue and indicate the advantages and disadvantages of different options.</p> <p>C1 - Expert language skills Can understand a wide range of demanding, longer texts and also grasp implicit meanings. Can express him/herself fluently and spontaneously without having to search for words more often. Can use the language effectively and flexibly in social and professional life or in education and studies. Can express himself/herself clearly, in a structured and detailed manner on complex matters, using various means of text linking as appropriate.</p> <p>C2 - Approximate mother-tongue knowledge Can easily understand practically anything he/she reads or hears. Can summarize information from various written and oral sources, presenting reasons and explanations in a coherent presentation. Can express himself/herself spontaneously, very fluently and precisely, and can also make clear finer nuances of meaning in more complex situations.</p> <p><u>Foreign Language II /ILV / Course no.: SPR2 / 2nd semester / ECTS: 5</u></p> <p>The modules are designed according to the Common European Framework of Reference for Languages (CEFR). In the modules, students will acquire the language skills and develop the skills necessary for a business-oriented professional or academic activity.</p> <p>The following competences are taught according to CEFR, i.e. after completion of the module, successful graduates will have mastered the following activities:</p> <p>A1 - Beginner Can understand and use familiar everyday expressions and very simple sentences aimed at satisfying specific needs. Can introduce him/herself and others and ask other people questions about him/herself - e.g. where he/she lives, people he/she knows or things he/she has - and can answer questions of this kind. Can communicate in a simple way if the interlocutors speak slowly and clearly and are willing to help.</p> <p>A2 - Basic knowledge Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. personal and family information, shopping, work, local area). Can communicate in simple, routine situations involving a simple and direct exchange of information on familiar and common matters. Can describe with simple language his/her own background and education, immediate environment and things related to immediate needs.</p>
Skills acquisition	<p>B1 - Advanced language use Can understand the main points when clear standard language is used and when it comes to familiar matters from work, school, leisure, etc. Can cope with most situations encountered when travelling in the area where the language is spoken. Can express himself/herself simply</p>

	<p>and coherently on familiar topics and personal areas of interest. Can report on experiences and events, describe dreams, hopes and goals and give brief reasons or explanations for plans and views.</p> <p>B2 - Independent use of language Can understand the main contents of complex texts on concrete and abstract topics; also understands technical discussions in his/her own special field. Can communicate so spontaneously and fluently that a normal conversation with native speakers is possible without much effort on both sides. Can express himself/herself clearly and in detail on a wide range of topics, explain a point of view on a topical issue and indicate the advantages and disadvantages of different options.</p> <p>C1 - Expert language skills Can understand a wide range of demanding, longer texts and also grasp implicit meanings. Can express him/herself fluently and spontaneously without having to search for words more often. Can use the language effectively and flexibly in social and professional life or in education and studies. Can express himself/herself clearly, in a structured and detailed manner on complex matters, using various means of text linking as appropriate.</p> <p>C2 - Approximate mother-tongue knowledge Can easily understand practically anything he/she reads or hears. Can summarize information from various written and oral sources, presenting reasons and explanations in a coherent presentation. Can express himself/herself spontaneously, very fluently and precisely, and can also make clear finer nuances of meaning in more complex situations.</p> <p><u>Foreign Language III /ILV / Course no.: SPR3 / 3rd semester / ECTS: 4</u></p> <p>The modules are designed according to the Common European Framework of Reference for Languages (CEFR). In the modules, students will acquire the language skills and develop the skills necessary for a business-oriented professional or academic activity.</p> <p>The following competences are taught according to CEFR, i.e. after completion of the module, successful graduates will have mastered the following activities:</p> <p>A1 - Beginner Can understand and use familiar everyday expressions and very simple sentences aimed at satisfying specific needs. Can introduce him/herself and others and ask other people questions about him/herself - e.g. where he/she lives, people he/she knows or things he/she has - and can answer questions of this kind. Can communicate in a simple way if the interlocutors speak slowly and clearly and are willing to help.</p> <p>A2 - Basic knowledge Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. personal and family information, shopping, work, local area). Can communicate in simple, routine situations involving a simple and direct exchange of information on familiar and common matters. Can describe with simple language his/her own background and education, immediate environment and things related to immediate needs.</p> <p>B1 - Advanced language use Can understand the main points when clear standard language is used and when it comes to familiar matters from work, school, leisure, etc. Can cope with most situations encountered when travelling in the area where the language is spoken. Can express himself/herself simply and coherently on familiar topics and personal areas of interest. Can report on experiences and events, describe dreams, hopes and goals and give brief reasons or explanations for plans and views.</p> <p>B2 - Independent use of language Can understand the main contents of complex texts on concrete and abstract topics; also understands technical discussions in his/her own special field. Can communicate so spontaneously and fluently that a normal conversation with native speakers is possible without much effort on both sides. Can express himself/herself clearly and in detail on a wide range of topics, explain a point of view on a topical issue and indicate the advantages and disadvantages of different options.</p> <p>C1 - Expert language skills</p>
Skills acquisition	<p>Can understand a wide range of demanding, longer texts and also grasp implicit meanings. Can express him/herself fluently and spontaneously without having to search for words more often. Can use the language effectively and flexibly in social and professional life or in education and studies. Can express himself/herself clearly, in a structured and detailed manner on complex matters, using various means of text linking as appropriate.</p>

	<p>C2 - Approximate mother-tongue knowledge Can easily understand practically anything he/she reads or hears. Can summarize information from various written and oral sources, presenting reasons and explanations in a coherent presentation. Can express himself/herself spontaneously, very fluently and precisely, and can also make clear finer nuances of meaning in more complex situations.</p>
<p>Course contents</p>	<p><u>Foreign Language I /ILV / Course no.: SPR1 / 1st semester / ECTS: 3</u></p> <p>A1 - Beginner Understand and use familiar everyday expressions and very simple sentences aimed at satisfying specific needs. Introduce himself/herself and others and ask other people questions about him/herself - e.g. where he/she lives, people he/she knows or things he/she has - and answer questions of this kind. Communicate in a simple way if the interlocutors speak slowly and clearly and are willing to help.</p> <p>A2 - Basic knowledge Understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. personal and family information, shopping, work, local area). Communicate in simple, routine situations involving a simple and direct exchange of information on familiar and common matters. Describe with simple language his/her own background and education, immediate environment and things related to immediate needs.</p> <p>B1 - Advanced language use Use clear standard language and communicate on familiar matters from work, school, leisure, etc. Apply relevant conversation skills for travel in the area in which the language is spoken. Express himself/herself simply and coherently on familiar topics and personal areas of interest. Report on experiences and events, describe dreams, hopes and goals and give brief reasons or explanations for plans and views.</p> <p>B2 - Independent use of language Express the main contents of complex texts on concrete and abstract topics; participate in technical discussions in his/her own special field. Communicate so spontaneously and fluently that a normal conversation with native speakers is possible without much effort on both sides. Express himself/herself clearly and in detail on a wide range of topics, explain a point of view on a topical issue and indicate the advantages and disadvantages of different options.</p> <p>C1 - Expert language skills Understand a wide range of demanding, longer texts and also grasp implicit meanings. Express himself/herself fluently and spontaneously without having to search for words more often. Use the language effectively and flexibly in social and professional life or in education and studies. Express himself/herself clearly, in a structured and detailed manner on complex matters, using various means of text linking as appropriate.</p> <p>C2 - Approximate mother-tongue knowledge Effortless communication in all language situations. Summarize information from various written and oral sources, presenting reasons and explanations in a coherent presentation. Express himself/herself spontaneously, very fluently and precisely, and can also make clear finer nuances of meaning in more complex situations.</p> <p><u>Foreign Language II /ILV / Course no.: SPR2 / 2nd semester / ECTS: 5</u></p> <p>A1 - Beginner Understand and use familiar everyday expressions and very simple sentences aimed at satisfying specific needs. Introduce himself/herself and others and ask other people questions about him/herself - e.g. where he/she lives, people he/she knows or things he/she has - and answer questions of this kind. Communicate in a simple way if the interlocutors speak slowly and clearly and are willing to help.</p> <p>A2 - Basic knowledge Understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. personal and family information, shopping, work, local area). Communicate in simple, routine situations, involving</p>
<p>Course contents</p>	<p>a simple and direct exchange of information on familiar and common matters. Describe with simple language his/her own background and education, immediate environment and things related to immediate needs.</p> <p>B1 - Advanced language use Use clear standard language and communicate on familiar matters from work, school, leisure, etc. Apply relevant conversation skills for travel in the area in which the language is spoken. Express himself/herself simply and coherently on familiar topics and personal areas of interest. Report on experiences and events, describe dreams, hopes and goals and give</p>

	<p>brief reasons or explanations for plans and views.</p> <p>B2 - Independent use of language Express the main contents of complex texts on concrete and abstract topics; participate in technical discussions in his/her own special field. Communicate so spontaneously and fluently that a normal conversation with native speakers is possible without much effort on both sides. Express himself/herself clearly and in detail on a wide range of topics, explain a point of view on a topical issue and indicate the advantages and disadvantages of different options.</p> <p>C1 - Expert language skills Understand a wide range of demanding, longer texts and also grasp implicit meanings. Express himself/herself fluently and spontaneously without having to search for words more often. Use the language effectively and flexibly in social and professional life or in education and studies. Express himself/herself clearly, in a structured and detailed manner on complex matters, using various means of text linking as appropriate.</p> <p>C2 - Approximate mother-tongue knowledge Effortless communication in all language situations. Summarize information from various written and oral sources, presenting reasons and explanations in a coherent presentation. Express himself/herself spontaneously, very fluently and precisely, and can also make clear finer nuances of meaning in more complex situations.</p> <p><u>Foreign Language III /ILV / Course no.: SPR3 / 3rd semester / ECTS: 4</u></p> <p>A1 - Beginner Understand and use familiar everyday expressions and very simple sentences aimed at satisfying specific needs. Introduce himself/herself and others and ask other people questions about him/herself - e.g. where he/she lives, people he/she knows or things he/she has - and answer questions of this kind. Communicate in a simple way if the interlocutors speak slowly and clearly and are willing to help.</p> <p>A2 - Basic knowledge Understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. personal and family information, shopping, work, local area). Communicate in simple, routine situations involving a simple and direct exchange of information on familiar and common matters. Describe with simple language his/her own background and education, immediate environment and things related to immediate needs.</p> <p>B1 - Advanced language use Use clear standard language and communicate on familiar matters from work, school, leisure, etc. Apply relevant conversation skills for travel in the area in which the language is spoken. Express himself/herself simply and coherently on familiar topics and personal areas of interest. Report on experiences and events, describe dreams, hopes and goals and give brief reasons or explanations for plans and views.</p> <p>B2 - Independent use of language Express the main contents of complex texts on concrete and abstract topics; participate in technical discussions in his/her own special field. Communicate so spontaneously and fluently that a normal conversation with native speakers is possible without much effort on both sides. Express himself/herself clearly and in detail on a wide range of topics, explain a point of view on a topical issue and indicate the advantages and disadvantages of different options.</p> <p>C1 - Expert language skills Understand a wide range of demanding, longer texts and also grasp implicit meanings. Express himself/herself fluently and spontaneously without having to search for words more often. Use the language effectively and flexibly in social and professional life or in education and studies. Express himself/herself clearly, in a structured and detailed manner on complex matters, using various means of text linking as appropriate.</p>
Course contents	<p>C2 - Approximate mother-tongue knowledge Effortless communication in all language situations. Summarize information from various written and oral sources, presenting reasons and explanations in a coherent presentation. Express himself/herself spontaneously, very fluently and precisely, and can also make clear finer nuances of meaning in more complex situations.</p>
Teaching and learning methods	<p><u>Foreign Language I /ILV / Course no.: SPR1 / 1st semester / ECTS: 3</u> ILV is designed according to a communicative, action-oriented approach</p> <p><u>Foreign Language II /ILV / Course no.: SPR2 / 2nd semester / ECTS: 5</u> ILV is designed according to a communicative, action-oriented approach</p>

	<p><u>Foreign Language III /ILV / Course no.: SPR3 / 3rd semester / ECTS: 4</u></p> <p>ILV is designed according to a communicative, action-oriented approach</p>
Evaluation Methods Criteria	<p><u>Foreign Language I /ILV / Course no.: SPR1 / 1st semester / ECTS: 3</u></p> <p>The performance and competence of the students in reading comprehension, listening comprehension, written expression, oral expression and the quality of their cooperation (also online) are taken into account for the assessment.</p>
	<p><u>Foreign Language II /ILV / Course no.: SPR2 / 2nd semester / ECTS: 5</u></p> <p>The performance and competence of the students in reading comprehension, listening comprehension, written expression, oral expression and the quality of their cooperation (also online) are taken into account for the assessment.</p>
	<p><u>Foreign Language III /ILV / Course no.: SPR3 / 3rd semester / ECTS: 4</u></p> <p>The performance and competence of the students in reading comprehension, listening comprehension, written expression, oral expression and the quality of their cooperation (also online) are taken into account for the assessment.</p>

Individual and Social Skills (ISK)

Module number:			Scope:
ISK	Individual and Social Skills	5.5	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	1st semester		
	2nd semester		
Level	1st semester: 1. Study cycle, Bachelor / 2nd semester: 1. Study cycle, Bachelor		
Previous knowledge	1st semester: None / 2nd semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Problem Solving in a Team /ILV / Course no.: vzISK1 / 1st semester / ECTS: 2</u> <ul style="list-style-type: none"> • Hillmer (2007): Schlüsselkompetenzen für Ingenieure & Naturwissenschaftler: Chapter – Gestaltung von Teamprozessen von Christof Fink, 1st ed., Studia Universitätsbuchhandlung Innsbruck • Hillmer (2007): Schlüsselkompetenzen für Ingenieure & Naturwissenschaftler: Chapter – Gesprächsführung und Verhandlungstechnik von Christof Fink, 1st ed., Studia Universitätsbuchhandlung Innsbruck • Lencioni (2008): Mein Traum-Team: oder die Kunst, Menschen zu idealer Zusammenarbeit zu führen, 1st ed., Campus Verlag Frankfurt/Main • Schweizer (2008): Systematisch Lösungen finden: Eine Denkschule für Praktiker, 3rd ed., vdf Hochschulverlag Zürich • Sell, Schimweg (2013): Probleme lösen: In komplexen Zusammenhängen denken, 6th Edition, Springer Verlag Berlin • Fischer, Pfeffel (2013): Systematische Problemlösung in Unternehmen: Ein Ansatz zur strukturierten Analyse und Lösungsentwicklung, 2nd Edition, Springer Gabler Publisher Wiesbaden 		
	<u>Presentation Techniques and Communication /ILV / Course no.: vzISK2 / 2nd semester / ECTS: 2</u> <ul style="list-style-type: none"> • Berkun (2010): Bekenntnisse eines Redners – oder die Kunst, gehört zu werden, 1st ed., O'Reilly Verlag • Gallo (2011): Überzeugen wie Steve Jobs: Das Erfolgsgeheimnis seiner Präsentationen, 1st ed., Ariston Verlag • Thiele (2010): Präsentieren ohne Stress: Wie Sie Lampenfieber in Auftrittsfreude verwandeln, 1st ed., Frankfurter Allgemeine Buch • Tracy, Scheelen (2008): Speak to Win – Wie Sie zu einem ausgezeichneten Redner werden vor großem und kleinem Publikum, 1st ed., GABAL Verlag • Schulz von Thun (2010): Miteinander reden, Rowohlt Verlag Leipzig • Rosenberg (2012): Gewaltfreie Kommunikation: Eine Sprache des Lebens, 10th ed., Junfermann Verlag Paderborn 		
	<u>Academic Research /ILV / Course no.: vzISK3 / 2nd semester / ECTS: 1.5</u> <ul style="list-style-type: none"> • Sandberg (2013): Wissenschaftliches Arbeiten von Abbildung bis Zitat, 2. Edition, Oldenbourg Publishers Munich • Bansch (2003): Wissenschaftliches Arbeiten: Seminar- und Diplomarbeiten, 8.Aufl., Oldenbourg Verlag Munich • Chalmers (2007): Wege der Wissenschaft: Einführung in die wissenschaftstheorie, 6th Edition, Springer Verlag Berlin • Eco (2010): Wie man eine wissenschaftliche Abschlussarbeit schreibt, 13th edition., UTB Facultas Universitätsverlag Stuttgart • Karmasin, Ribing (2010): Die Gestaltung wissenschaftlicher Arbeiten, 5th edition., UTB Facultas Universitätsverlag Stuttgart • Leopold-Wildburger, Schütz (2010): Verfassen und Vortragen: Wissenschaftliche Arbeiten und Vorträge leicht gemacht, 2nd Edition, Springer Verlag Berlin 		

	<ul style="list-style-type: none"> Rössl (Ed.) (2008): Die Diplomarbeit in der Betriebswirtschaftslehre: Ein Leitfaden zur Erstellung einer Laureatsarbeit, Bachelorarbeit, Diplomarbeit, Masterarbeit, Dissertation, 4th edition, Facultas WUV Universitätsverlag Vienna
<p>Skills acquisition</p>	<p><u>Problem Solving in a Team /ILV / Course no.: vzISK1 / 1st semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> 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. 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. <p><u>Presentation Techniques and Communication /ILV / Course no.: vzISK2 / 2nd semester / ECTS: 2</u></p> <p>The students are able to:</p> <ul style="list-style-type: none"> 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. <p><u>Academic Research /ILV / Course no.: vzISK3 / 2nd semester / ECTS: 1.5</u></p> <p>Students are able to:</p> <ul style="list-style-type: none"> 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.
<p>Course contents</p>	<p><u>Problem Solving in a Team /ILV / Course no.: vzISK1 / 1st semester / ECTS: 2</u></p> <ul style="list-style-type: none"> Leading and guiding teams Controlling team processes; basic elements of moderation Roles in the team; Team phases Conflicts in the team Classification of problem types General problem-solving process Tools for problem solving Creativity methods Exercises and outdoor elements <p><u>Presentation Techniques and Communication /ILV / Course no.: vzISK2 / 2nd semester / ECTS: 2</u></p> <ul style="list-style-type: none"> Presentation and lecture techniques Structure and arrangement of presentations Use of media for presentations Exercises and video analysis <p><u>Academic Research /ILV / Course no.: vzISK3 / 2nd semester / ECTS: 1.5</u></p> <ul style="list-style-type: none"> 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

	<ul style="list-style-type: none"> 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.
Teaching and learning methods	<p><u>Problem Solving in a Team /ILV / Course no.: vzISK1 / 1st semester / ECTS:2</u> Integrated course</p> <p><u>Presentation Techniques and Communication /ILV / Course no.: vzISK2 / 2nd semester / ECTS: 2</u> Integrated course</p> <p><u>Academic Research /ILV / Course no.: vzISK3 / 2nd semester / ECTS: 1.5</u> Lecture</p>
Evaluation Methods Criteria	<p><u>Problem Solving in a Team /ILV / Course no.: vzISK1 / 1st semester / ECTS: 2</u> Project report</p> <p><u>Presentation Techniques and Communication /ILV / Course no.: vzISK2 / 2nd semester / ECTS: 2</u> Term papers, final presentation</p> <p><u>Academic Research /ILV / Course no.: vzISK3 / 2nd semester / ECTS: 1.5</u> Final presentation, final exam</p>

Semester abroad Individual and Social Skills (AIS)

Module number:			Scope:
AIS	Semester abroad Individual and Social Skills	5	ECTS
Degree program	University of Applied Sciences Bachelor Degree Program - Industrial Engineering and Management Full-time		
Position in the curriculum	5th semester		
Level	5th semester: 1. Study cycle, Bachelor		
Previous knowledge	5th semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	Depending on the subject focus of the respective elective subjects		
Skills acquisition	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	Consolidation through courses such as Business Communication, Negotiation and Conflict Resolution, International Business Communication, Bargaining Behavior.		
Teaching and learning methods	The teaching and learning methods are based on the curricula or specifications of the partner universities concerned.		
Evaluation Methods Criteria	The evaluation methods and evaluation criteria are based on the curricula or specifications of the partner universities concerned.		

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.

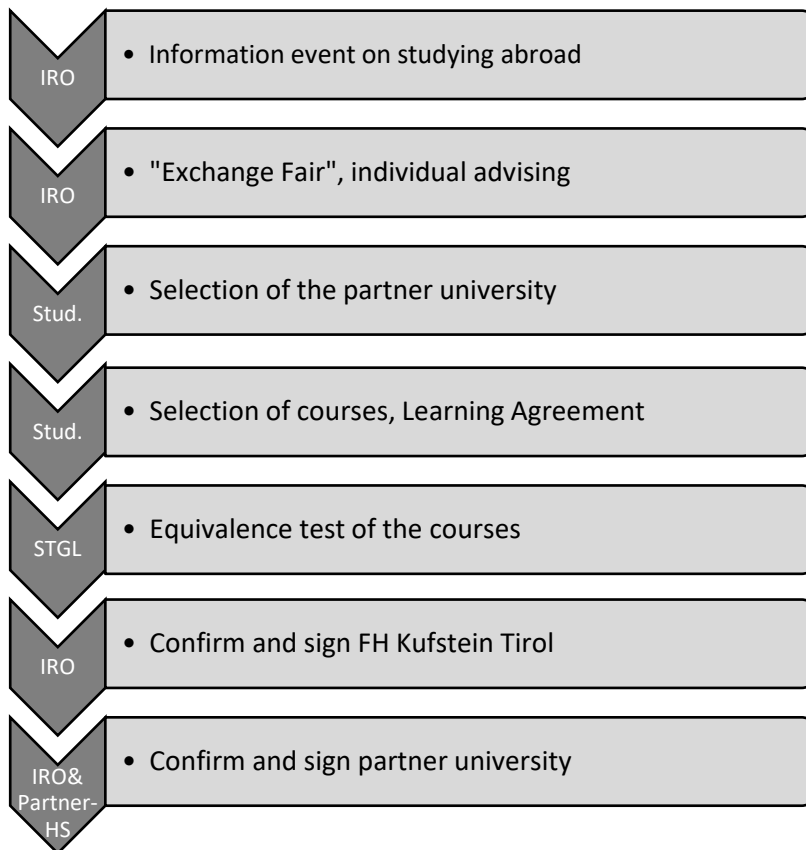
This ensures that students are given an in-depth knowledge of the relevant subjects so that the desired competences can be developed. Intercultural and linguistic competences, which are highly relevant in practice, are also developed during the studies abroad. Students are also encouraged to organize 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).

Procedure for studying abroad



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 FHStG 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).	