

Study regulations of the Bachelor's course

Industrial Engineering & Management

To obtain the academic degree

Bachelor of Science in Engineering
abbreviated BSc

as an appendix to the statutes of the
HOK | University of Applied Sciences Kufstein Tirol

Organizational form: full-time

Duration: 6 semesters

Scope: 180 ECTS

Places for beginners per academic year: 30

Version 1

Adopted by the Faculty on May 6, 2026

Program starts WS 2027/28

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1 OCCUPATIONAL PROFILES

1.1 Career opportunities

Thanks to their broad technical and economic training, graduates of the Bachelor's program in Industrial Engineering have access to a wide range of career opportunities at the intersection of technology and business.

Graduates can find employment opportunities in the following key regional industries:

- Construction industry
- Chemical and pharmaceutical industries
- Electrical and electronics companies
- Energy sector
- Equipment manufacturers
- Wood Industry
- Consumer and Industrial Goods Manufacturing
- Machinery and plant engineering
- Public Sector
- Transportation and logistics

Within these industries, graduates can pursue careers in the following fields, for example:

(1) Product Management

Responsibilities in product management include conducting market research to identify economic and technical trends, translating these findings into market and customer requirements and the resulting technical specifications, and overseeing product development, production, market launch, sales, and after-sales service. In a different organizational structure based on functional specialization, this corresponds to the career fields of innovation and technology management and product marketing.

(2) Production Planning, Control, and Logistics

Logistics—or supply chain management, which has now evolved into a cross-functional discipline—along with the close integration of logistics with production planning and control, offer industrial engineers a comprehensive field of activity due to the need for cross-functional expertise and interdisciplinary skills. Tasks in this area include:

- **production program planning**, materials management, scheduling and capacity planning, production control, and order monitoring. Analysis and optimization of transportation structures with regard to costs and schedules.
- **Materials management/purchasing** with a focus on the materials required in the areas of production, auxiliary materials, operating supplies, and additives. This involves applying operational and strategic mechanisms for warehousing and procurement. Here, material requirements and cost trends must be analyzed to implement ongoing optimizations (e.g., in the areas of inventory management, component standardization, procurement strategies, and supplier selection).
- **Supply Chain Management/Logistics**, particularly the planning of the flow of goods and information, with special consideration given to technical and economic conditions. In addition to planning, simulation, and control tasks, this also includes controlling and quality management across the entire value chain.

(3) Work Planning/Cost Planning

Work planning ensures cost-effective manufacturing/production within the product development process and, as an interface function, is also a core competency of an industrial engineer. Responsibilities include designing workflows and work systems. Thus, the focus is on determining whether to perform tasks in-house or outsource them, defining manufacturing/production steps with target times based on the framework conditions, and planning operations, inspections, and costs, among other things. In large companies, the function of cost planning is established as a separate department due to the significance of costs.

(4) Project Management

Interdisciplinary and internationally diverse project teams are now standard in all areas of business. Project management—encompassing various tasks from planning to control—is one of the core responsibilities of industrial engineers due to the breadth of their expertise and their ability to bridge the interface between engineering and business.

(5) Information Management & IT Support

Supporting business processes through information management and modern IT systems is a crucial aspect of a company's success. Industrial engineers can use their practical knowledge to identify requirements, evaluate and select IT tools, and support their implementation.

(6) Product Marketing

Development and implementation of sales promotion strategies involving product pricing, customer communication, and distribution channels based on customer and market analyses.

(7) Quality and Process Management

Planning and organizing all measures to improve a company's products, processes, or services, as well as managing the processes involved in product development. This includes, in particular, maintenance and compliance management during the construction of facilities, as well as occupational safety.

(8) Procurement

Selecting and evaluating suppliers requires technical and economic understanding and knowledge of product development processes. A successful decision can only be made through a holistic approach (economic/technical). Tasks include analyzing and monitoring the procurement market, assessing technologies and concepts, evaluating suppliers, and conducting negotiations. In addition to physical goods, this also includes the procurement of services, such as those related to product development, e.g., development services.

(9) Product Development / Design

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

(10) Management Consultants

Management consultants offer their consulting services as a professional service. Typically, the subject of the consultation is the management of the client's organization. Alternatively,

consulting services may also be offered to assist with technical decisions and changes or to provide solutions to specific economic and technical issues.

(11) Controlling – Technical Controlling

Technical controlling is a challenging and multifaceted role that requires both technical and business management knowledge. Technical controllers must be able to understand, structure, and communicate complex issues. They must also possess analytical skills to evaluate data and derive recommendations for action. In addition, they must be able to collaborate and work together with various departments and stakeholders.

For graduates of the bachelor's program, entry-level positions in the areas mentioned above typically start with roles without managerial responsibility (administrative work, project support, assistant roles) or trainee positions. After gaining relevant professional experience and depending on individual performance, career opportunities in leadership roles become available.

1.2 Qualification profile

The qualification objectives and learning outcomes of the Bachelor's program in Industrial Engineering cannot be clearly assigned to a specific ISCED (International Standard Classification of Education) level; the closest equivalence lies within Level 04, Business, Administration, and Law (specifically 041, 0413, 0414, 0416) and Level 07, Engineering, Manufacturing, and Construction (specifically 071–0713–16 and 0722). The content taught qualifies graduates for the professional fields of activity mentioned in the previous chapter.

The qualification objectives and learning outcomes of the Bachelor's program in Industrial Engineering correspond to both academic and professional requirements. The curriculum qualifies graduates for the professional fields of activity mentioned above. Upon completion of the Bachelor's program, **the** following **competencies** are acquired based on a qualification profile that spans various industries and company size categories:

Technical Competence (Academic Competence)

Graduates recognize and understand fundamental technical problems and can solve tasks using existing methods and tools. They have mastered the basic approaches and methods necessary to address technical problems in the field of mechanical engineering and, building on this, in automation in general. Specifically, graduates are able to:

- Classify and understand fundamental technical concepts and technical terminology.
- To contextualize and understand the fundamentals of the natural sciences.
- To contextualize and understand fundamental concepts in mechanical engineering.
- Solve technical problems by applying knowledge from foundational subjects such as mathematics, statics, strength of materials, machine elements, etc.
- To know and understand the basic technical design of machines and systems.
- Understand and contextualize technical principles and laws for solving technical problems.

- Analyze technical problems and, based on this analysis, develop proposals for a suitable approach (requirements, concept, design, elaboration), including appropriate tools and methods; select a proposal and implement it.

The following **modules** and **courses** are designed to develop technical competence (note: "E" indicates English-language courses):

Module: "Formal Sciences" (FWW):

- Mathematics 1
- Mathematics 2
- Mathematics 3

Module: "Engineering Sciences" (ING):

- Structural Analysis and Strength of Materials
- Dynamics & Hydromechanics
- Thermodynamics

Module: "Electrical Engineering" (ELT):

- Electrical Engineering (VO)
- Electrical Engineering (Lab)
- Automation Technology (Lecture)
- Automation Technology (Lab)

Module: "Mechanical Engineering" (MAB):

- Technical Drawing
- Computer-Aided Technologies (CAX)
- Machine Components
- Machinery & Plant Engineering

Module: "Information Technology" (INF):

- Digital Supply Chain (E)
- Programming and Data Management

Module: "Fundamentals of Product & Production" (GPP)

- Digital Product Development
- Manufacturing Technology and Materials Science

Module: "Semester Abroad in Engineering" (ATE)

Courses from the following two subfields are recommended:

- Advanced Engineering (e.g., Fluid Mechanics, Heat Transfer, Machine Dynamics, Multibody Dynamics, Modeling and Simulation, etc.)

- Product Development (e.g., Mechatronic Systems, Internal Combustion Engines, Drive and Control Technology, Thermal Turbomachinery, Hydraulic Flow Machinery, Robotics, Plant Design, Systems Engineering, etc.)

Competence in Economics/Management (Technical Expertise)

Graduates recognize and understand fundamental economic problems and can solve problems using existing methods and tools. They have mastered the basic approaches and methods necessary to address economic challenges. Specifically, graduates are able to:

- Understand and contextualize economic and legal terminology.
- Understand and contextualize fundamental economic relationships.
- Understand and contextualize the fundamental concepts and principles of leadership and management.
- Understand tasks, methods, and processes in the key functional areas of businesses, particularly in the areas of marketing, finance and accounting, human resources, and organization.
- Analyze and contextualize corporate organizations and strategies.
- Describe and explain relevant tasks, processes, and tools/instruments at the strategic and operational levels.
- Identify requirements and framework conditions based on an initial situation and derive objectives.
- Based on these objectives, derive a suitable approach and develop, evaluate, and select alternative solutions.
- Understand and explain the management cycle (goal setting, planning, implementation, steering, and monitoring) in the respective field.

The following modules and courses are designed to help students achieve the basic competency in Economics/Management (note: "E" indicates English-language courses):

Module: "Economics" (WIR):

- Fundamentals of Economics (E)
- Introduction to Law

Module: "Management" (MGM):

- Project Management (E)
- Business Economics, Finance, and Marketing (E)
- Innovation Management & Product Development (E)

Module: "Semester Abroad in Business/Management" (AWM)

Courses from the following four subfields 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 Competency (optional) (Technical Expertise)

Graduates recognize and understand fundamental problems in the field of product development and can solve them in a task-specific manner. They possess the basic approaches and methods necessary to tackle challenges in the field of research and development. Specifically, graduates are able to:

- Identify and apply the fundamentals and methods of design in product development.
- Optimize product development processes using 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.
- Identify current market challenges and address them in product development.
- Understand the process and tools for cost management in product development.
- Define and track goals in product development using appropriate metrics.
- Analyze core processes in the development area, derive measures in light of interconnectivity, and interpret their effects.

The following modules and courses are designed to help students achieve the core competency "Product Development" (note: "E" indicates English-language courses):

Module: "Product Development" (PEE):

- Design Project – Product Development
- Information Systems in Product Development
- R&D Management (E)

Competency in Organization and Management (optional) (Specialized Academic Competency)

Graduates recognize and understand fundamental issues in the field of corporate organization within manufacturing companies and can solve these issues in a task-specific manner. They possess the fundamental approaches and methods necessary to address challenges in the areas of organization, management, and leadership, as well as production processes and planning.

Specifically, graduates are able to:

- identify and distinguish the fundamentals, structures, and methods of a modern organization in a global context.
- to identify, improve, and optimize business processes using system support, and to apply modern methods.
- Optimize production processes using system support and apply modern methods.
- to design digital transformation strategies within the context of these processes and to develop implementation methods.
- to take a holistic view of employee development and growth—understanding both the global context and the requirements and opportunities of the local market.
- Identify current trends in production and describe their impact on production.
- Critically reflect on current trends in light of sustainability requirements, and understand and apply sustainability aspects.
- Identify current market challenges and implement the requirements for production and process design.
- Define and track production and corporate goals using appropriate key performance indicators.
- To identify and derive new, global production methods and business models, and to identify their implications for an innovative manufacturing company, particularly in the SME sector.

The following modules and courses are designed to help students achieve the “Production” applied competency (note: “E” indicates English-language courses):

Module: “Organization and Management” (OMT):

- Smart Factory Planning
- Digital Production & E-Competence
- Management & Leadership (E)

Competency in Practical Application (Technical Expertise)

Graduates will be able to:

- Adapt and apply theoretical knowledge to practical tasks.
- To think in an integrated and interdisciplinary manner in the context of practice-theory-reflection.
- To prepare, present, and communicate results in a structured and appropriate manner, and to apply the formal and substantive requirements of academic work, particularly when writing bachelor’s theses.
- Recognize the importance of project communication, self-organization, time management, organizational skills, as well as stress management and resilience, and apply these competencies strategically to act successfully in dynamic and demanding project situations (work-life management).

The following **modules and courses** are designed to help students acquire these competencies:

Module: "Practical Projects" (PRA):

- Practical Project 1
- Practical Project 2

Module: "Bachelor's Thesis and Bachelor's Thesis Seminar" (BAS):

- Bachelor's Thesis Seminar

Module: Professional Internship (BPR) – at least 500 hours

- Professional Internship

Competencies: Individual, Social, and Methodological Skills (Personal and Social Competencies)

In addition to subject-specific core competencies, students acquire a range of **individual, methodological, and social skills** to successfully handle team- and leadership-related tasks in interactive and intercultural situations. Furthermore, students gain valuable practical experience through the hands-on application of what they have learned.

Graduates are able to:

- communicate confidently in English during presentations (collaborating in English-speaking teams, reading and preparing documentation).
- to identify social conflicts, develop and implement conflict resolution strategies, and develop the ability to recognize, manage, and prevent conflicts.
- apply basic mediation techniques.
- to take into account specific management roles, their implications, and developments across the various phases of conflict, and to derive alternative courses of action over time through a discursive approach that balances experiential learning and reflection, particularly with regard to work-life management.

The following **modules and courses** are designed to help students acquire these competencies:

Module: "Languages" (SPR)

- Foreign Language I–II

Module: "Individual and Social Competence" (ISK)

- Presentation Techniques and Communication
- Academic Research

Module: Semester Abroad: Individual and Social Competence (AIS)

Recommended courses include, for example:

- Business Communication, Negotiation and Conflict Resolution, International Business Communication, Bargaining Behavior, etc.

Professional Field	Competency Description (Selection)	Competency	Modules
- Design - Information Management	- Understands fundamental technical concepts and terminology - Understands the fundamentals of the natural sciences - Understands fundamental concepts in mechanical engineering - Can solve technical problems by applying knowledge from foundational subjects - Understands the basic technical design of machines and systems - Can analyze technical problems and, based on that analysis, develop proposals for an appropriate course of action	Technology	- Formal Sciences - Engineering - Electrical Engineering - Mechanical Engineering - Information Technology - Fundamentals of Product & Production - Semester Abroad in Engineering
- Work Planning - Cost Planning - Product Marketing - Procurement	- Understands economic and legal terminology - Understands basic economic concepts - Understands the fundamental concepts and principles of management - Understands tasks, methods, and processes in the key functional areas of a business. - Can identify requirements and framework conditions based on an initial situation, derive goals, and develop alternative solutions	Economics & Management	- Economics - Management - Study Abroad Semester in Economics & Management
Product Management	- Can apply the fundamentals and methods of design in product development - Can analyze product data and prepare it for transfer to production - Can identify current trends in development	Product Development	Product Development

	Understands the process and tools for cost management in product development		
- Production Planning / Control - Logistics	- Can apply the fundamentals and methods of design in production - Can optimize production processes using system support - Can identify current trends in production - Is familiar with new, global production methods	Production	Fundamentals of Product & Production
Technical Consulting	- Can apply theoretical knowledge to practical tasks - Can think in an integrated and interdisciplinary manner in terms of practice, theory, and reflection - Can organize and present or communicate results in a structured and appropriate manner - Can apply the formal and substantive requirements of academic work, particularly when writing a bachelor's thesis	Practical Application	- Practical Projects - Bachelor's Thesis and Bachelor's Thesis Seminar - Professional internship
Project management	- Can communicate in English with confidence in presentations - Recognizes social conflicts - Can develop and implement conflict resolution strategies and develop the ability to identify, manage, and prevent conflicts	Personal, social, and methodological skills	- Languages - Personal and social competence - Semester Abroad: Personal and Social Competencies
Controlling	- Familiar with organizational structures - Understands business processes and their KPIs - Understands the digitization of business processes	Economics and Management	- Economics - Management - Organization & Management

2 CURRICULUM

2.1 Curriculum data

	FT	Comments (if any)
First Year of Study (YYYY/MM ₊₁)	2027/28	
Standard duration of study (Number of semesters)	6	
SWS (Total for all semesters)	76	
ASWS (Total for all semesters)	82.7	
ECTS (Total for all semesters)	180	
Winter Semester Start (Date, Note: possibly calendar week)	Calendar Week 40	
Winter semester end (Date, Note: possibly calendar week)	Calendar Week 5	
Start of summer semester (Date, Note: possibly calendar week)	Calendar Week 11	
End of semester (Date, Note: possibly calendar week)	Calendar Week 28	
WS Weeks	15	
SS weeks	15	
Mandatory semester abroad (Semester)	5th semester	
Language of Instruction (Specify)	German/ English	The percentage of specialized courses taught in English is 22,37 % of the total weekly class hours
Professional internship (Semester, duration in weeks per semester)	6th semester 500 hours	

2.2 Curriculum matrix

The curriculum matrix for the Bachelor's program in Industrial Engineering is presented below. The time commitment for supervising Bachelor's theses is not included in the following list of courses. For each supervised thesis, 0.2 SWS is allocated; that is, with 30 accredited student slots, this results in an additional ASWS workload of 6 ASWS. This brings the total ASWS workload to 88.7 ASWS over all 6 semesters, including Bachelor's thesis supervision.

The "Fundamentals of Economics" module in the third semester is offered jointly with the Bachelor's programs in Code & Digital Design, Drone Engineering, Energy & Sustainability Management, and Facility Management & Real Estate Management (full-time). The total number of accredited student slots for these programs requires a total of three parallel groups. This results in a group division factor of 0.6 for each participating program. With a workload of 4 SWS for this module, this corresponds to 2.4 ASWS.

The modules "Electrical Engineering" and "Electrical Engineering – Practical Skills" in the first semester are offered jointly with the bachelor's program in Energy & Sustainability Management. This results in a group division factor of 0.5. With 2 SWS in the "Electrical Engineering" module, this results in 1.0 ASWS. With 1.5 SWS in the "Electrical Engineering – Practical Skills" module, this results in 0.75 ASWS.

1. Semester

Course no.	Course title	LV-Typ	T	E	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
SPR1	Foreign Language I	ILV			4	1	4	60	SPR	6
vzELT1	Electrical Engineering (E)	VO	X	X	2	0.5	1.0	15.0	ELT	3
vzELT2	Electrical Engineering - Practical Session (E)	UE	X	X	1.5	0.5	0.75	11.25	ELT	2
vzFWW1	Mathematics 1	ILV	X		2	1	2	30	FWW	3
vzING1	Statics and Strength Theory	ILV	X		4	1	4	60	ING	5
vzMAB1	Technical Drawing	ILV	X		2	1	2	30	MAB	3
vzMAB.2	Computer Aided Technologies (CAx)	ILV	X		2	2	4	60	MAB	3
vzMAB3	Machine Elements	VO	X		4	1	4	60	MAB	5
Total line:					21.5		21.75	326.25		30
Course hours = Total WSH x course weeks					322.5					

2. Semester

Course no.	Course title	LV-Typ	T	E	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
SPR2	Foreign Language II	ILV			4	1	4	60	SPR	6
vzELT.3	Automatisation Techniques	VO	X		2	1	2	30	ELT	3
vzERL.4	Automation Techniques	UE	X		1.5	1	1.5	22.5	ELT	2
vzFWW2	Mathematics 2	ILV	X		3	1	3	45	FWW	4
vzGPP1	Manufacturing Technology and Materials Engineering	ILV	X		2.5	1	2.5	37.5	GPP	4
vzINF1	Coding & Data Management	ILV	X		2.5	1	2.5	37.5	INF	4
vzING2	Dynamics and Hydromechanics	ILV	X		2.5	1	2.5	37.5	ING	4
vzISK1	Presentation Techniques and Communication	ILV			1.5	1	1.5	22.5	ISK	3
Total line:					19.5		19.5	292.5		30
Course hours = Total WSH x course weeks					292.5					

3. Semester

Course no.	Course title	LV-Typ	T	E	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
FWW.3	Mathematics 3	ILV	X		3	1	3	45	FWW	4
vzING3	Thermodynamics	ILV	X		3	1	3	45	ING	5
vzMAB4	Mechanical and plant engineering	VO	X		2.5	1	2.5	37.5	MAB	4
vzMGM.1	Project Management (E)	ILV		X	1	1	1	15	MGM	2
vzOMT1	Smart Factory Planning (WP)*	ILV			2.5	1	2.5	37.5	OMT	5
vzPEE1	Design Project - Product Development (WP)*	ILV	X		2.5	1	2.5	37.5	PEE	5
vzPRA1	Practical Project I	PT	X		2	3	6	90	PRA	4
vzWIR.1	Fundamentals of Economics (E)	ILV		X	4	0.6	2.4	36.0	WIR	6
Total line:					18.0		20.4	306.0		30
Course hours = Total WSH x course weeks					270.0					

4. Semester

Course no.	Course title	LV-Typ	T	E	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
vzGPP2	Digital Product Creation	VO	X		2	1	2	30	GPP	3
vzINF.2	Digital Supply Chain (E)	ILV	X	X	2.5	1	2.5	37.5	INF	5
vzISK.2	Scientific writing	ILV			1	1	1	15	ISK	1.5
vzMGM2	Business Economics: Financing & Marketing (E)	ILV		X	2	1	2	30	MGM	4
vzMGM4	Innovation Management & Product Development (E)	ILV		X	2	1	2	30	MGM	4
vzOMT2	Information Systems in Production (WP) (WP)*	ILV			2	1	2	30	OMT	2.5
vzOMT3	Management & Leadership (E) (WP)*	ILV		X	2	1	2	30	OMT	4
vzPEE2	Information Systems in Product Development (WP) (WP)*	ILV	X		2	1	2	30	PEE	2.5
vzPEE3	R&D Management (WP)(E) (WP)*	ILV		X	2	1	2	30	PEE	4
vzPRA2	Practical Project 2	PT	X		2	3	6	90	PRA	4
vzWIR2	Introduction to Law	VO			1	1	1	15	WIR	2
Total line:					16.5		20.5	307.5		30.0
Course hours = Total WSH x course weeks					247.5					

5. Semester

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

6. Semester

Course no.	Course title	LV-Typ	T	E	WSH	No. of groups	ASWS	ALVS	MODUL	ECTS
v.BAS2	Bachelor Thesis	SE			0	1	0	0	BAS	6
vzBAS1	Bachelor Thesis Seminar 2:	SE			0.5	1	0.5	7.5	BAS	4
vzBPR	Internship	PT			0	1	0	0	BRP	20
Total line:					0.5		0.5	7.5		30
Course hours = Total WSH x course weeks					7.5					

Abbreviations	
E	Lecture in English language
ECTS	ECTS – Credit points
LV	Course
LVS	Course hour(s)
WSH	Weekly semester hour(s)
T	Lecture with technical background
WP	Elective subject

Summary curriculum data

Description	WSH	ASWS	ALVS	ECTS
Total number of courses over all semesters	76	82.65	1239.75	180
Total number of courses in 1st year of study	41	41.25	618.75	60
Total number of courses in 2nd year of study	34.5	40.9	613.5	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	53			81.5
Percentage of technical courses over all semesters based on WSH / ECTS	69.74 %			45.28 %
Total number of specialized courses in English over all semesters	17			30
Proportion of specialized courses in English over all semesters (Calculation excluding language courses)	22.37 %			16.67 %

2.3 Modularization

Module number:	Mechanical Engineering	Scope:	
MAB		15	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	1. Semester		
	3. Semester		
Level	1. Semester: First cycle, Bachelor / 1. Semester: First Cycle, Bachelor / 3. Semester: First cycle, Bachelor		
Previous knowledge	1. Semester: None / 1. Semester: not applicable / 3. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Technical Drawing /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 3</u> • Dobler, et al. (2007): Fachkunde Metall, 55. Aufl., Europa Lehrmittelverlag Haan • Frischherz (1987): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf • Burmester, et al. (2023): Fachkunde Metall, 59. Aufl., Europa Lehrmittelverlag Haan-Gruiten • Gomerlinger, et al. (2023): Tabellenbuch Metall, 49. Aufl., Europa Lehrmittelverlag Haan-Gruiten • Grollius (2023): Technisches Zeichnen für Maschinenbauer, 5. Aufl., Hanser Verlag München • Bender, Gericke (2021): Pahl/Beitz Konstruktionslehre, 9. Auflage, Springer Vieweg Berlin, Heidelberg		
	<u>Computer Aided Technologies (CAX) /ILV / LV-Nr: vzMAB.2 / 1.Semester / ECTS: 3</u> • Dobler, et al. (2007): Fachkunde Metall, 55. Aufl., Europa Lehrmittelverlag Haan • Frischherz (1987): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf • Vogel (2020): Einstieg in Solidworks, 5. Aufl.; Hanser Verlag München • Vogel (2021): Konstruieren mit SolidWorks, 9. Aufl., Hanser Verlag München • Huber (2026): SolidWorks 1, Mechanical Design, 1. Aufl., Springer Vieweg Berlin, Heidelberg • Planchard, et al. (2026): Official Guide to Certified SOLIDWORKS Associate Exams: CSWA, CSWA-SD, CSWA-S, CSWA-AM (SOLIDWORKS 2023 - 2026), SDC Publications		
	<u>Machine Elements /VO / LV-Nr: vzMAB3 / 1.Semester / ECTS: 5</u> • Dobler, et al. (2007): Fachkunde Metall, 55. Aufl., Europa Lehrmittelverlag Haan • Wittel, et al. (2009): Roloff/Matek Maschinenelemente: Normung, Berechnung, Gestaltung, 19. Aufl., Vieweg+Teubner Verlag Wiesbaden • Frischherz (2006): Tabellenbuch für Metalltechnik, Bohmann Fachbuch im Verlag Jugend & Volk Wiener Neudorf • Künne (2007): Köhler/Rögnitz Maschinenteile 1 und 2, 10. Aufl., Vieweg+Teubner Verlag Wiesbaden • Raich (2005): Metalltechnik / Konstruktionsgrundlagen für Metalltechnik, Jugend & Volk Verlag Wiener Neudorf • Künne (2007): Köhler/Rögnitz Maschinenteile 1 und 2, 10. Aufl., Vieweg+Teubner Verlag Wiesbaden		
	<u>Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 4</u> • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan • Dubbel (2001): Taschenbuch für den Maschinenbau, 20. Aufl., Springer Verlag Berlin • Franzke (1990): Einführung in die Maschinen- und Anlagentechnik Band 1 & 2, Springer Verlag Berlin • Hering (2002): Grundwissen des Ingenieurs, 13. Aufl., Fachbuchverlag Leipzig • Kalide (2010): Energieumwandlung in Kraft- und Arbeitsmaschinen, 10. Aufl., Carl Hanser Verlag München • Koether (2007): Fertigungstechnik für Wirtschaftsingenieure, 3. Aufl., Carl Hanser Verlag München		
Acquisition of skills	<u>Technical Drawing /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 3</u> The participants are able to: • read standard-compliant workpiece drawings and correctly interpret display and dimension details. • create basic part drawings of simple bodies manually. • independently extract information from table books and apply it to their own drawing representations. • independently present machine elements in accordance with the applicable standards.		
	<u>Computer Aided Technologies (CAX) /ILV / LV-Nr: vzMAB.2 / 1.Semester / ECTS: 3</u> The participants are able to: • 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		
	<u>Machine Elements /VO / LV-Nr: vzMAB3 / 1.Semester / ECTS: 5</u>		

	The participants are able to: • analyze, select and apply tolerances and fits • analyze and calculate simple static and dynamic component loads. • design simple components for shape and fatigue strength. • identify and calculate stresses in simple adhesive, solder, weld, rivet and screw connections. • design and dimension simple adhesive, solder, weld, rivet and bolt connections. • select, design and dimension simple shaft-hub connections.
	<u>Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 4</u>
	The Participants are able to: • differentiate fundamental functioning between power generating machinery and work machines, give examples and identify the important application areas. • identify the fundamental structure of machines and plants, categorise fundamental interpretations, if necessary calculate, and identify the strengths and weaknesses of the variants. • analyse and assess practical examples.

Acquisition of skills	• know companies from the machine and plant construction industry.
Course contents	<u>Technical Drawing /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 3</u> • Preparation of workpiece drawings with standard-compliant view arrangement, cuts, dimensions, surface and tolerance specifications, workpiece details • Creation of parts lists and interpretation of exploded drawings Standard-compliant representation of basic machine elements: • Representation of threads, countersinks • Representation of screw, bolt and pin connections • Representation of shaft-hub connections, bearings, gear wheels
	<u>Computer Aided Technologies (CAx) /ILV / LV-Nr: vzMAB.2 / 1.Semester / ECTS: 3</u> • Softwarestructure, function of the CAD-System • 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
	<u>Machine Elements /VO / LV-Nr: vzMAB3 / 1.Semester / ECTS: 5</u> Tolerances and fits: • Basic concepts of tolerances and fits • Tolerance and fit selection, tolerance systems Fundamentals of the calculation methods: • Simple stress types: Tensile and compressive stress, surface pressure, bending and torsion • Static and dynamic stress types • Durability and design strength, permissible stresses and safety Connecting elements in mechanical engineering: • Functions and design variants of bolts, pins, screws and rivets • Fundamentals of soldering, gluing and welding connections • Design rules and calculation bases for feather keys, spline shafts, polygon connections, serrations, press fits, clamping and spline connections, clamping element connections
	<u>Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 4</u> • Power and working machines, classification and history • Hydropower plants: Low, medium and high pressure plants, Hydropower machines • Pumps: Displacement, centrifugal and vacuum pumps. Pump systems • Thermal plants: Steam generators, steam and gas turbines, power plant construction forms • Compressors: Compressors with displacement effect, turbo compressors • Internal combustion engines: Two-stroke and four-stroke, petrol and diesel engines. • Conveying systems: Lifting machines (winches, cranes, elevators), continuous conveyors and floor conveyors • Sustainability and renewable Energies
Teaching and learning methods	<u>Technical Drawing /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 3</u> Integrated course
	<u>Computer Aided Technologies (CAx) /ILV / LV-Nr: vzMAB.2 / 1.Semester / ECTS: 3</u> Integrated lectures
	<u>Machine Elements /VO / LV-Nr: vzMAB3 / 1.Semester / ECTS: 5</u> Lecture
	<u>Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 4</u> Integrated course
Evaluation Methods Criteria	<u>Technical Drawing /ILV / LV-Nr: vzMAB1 / 1.Semester / ECTS: 3</u> Portfolio exam
	<u>Computer Aided Technologies (CAx) /ILV / LV-Nr: vzMAB.2 / 1.Semester / ECTS: 3</u> Portfolio exam
	<u>Machine Elements /VO / LV-Nr: vzMAB3 / 1.Semester / ECTS: 5</u> Portfolio exam
	<u>Mechanical and plant engineering /VO / LV-Nr: vzMAB4 / 3.Semester / ECTS: 4</u> Portfolio exam Presentation

Module number:	Electronics	Scope:	
ELT		10	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	1. Semester		
	2. Semester		
Level	1. Semester: First cycle, Bachelor / 2. Semester: First cycle, Bachelor		
Previous knowledge	1. Semester: not applicable / 2. Semester: None		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Electrical Engineering (E) /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3</u> • Hagmann (2006): Grundlagen der Elektrotechnik, 12. Aufl., AULA-Verlag Graz • Bieneck (2005): Elektro T, Grundlagen der Elektrotechnik, Lehrbuch: Informations- und Arbeitsbuch für Schüler und Studenten der elektrotechnischen Berufe, Holland & Josenhans Stuttgart • Orłowski (2008): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 7. Aufl., Springer Verlag Berlin • Stiller (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag München		
	<u>Electrical Engineering - Practical Session (E) /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 2</u> • Hagmann (2006): Grundlagen der Elektrotechnik, 12. Aufl., AULA-Verlag Graz • Bieneck (2005): Elektro T, Grundlagen der Elektrotechnik, Lehrbuch: Informations- und Arbeitsbuch für Schüler und Studenten der elektrotechnischen Berufe, Holland & Josenhans Stuttgart • Orłowski (2008): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 7. Aufl., Springer Verlag Berlin • Stiller (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag München		
	<u>Automatisation Techniques /VO / LV-Nr: vzELT.3 / 2.Semester / ECTS: 3</u> • Stiller, Christoph (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag Herzogenrath • Orłowski, Peter (2011): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 9. Aufl., Springer Verlag Berlin		
	<u>Automation Techniques /UE / LV-Nr: vzERL.4 / 2.Semester / ECTS: 2</u> • Stiller, Christoph (2006): Grundlagen der Mess- und Regelungstechnik, Shaker Verlag Herzogenrath • Orłowski, Peter (2011): Praktische Regeltechnik: Anwendungsorientierte Einführung für Maschinenbauer und Elektrotechniker, 9. Aufl., Springer Verlag Berlin		
Acquisition of skills	<u>Electrical Engineering (E) /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3</u> The participants are able to: • explain electrical quantities and units. • describe the basic laws of electrical engineering. • read electrical or electronic circuit diagrams. • calculate currents, voltages and resistances in electrical circuits. • explain the difference between direct current, alternating current and three-phase current. • describe the operation of electrical systems and machines. • distinguish between electrical protective measures. • explain electronic components.		
	<u>Electrical Engineering - Practical Session (E) /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 2</u> The participants are able to: • use common electrical measuring instruments (e.g. digital multimeters, oscilloscopes, ...) correctly and safely. • understand electrical or electronic circuit diagrams. • measure and evaluate current, voltage and resistance in electrical circuits. • identify basic laws of electrical engineering. • construct and analyze electrical and electronic circuits according to circuit diagrams. • demonstrate the behavior of capacitor and coil in the AC circuit. • distinguish and select electronic components. • identify and select circuits for electrical machines (e.g. three-phase asynchronous motors).		
	<u>Automatisation Techniques /VO / LV-Nr: vzELT.3 / 2.Semester / ECTS: 3</u>		

	The participants: • 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 <u>Automation Techniques /UE / LV-Nr: vzERL.4 / 2.Semester / ECTS: 2</u> The participants are able to: • use various measuring instruments for measuring non-electrical quantities correctly and safely • use sensors, positioning elements and actuators
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Acquisition of skills	• carry out programming for automation • modify bus systems (networks). • operate robot systems
Course contents	<u>Electrical Engineering (E) /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3</u> • 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
	<u>Electrical Engineering - Practical Session (E) /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 2</u> • Measurement of current, voltage and resistance • Interpretation of the fundamental electrotechnical laws • Series and parallel connection • Capacitor and coil in AC circuit • Use and switching of electrical equipment and electrical machines • Structure of basic logic functions with integrated circuits (IC) • Electronic components
	<u>Automatisation Techniques /VO / LV-Nr: vzELT.3 / 2.Semester / ECTS: 3</u> • 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
	<u>Automation Techniques /UE / LV-Nr: vzERL.4 / 2.Semester / ECTS: 2</u> • 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	<u>Electrical Engineering (E) /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3</u> Lecturer
	<u>Electrical Engineering - Practical Session (E) /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 2</u> Exercise
	<u>Automatisation Techniques /VO / LV-Nr: vzELT.3 / 2.Semester / ECTS: 3</u> Lecture
	<u>Automation Techniques /UE / LV-Nr: vzERL.4 / 2.Semester / ECTS: 2</u> Exercise
Evaluation Methods Criteria	<u>Electrical Engineering (E) /VO / LV-Nr: vzELT1 / 1.Semester / ECTS: 3</u> Portfolio exam
	<u>Electrical Engineering - Practical Session (E) /UE / LV-Nr: vzELT2 / 1.Semester / ECTS: 2</u> Portfolio exam
	<u>Automatisation Techniques /VO / LV-Nr: vzELT.3 / 2.Semester / ECTS: 3</u> Exam
	<u>Automation Techniques /UE / LV-Nr: vzERL.4 / 2.Semester / ECTS: 2</u>

	Report
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Module number:	Foreign Language	Scope:	
SPR		12	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	1. Semester		
	2. Semester		
Level	1. Semester: A1 bis C2 (GER) / 2. Semester: A1 bis C2 (GER)		
Previous knowledge	1. Semester: Beginner Modules: - Chinese, German, Spanish at levels A1/A2 with target level A2: no prior knowledge permitted. Upper Beginner Modules: - German at levels A2/B1 with target level B1.1: solid prior knowledge at A1 level required. Advanced Modules: - Business German, Business French, Business Italian, Business Spanish at levels B1/B2 with target level B2.1: solid prior knowledge at A2 level required. - Business English for Academic and Professional Purposes at levels B2+/C1 with target level C1: prior knowledge at B2 level or completion of an English bridging/preparatory course required. - Business English for Academic and Professional Purposes at levels C1/C2 with target level C2.1: solid prior knowledge at B2.2 level required. / 2. Semester: Beginner Modules: - Chinese, German, Spanish at levels A1/A2 with target level A2: no prior knowledge permitted. Upper Beginner Modules: - German at levels A2/B1 with target level B1.1: solid prior knowledge at A1 level required. Advanced Modules: - Business German, Business French, Business Italian, Business Spanish at levels B1/B2 with target level B2.1: solid prior knowledge at A2 level required. - Business English for Academic and Professional Purposes at levels B2+/C1 with target level C1: prior knowledge at B2 level or completion of an English bridging/preparatory course required. - Business English for Academic and Professional Purposes at levels C1/C2 with target level C2.1: solid prior knowledge at B2.2 level required.		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6</u> Textbook to be arranged; authentic materials, such as articles from English-language magazines (including professional journals), newspapers, and online media source		
	<u>Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6</u> Textbook to be arranged; authentic materials, such as articles from English-language magazines (including professional journals), newspapers, and online media source		
Acquisition of skills	<u>Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6</u>		

	The participants: • (A1 – Beginner) Can understand and use familiar, everyday expressions and very simple sentences aimed at satisfying concrete needs. • (A1 – Beginner) Can introduce themselves and others, ask people questions about personal details – e.g., where they live, people they know, and things they have – and can respond to such questions. • (A1 – Beginner) Can communicate in a simple way if the interlocutor speaks slowly and clearly and is willing to help. • (A2 – Elementary) Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g., personal and family information, shopping, work, local area) • (A2 – Elementary) Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. • (A2 – Elementary) Can describe in simple terms aspects of their background, immediate environment, and matters in areas of immediate need. • (B1 – Intermediate) Can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc. • (B1 – Intermediate) Can deal with most situations likely to arise while travelling in an area where the language is spoken and can produce simple connected text on topics that are familiar or of personal interest. • (B1 – Intermediate) Can describe experiences and events, dreams, hopes, and ambitions and briefly give reasons and explanations for opinions and plans. • (B2 – Upper Intermediate) Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in their field of specialization. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. • (C1 – Advanced) Can understand a wide range of demanding, longer texts, and recognize implicit meaning. • (C1 – Advanced) Can express themselves fluently and spontaneously without much obvious searching for expressions and can use the language flexibly and effectively for social, academic, and professional purposes • (C1 – Advanced) Can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors, and cohesive devices. • (C2 – Near-native proficiency) Can understand with ease virtually everything heard or read. • (C2 – Near-native proficiency) Can summarize information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. • (C2 – Near-native proficiency) Can express themselves spontaneously, very fluently, and precisely, differentiating finer shades of meaning even in more complex situations.
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Acquisition of skills	<u>Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6</u> The participants: • (A1 – Beginner) Can understand and use familiar, everyday expressions and very simple sentences aimed at satisfying concrete needs. • (A1 – Beginner) Can introduce themselves and others, ask people questions about personal details – e.g., where they live, people they know, and things they have – and can respond to such questions. • (A1 – Beginner) Can communicate in a simple way if the interlocutor speaks slowly and clearly and is willing to help. • (A2 – Elementary) Can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g., personal and family information, shopping, work, local area) • (A2 – Elementary) Can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. • (A2 – Elementary) Can describe in simple terms aspects of their background, immediate environment, and matters in areas of immediate need. • (B1 – Intermediate) Can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc. • (B1 – Intermediate) Can deal with most situations likely to arise while travelling in an area where the language is spoken and can produce simple connected text on topics that are familiar or of personal interest. • (B1 – Intermediate) Can describe experiences and events, dreams, hopes, and ambitions and briefly give reasons and explanations for opinions and plans. • (B2 – Upper Intermediate) Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in their field of specialization. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. • (C1 – Advanced) Can understand a wide range of demanding, longer texts, and recognize implicit meaning. • (C1 – Advanced) Can express themselves fluently and spontaneously without much obvious searching for expressions and can use the language flexibly and effectively for social, academic, and professional purposes • (C1 – Advanced) Can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors, and cohesive devices. • (C2 – Near-native proficiency) Can understand with ease virtually everything heard or read. • (C2 – Near-native proficiency) Can summarize information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. • (C2 – Near-native proficiency) Can express themselves spontaneously, very fluently, and precisely, differentiating finer shades of meaning even in more complex situations.
Course contents	<u>Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6</u> A1 – Beginner Understand and use familiar, everyday expressions and very simple sentences aimed at satisfying concrete needs. Introduce themselves and others, ask people questions about personal details – e.g., where they live, the people they know, or the things they have – and respond to such questions. Communicate in a simple way if the conversation partners speak slowly and clearly and are prepared to help. A2 – Elementary Knowledge Understand sentences and frequently used expressions related to areas of most immediate relevance (e.g., personal and family information, shopping, work, local environment). Communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Describe in simple terms their background, education, immediate environment, and matters in areas of immediate need. B1 – Intermediate Language Use Use clear standard language in academic and business contexts and communicate about familiar topics related to work, school, leisure, etc., applying relevant conversational skills. Express themselves simply and coherently on familiar topics and areas of personal interest. Report on experiences and events, describe dreams, hopes, and ambitions, and briefly give reasons and explanations for opinions and plans. B2 – Independent Language Use Express themselves on the main ideas of complex texts on both concrete and abstract topics in academic and business contexts and participate in technical discussions in their own field of specialization. Communicate with such a degree of fluency and spontaneity that normal conversation with native speakers is quite possible without strain for either party. Express themselves clearly and in detail on a wide range of subjects, explain a viewpoint on a topical issue, and outline the advantages and disadvantages of various options. C1 – Advanced Language Proficiency Understand a wide range of demanding, longer texts and recognize implicit meanings. Use the language effectively and flexibly in academic and business contexts and express themselves fluently and spontaneously without much obvious searching for words. Produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors, and cohesive devices. C2 – Near-Native Proficiency Communicate effortlessly in all language situations. Summarize information from various written and spoken sources and reconstruct arguments and accounts in a coherent presentation. Express themselves spontaneously, very fluently, and precisely, differentiating finer shades of meaning even in more complex situations. <u>Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6</u>

	A1 – Beginner Understand and use familiar, everyday expressions and very simple sentences aimed at satisfying concrete needs. Introduce themselves and others, ask people questions about personal details – e.g., where they live, the people they know, or the things they have – and respond to such questions. Communicate in a simple way if the conversation partners speak slowly and clearly and are prepared to help. A2 – Elementary Knowledge Understand sentences and frequently used expressions related to areas of most immediate relevance (e.g., personal and family information, shopping, work, local environment). Communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. Describe in simple terms their
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Course contents	background, education, immediate environment, and matters in areas of immediate need. B1 – Intermediate Language Use Use clear standard language in academic and business contexts and communicate about familiar topics related to work, school, leisure, etc., applying relevant conversational skills. Express themselves simply and coherently on familiar topics and areas of personal interest. Report on experiences and events, describe dreams, hopes, and ambitions, and briefly give reasons and explanations for opinions and plans. B2 – Independent Language Use Express themselves on the main ideas of complex texts on both concrete and abstract topics in academic and business contexts and participate in technical discussions in their own field of specialization. Communicate with such a degree of fluency and spontaneity that normal conversation with native speakers is quite possible without strain for either party. Express themselves clearly and in detail on a wide range of subjects, explain a viewpoint on a topical issue, and outline the advantages and disadvantages of various options. C1 – Advanced Language Proficiency Understand a wide range of demanding, longer texts and recognize implicit meanings. Use the language effectively and flexibly in academic and business contexts and express themselves fluently and spontaneously without much obvious searching for words. Produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors, and cohesive devices. C2 – Near-Native Proficiency Communicate effortlessly in all language situations. Summarize information from various written and spoken sources and reconstruct arguments and accounts in a coherent presentation. Express themselves spontaneously, very fluently, and precisely, differentiating finer shades of meaning even in more complex situations.
Teaching and learning methods	<u>Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6</u> Blended Learning <u>Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6</u> Blended Learning
Evaluation Methods Criteria	<u>Foreign Language I /ILV / LV-Nr: SPR1 / 1.Semester / ECTS: 6</u> Portfolio exam <u>Foreign Language II /ILV / LV-Nr: SPR2 / 2.Semester / ECTS: 6</u> Portfolio exam

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

	• Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 1, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 2, 13. Aufl., Vieweg+Teubner Verlag Wiesbaden • Papula (2011): Mathematik für Ingenieure und Naturwissenschaftler, Band 3, 6. Auflage.- Vieweg+Teubner Verlag Wiesbaden • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 1: Grundlagen, 13. Aufl., NWB Verlag Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 2: Differenzi-al- und Integralrechnung, 13. Aufl., NWB Verlag Herne • Schwarze (2010): Mathematik für Wirtschaftswissenschaftler - Band 3: Lineare Algebra, Lineare Optimierung und Graphentheorie, 13. Aufl., NWB Verlag Herne • Schwarze (2003): Mathematik für Wirtschaftswissenschaftler – Elementare Grundlagen für Studienanfänger, Kapitel 1 bis 10, 7. Aufl., NWB Verlag Herne • Stingl (2009): Mathematik für Fachhochschulen: Technik und Informatik, 8. Aufl., Carl Hanser Verlag München • Tietze (2000): Einführung in die Angewandte Wirtschafts-Mathematik, 9. Aufl., Vieweg+Teubner Verlag Wiesbaden • Janssen, Laatz (2007): Statistische Datenanalyse mit SPSS für Windows, 6. Aufl., Springer Verlag Berlin • Brosius (2002): SPSS 11, Verlag Moderne Industrie Bonn • Bourier (2014): Beschreibende Statistik: Praxisorientierte Einführung, 12. Aufl., Springer Gabler Verlag Wiesbaden • Jeske (2003): Spaß mit Statistik: Aufgaben, Lösungen und Formeln für Statistik, 4. Aufl., Oldenbourg Wissenschaftsverlag München • Mosler, Schmid (2008): Wahrscheinlichkeitsrechnung und schließende Statistik, 3. Aufl., Springer Verlag Berlin • Mosler, Schmid (2009): Deskriptive Statistik und Wirtschaftsstatistik, 4. Aufl., Springer Verlag Berlin
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Acquisition of skills	<u>Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3</u> The participants 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.
	<u>Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4</u> The participants 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.
	<u>Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4</u> The participants can in simple cases, 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	<u>Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3</u> • Equations: linear, quadratic, system of linear equations, matrices and determinants • Functions: Linear functions, polynomials, trigonometric functions, exponential functions and logarithms • Vector calculus • Differential calculus in a variable: Derivation rules, curve discussions, extreme value tasks, Taylor series, Newton methods • Integral calculation in one variable: Fundamental theory of integral calculus, integration techniques
	<u>Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4</u> Differential calculus in several variables: • Extreme value tasks with and without constraints technical applications, nonauthentic integrals, numerical integration • Complex numbers and functions Important differential equations (DGI): • General information about linear and nonlinear DGI, DGI 1st order with separated variables, linear DGI 1st order with constant coefficients and technical applications, linear DGL 2nd order with constant coefficients and vibration problems
	<u>Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4</u> • Statistics: Descriptive Statistics: Characteristics, frequency, mean values, scatter measures, regression, correlation, time series • Inductive statistics: Elements of probability theory, random variables and their distribution, forecasting, estimation methods, hypothesis tests
Teaching and learning methods	<u>Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3</u> Integrated Course
	<u>Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4</u> Integrated course
	<u>Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4</u> ILV
Evaluation Methods Criteria	<u>Mathematics 1 /ILV / LV-Nr: vzFWW1 / 1.Semester / ECTS: 3</u> Exam
	<u>Mathematics 2 /ILV / LV-Nr: vzFWW2 / 2.Semester / ECTS: 4</u> Exam
	<u>Mathematics 3 /ILV / LV-Nr: FWW.3 / 3.Semester / ECTS: 4</u> Exam

Module number:	Engineering Science	Scope:	
ING		14	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	1. Semester		
	2. Semester		
	3. Semester		
Level	1. Semester: First cycle, Bachelor / 2. Semester: First cycle, Bachelor / 3. Semester: First cycle, Bachelor		
Previous knowledge	1. Semester: not applicable / 2. Semester: not applicable / 3. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 5</u> - Assmann (2009): Technische Mechanik Bd. 1: Statik, 19. Aufl., Oldenbourg Verlag München - Assmann (2013): Technische Mechanik Bd. 2: Festigkeitslehre, 18. Aufl., Oldenbourg Verlag München - Böge (2013): Technische Mechanik: Statik – Reibung – Dynamik – Festigkeitslehre - Fluidmechanik, 30. Aufl., Springer Vieweg Verlag Wiesbaden - Böge (2013): Aufgabensammlung Technische Mechanik, 21. Aufl., Springer Vieweg Verlag Wiesbaden - Gross (2013): Technische Mechanik 1: Statik, 12. Aufl., Springer Vieweg Verlag Wiesbaden - Gross (2014): Technische Mechanik 2: Elastostatik, 12. Aufl., Springer Vieweg Verlag Wiesbaden		
	<u>Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 5</u> - Cerbe, Wilhelms (2013): Technische Thermodynamik: Theoretische Grundlagen und praktische Anwendungen, 17. Aufl., Carl Hanser Verlag München - Baehr (2005): Thermodynamik: Grundlagen und technische Anwendungen, 12. Aufl., Springer Vieweg Verlag Wiesbaden - Doering, Schedwill, Dehli (2012): Grundlagen der technischen Thermodynamik, 7. Aufl., Springer Vieweg Verlag Wiesbaden - Berties (1996): Übungsbeispiele aus der Wärmelehre, 20. Aufl., Fachbuchverlag Leipzig		
	<u>Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4</u> - Assmann (2010): Technische Mechanik Bd. 3 T: Kinematik und Kinetik, Oldenbourg Wissenschaftsverlag München - Böswirth (2007): Technische Strömungslehre: Lehr- und Übungsbuch, 7. Aufl., Vieweg+Teubner Verlag Wiesbaden - Bohl, Elmendorf (2008): Technische Strömungslehre, 14. Aufl., Vogel Business Media Würzburg - Böge (2011): Technische Mechanik: Statik – Dynamik – Fluidmechanik – Festigkeitslehre, 29. Aufl., Vieweg+Teubner Verlag Wiesbaden - Junge (2011): Einführung in die Technische Strömungslehre, Fachbuchverlage Leipzig Mayr (2012): Technische Mechanik: Statik – Kinematik – Kinetik – Schwingungen – Festigkeitslehre, 7. Aufl., Carl Hanser Verlag München - Richard, Sander (2008): Technische Mechanik. Dynamik – effektive und anwendungsnah, Vieweg+Teubner Verlag Wiesbaden		
Acquisition of skills	<u>Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 5</u> The participants are able to: - analyze systems of forces and calculate unknown forces by size and direction. - 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. - apply the basic relationships of strength theory to simple machine parts and to perform cross-sectional dimensioning. - make essential statements on strength hypotheses.		
	<u>Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 5</u> The participants are able to: - explain the basic principles and laws of thermodynamics. - understand the use of principles and laws for the design of machinery and equipment. - explain the procedure for the evaluation and comparison of real processes on the basis of comparison processes. - apply the principles and laws of thermodynamics to concrete problems (evaluation/design). - apply the principles and laws to machines and plants. - mathematically analyze and evaluate real processes on the basis of comparative processes.		
	<u>Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4</u>		

	Through the "Dynamics" component, the participants are able to: • Analyze physical problems in the field of dynamics independently, • Develop solution methods and devise solutions. • Reduce technical systems of a mechanical nature to the underlying physical principles. • Apply mathematical methods to solve physical problems. • Independently identify problems in technical systems, develop physical models for solutions and estimate the feasibility of physical processes. • Describe, present and pass on knowledge gained. Through the "Hydromechanics" component, the participants are able to: • Describe the essential material properties of liquids. • Determine and calculate the forces acting on geometric surfaces due to hydrostatic pressure. • Calculate the momentum of simple geometric bodies. • Apply and calculate the continuity and energy equations to simple hydraulic systems.
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Acquisition of skills	- 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.
Course contents	<u>Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 5</u> - Power systems and balance on the rigid body - Bearing reactions, focus - Rod, beam, frame - internal forces - Level framework - Adhesion and friction on machine parts - Stress types: Tension/compression, shear, surface pressure, moment of area and resistance, bending, torsion - Change of shape - General information about forces; breakdown, resultant, reduction, moment of a force, distributed forces - Cutting methods, equilibrium in central and general force groups - Coulomb friction - Center of gravity & area torques - Internal forces on rod and beam - Stress state, principal stresses, Hooke's law - Tensile/compressive stresses, shear stresses, bending stresses, torsion, deformations - Strength hypotheses, composite loading
	<u>Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 5</u> - Main theorems of thermodynamics - Equation of state and change of state of ideal gases - Cyclic processes - Water and steam - Thermal machines - Heat transfer, combustion
	<u>Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4</u> Dynamics component: - Kinematics of the mass point; description of the movement of the mass point, velocity, acceleration, relative movement - Kinetics of the mass point; Newtonian law, momentum theorem, spin theorem, energy conservation theorem - Kinematics and kinetics of the rigid body: Kinematics of the general motion of a rigid body, mass moment of inertia, impulse theorem, twist theorem, energy conservation theorem, systems of rigid bodies - Impact processes; straight central impact, eccentric impact - Vibrations; classification of vibrations, free and forced vibrations, damped and undamped vibrations, resonance Hydromechanics component: - Substance properties of liquids and gases - Hydrostatic pressure - Buoyancy - Equation of continuity - Energy equation - Pipe hydraulics - Outflow from containers - Principle of linear momentum - Principle of angular momentum - Laws of similarity
Teaching and learning methods	<u>Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 5</u> integrated Lecture
	<u>Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 5</u> integrated Lecture
	<u>Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4</u> Integrated course
Evaluation Methods Criteria	<u>Statics and Strength Theory /ILV / LV-Nr: vzING1 / 1.Semester / ECTS: 5</u> Exam
	<u>Thermodynamics /ILV / LV-Nr: vzING3 / 3.Semester / ECTS: 5</u> Exam Presentation
	<u>Dynamics and Hydromechanics /ILV / LV-Nr: vzING2 / 2.Semester / ECTS: 4</u> Exam Presentation Project

Module number:	Basics in Product & Production	Scope:	
GPP		7	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	2. Semester		
	4. Semester		
Level	2. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	2. Semester: not applicable / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3</u> • 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		
	<u>Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4</u> • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan • Schmid, et al. (2013): Produktionsorganisation: Qualitätsmanagement und Produktpolitik, 8. Aufl., EUROPA Lehrmittelverlag Haan • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München		
Acquisition of skills	<u>Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3</u> The participants are able to: • understand the entire process of digital product creation and its individual elements. • depending on the requirements of the product to be developed, combine the elements of product creation into a meaningful process. • have an overview of the technologies so as to be able to solve the problem in the individual process steps.		
	<u>Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4</u> The participants are able to: • identify modern manufacturing processes with advantages/disadvantages and limitations. • optimize the cutting parameters during machining. • analyze and define the use of handling technology. • identify procedures and methods of quality assurance/improvement and apply selected methods. • draw up work plans for production.		
Course contents	<u>Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3</u> • 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		
	<u>Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4</u>		

	Production engineering: • Overview of manufacturing processes in the fields of prototyping, forming, separating, joining, changing material properties and coating. As well as additional new processes like 3D Printing. • Machining: Turning, milling, drilling, grinding • 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
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Course contents	Production engineering: • Manual and automated handling technology in the production area, in the special construction, programming and application areas of industrial robots • Fundamentals of fixture construction: Positioning, clamping devices and additional functions of turning, milling, drilling and welding devices • Processes and methods for increasing productivity by optimizing the cutting values • Procedures and methods for quality assurance and improvement as well as for ongoing quality control in the production area Work planning: • Tasks of work planning • Schedule creation Materials engineering: • Internal structure of metallic materials and plastics • Basic principles of alloy formation and description using phase diagrams • Properties of iron and iron alloys and of selected non-ferrous metals • Properties, characteristics and applications of important steel groups, non-ferrous metals and plastics • Methods of static and dynamic material testing
Teaching and learning methods	<u>Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3</u> integrated Lecture
	<u>Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4</u> integrated Lecturer
Evaluation Methods Criteria	<u>Digital Product Creation /VO / LV-Nr: vzGPP2 / 4.Semester / ECTS: 3</u> Portfolio exam
	<u>Manufacturing Technology and Materials Engineering /ILV / LV-Nr: vzGPP1 / 2.Semester / ECTS: 4</u> Exam

Module number:	Information Technology	Scope:	
INF		9	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	2. Semester		
	4. Semester		
Level	2. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	2. Semester: not applicable / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Coding & Data Management /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 4</u> - Braun, Esswein, Greifenberg (2006): Einführung in die Programmierung; Springer - Herold, Wurz, Wohlrab, Hopf (2017): Einführung in die Informatik; Person - Wolf (2016): Grundkurs C, 2. Auflage, Rheinwerk - 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 München. - Gronwald (2015) Integrierte Business-Informationssysteme: ERP, SCM, CRM, BI, Big Data Analytics - Prozesssimulation, Rollenspiel, Serious Gaming (eXa-men.press), Springer Vieweg Verlag. - Alpar, Alt (2014), Anwendungsorientierte Wirtschaftsinformatik: Strategische Planung, Entwicklung und Nutzung von Informationssystemen, 7. Aufl.Springer Verlag		
	<u>Digital Supply Chain (E) /ILV / LV-Nr: vzINF.2 / 4.Semester / ECTS: 5</u> - 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 Wertstromdesign: Der Weg zur schlanken Fabrik, 2. Aufl., Springer Verlag Berlin - Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München - Frick (2007): Grundkurs SAP ERP: Geschäftsprozessorientierte Einführung Mit Durchgehendem Fallbeispiel, Vieweg+Teubner Verlag Wiesbaden - Gronau (2010): Enterprise Resource Planning: Architektur, Funktionen und Management von ERP-Systemen, Oldenbourg Wissenschaftsverlag München - Kurbel (2010): Enterprise Resource Planning und Supply Chain Management in der Industrie, Oldenbourg Wissenschaftsverlag München - Scheer (1998): ARIS vom Geschäftsprozess zum Anwendungssystem, 3. Aufl., Springer Verlag Berlin		
Acquisition of skills	<u>Coding & Data Management /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 4</u> The participants are able to: - read software programs - program and test simple software on their own - understand the software development process - understand the importance of software for product development and production		
	<u>Digital Supply Chain (E) /ILV / LV-Nr: vzINF.2 / 4.Semester / ECTS: 5</u> The participants are able to: - identify remits and contents of logistics. - explain the meaning of processing time and stock. - identify key figures to measure the logistics performance, logistics costs and flexibility. - describe concepts, their potential use and their advantages / disadvantages and limits. - define targets based on key requirements and select adequate concepts for them. - work on basic tasks of logistics on their own. - understand the technical structure of an information system - identify ERP enterprise architecture and terminology - understand the complexity of an integrated ERP system and the most important interfaces - understand the impact of AI and know valuable Use Cases.		
Course contents	<u>Coding & Data Management /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 4</u>		

	• 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) • Understanding and differentiating the structure of information systems • Identification of interfaces to mobile devices • Cloud computing • Data security • Testing • Use and Inegration of AI with ERP Systems • Role of AI with new Business Processes
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Course contents	<u>Digital Supply Chain (E) /ILV / LV-Nr: vzINF.2 / 4.Semester / ECTS: 5</u> Logistics: • 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 Information Systems: • 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	<u>Coding & Data Management /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 4</u> Integrated course
	<u>Digital Supply Chain (E) /ILV / LV-Nr: vzINF.2 / 4.Semester / ECTS: 5</u> Lecture
Evaluation Methods Criteria	<u>Coding & Data Management /ILV / LV-Nr: vzINF1 / 2.Semester / ECTS: 4</u> Portfolio exam Exam
	<u>Digital Supply Chain (E) /ILV / LV-Nr: vzINF.2 / 4.Semester / ECTS: 5</u> Portfolio exam

Module number:	Individual and Social Competences	Scope:	
ISK		4.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	2. Semester		
	4. Semester		
Level	2. Semester: First cycle, Bachelor / 4. Semester: Bachelor		
Previous knowledge	2. Semester: not applicable / 4. Semester: none		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Presentation Techniques and Communication /ILV / LV-Nr: vzISK1 / 2.Semester / ECTS: 3</u> • Berkun (2010): Bekenntnisse eines Redners – oder die Kunst, gehört zu werden, 1. Aufl., O'Reilly Verlag • Gallo (2011): Überzeugen wie Steve Jobs: Das Erfolgsgeheimnis seiner Präsentationen, 1. Aufl., Ariston Verlag • Thiele (2010): Präsentieren ohne Stress: Wie Sie Lampenfieber in Auftrittsfreude verwandeln, 1. Aufl., Frankfurter Allgemeine Buch • Tracy, Scheelen (2008): Speak to Win – Wie Sie zu einem ausgezeichneten Redner werden vor großem und kleinem Publikum, 1. Aufl., GABAL Verlag • Schulz von Thun (2010): Miteinander reden, Rowohlt Verlag Leipzig • Rosenberg (2012): Gewaltfreie Kommunikation: Eine Sprache des Lebens, 10. Aufl., Junfermann Verlag Paderborn		
	<u>Scientific writing /ILV / LV-Nr: vzISK.2 / 4.Semester / ECTS: 1.5</u> • Sandberg (2013): Wissenschaftliches Arbeiten von Abbildung bis Zitat, 2. Aufl., Oldenbourg Verlag München • Bansch (2003): Wissenschaftliches Arbeiten: Seminar- und Diplomarbeiten, 8.Aufl., Oldenbourg Verlag München • Chalmers (2007): Wege der Wissenschaft: Einführung in die wissenschaftstheorie, 6. Aufl., Springer Verlag Berlin • Eco (2010): Wie man eine wissenschaftliche Abschlussarbeit schreibt, 13. Aufl., UTB Facultas Universitätsverlag Stuttgart • Karmasin, Ribing (2010): Die Gestaltung wissenschaftlicher Arbeiten, 5. Aufl., UTB Facultas Universitätsverlag Stuttgart • Leopold-Wildburger, Schütz (2010): Verfassen und Vortragen: Wissenschaftliche Arbeiten und Vorträge leicht gemacht, 2. Aufl., Springer Verlag Berlin • Rössl (Hg.) (2008): Die Diplomarbeit in der Betriebswirtschaftslehre: Ein Leitfaden zur Erstellung einer Laureatsarbeit, Bachelorarbeit, Diplomarbeit, Masterarbeit, Dissertation, 4. Auflage, Facultas WUV Universitätsverlag Wien • Buck (2026): Wissenschaftliches Schreiben mit KI, UTB Verlag		
Acquisition of skills	<u>Presentation Techniques and Communication /ILV / LV-Nr: vzISK1 / 2.Semester / ECTS: 3</u> The participants are able to: • use voice, body language and wording confidently during presentation. • select and use presentation structures in a targeted manner. • prepare and implement a good introduction and conclusion. • speak freely in front of a group and present content.		
	<u>Scientific writing /ILV / LV-Nr: vzISK.2 / 4.Semester / ECTS: 1.5</u> The participants: • 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		
Course contents	<u>Presentation Techniques and Communication /ILV / LV-Nr: vzISK1 / 2.Semester / ECTS: 3</u> • Presentation and lecture techniques • Structure and arrangement of presentations • Use of media for presentations • Exercises and video analysis		
	<u>Scientific writing /ILV / LV-Nr: vzISK.2 / 4.Semester / ECTS: 1.5</u> • Introduction to academic research • Rules and principles of science and academic research • Hermeneutic text analysis • Seminar papers at a high academic level • Dealing with literature as well as discussions about the quality of academic research • Criteria of scientific work such as intellectual honesty and intersubjective comprehensibility		
Teaching and learning methods	<u>Presentation Techniques and Communication /ILV / LV-Nr: vzISK1 / 2.Semester / ECTS: 3</u> Integrated course		
	<u>Scientific writing /ILV / LV-Nr: vzISK.2 / 4.Semester / ECTS: 1.5</u> Lecture, Exercise		

Evaluation Methods Criteria	<u>Presentation Techniques and Communication /ILV / LV-Nr: vzISK1 / 2.Semester / ECTS: 3</u> Homework Presentation Exam
	<u>Scientific writing /ILV / LV-Nr: vzISK.2 / 4.Semester / ECTS: 1.5</u> Portfolio exam

Module number:	Transfer	Scope:	
PRA		8	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	3. Semester		
Level	3. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4</u> In accordance with the specific task		
	<u>Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4</u> In accordance with the specific task		
Acquisition of skills	<u>Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4</u> The participants are able to: • carry out a project on the basis of professional project management. • master the systematic, technically sound and on-schedule handling of projects. • identify the specific roles within a project. • assess the importance of project communication in all directions (conversations, documentation, descriptions, presentations) and act accordingly. • use expertise to solve specific problems. • work in a stressful and new environment and are successful in dynamic situations (Work-Life-Management).		
	<u>Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4</u> The participants are able to: • carry out a project on the basis of professional project management. • master the systematic, technically sound and on-schedule handling of projects. • identify the specific roles within a project. • assess the importance of project communication in all directions (conversations, documentation, descriptions, presentations) and act accordingly. • use expertise to solve specific problems. • work in a stressful and new environment and are successful in dynamic situations (Work-Life-Management).		
Course contents	<u>Practical Project I /PT / LV-Nr: vzPRA1 / 3.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 / LV-Nr: vzPRA2 / 4.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 I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4</u> Project work and presentation		
	<u>Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4</u> Project work		
Evaluation Methods Criteria	<u>Practical Project I /PT / LV-Nr: vzPRA1 / 3.Semester / ECTS: 4</u>		

	Presentation Project Report
	<u>Practical Project 2 /PT / LV-Nr: vzPRA2 / 4.Semester / ECTS: 4</u> Report Presentation Project

Module number:	Business and Economy	Scope:	
WIR		8	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	3. Semester		
Level	3. Semester: First Cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	3. Semester: None / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Fundamentals of Economics (E) /ILV / LV-Nr: vzWIR.1 / 3.Semester / ECTS: 6</u> • Atrill, P.; McLaney, E; Accounting and Finance for Non-Specialists; 2022; 12. Auflage • Kotler, P.; Keller, K.L; Marketing Management; 2022; 16. Auflage • Sloman, J.; Garratt, D.; Guest, J.; Economics for Business; 2023; 9.Auflage		
	<u>Introduction to Law /VO / LV-Nr: vzWIR2 / 4.Semester / ECTS: 2</u> • 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 • Hayböck (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)		
Acquisition of skills	<u>Fundamentals of Economics (E) /ILV / LV-Nr: vzWIR.1 / 3.Semester / ECTS: 6</u> The participants: • define key concepts and terminology in business administration, economics, and accounting • explain the basic structures and functions of enterprises and markets • describe the fundamental principles of cost accounting, financial reporting, and budgeting • apply basic economic models (supply and demand, market equilibrium) to real-world problems • analyze business cases using management, marketing, and financial frameworks • prepare simple financial statements and interpret balance sheets and income statements • evaluate investment and financing alternatives using standard financial indicators (NPV, IRR) • assess the efficiency of business processes and organizational structures • integrate knowledge from business, economics, and accounting to support decision-making in an engineering context		
	<u>Introduction to Law /VO / LV-Nr: vzWIR2 / 4.Semester / ECTS: 2</u> The participants are able to: • identify and classify legal problems (e.g. private, commercial, European law, etc.) in practice. • find legal sources and research information independently. • differentiate legal problems and be able to find a solution independently. • analyze frequent problem cases from practice on the basis of concrete case studies. • understand a legal topic independently and subsequently be able to explain it to others.		
Course contents	<u>Fundamentals of Economics (E) /ILV / LV-Nr: vzWIR.1 / 3.Semester / ECTS: 6</u>		

	Introduction to Business Administration: • Definition and objectives of business administration • Legal and organizational forms of enterprises • Management functions: planning, organizing, leading, controlling • Fundamentals of corporate governance and business ethics Marketing & Sales: • Principles of marketing and market segmentation • Marketing mix: product, price, place, promotion • Market research and consumer behavior Human Resource Management: • HR planning, recruitment, and development • Motivation and leadership theories • Performance appraisal and compensation Procurement, Production, Logistics: • Fundamentals of supply chain management • Procurement and sourcing strategies • Production systems and inventory management Fundamentals of Economics: • Microeconomics: supply, demand, and market equilibrium • Elasticities, cost and production theory • Macroeconomics: GDP, inflation, unemployment, fiscal and monetary policy • Economic systems and global trade
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Course contents	Accounting and Financial Management: • Introduction to double-entry bookkeeping • Balance sheet, income statement, and cash flow statement • Cost and performance accounting (cost types, cost centers, cost units) • Investment appraisal (static and dynamic methods) • Financing: equity and debt financing, capital structure
	<u>Introduction to Law /VO / LV-Nr: vzWIR2 / 4.Semester / ECTS: 2</u> • 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	<u>Fundamentals of Economics (E) /ILV / LV-Nr: vzWIR.1 / 3.Semester / ECTS: 6</u> Lecture, Exercise
	<u>Introduction to Law /VO / LV-Nr: vzWIR2 / 4.Semester / ECTS: 2</u> Lecture
Evaluation Methods Criteria	<u>Fundamentals of Economics (E) /ILV / LV-Nr: vzWIR.1 / 3.Semester / ECTS: 6</u> Portfolio
	<u>Introduction to Law /VO / LV-Nr: vzWIR2 / 4.Semester / ECTS: 2</u> Homework Project Exam

Module number:	Management	Scope:	
MGM		10	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	3. Semester		
Level	3. Semester: First cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	3. Semester: None / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Project Management (E) /ILV / LV-Nr: vzMGM.1 / 3.Semester / ECTS: 2</u> • Gareis (2005): Happy Projects!: Project and programme management. Project portfolio management. Management of the project-oriented organization. Management in the project-oriented society, 1. Aufl., MANZ Verlag Wien • Patzak, Rattay (2014): Projektmanagement: Leitfaden zum Management von Projekten, Projektportfolios und projektorientierten Unternehmen, 6. Aufl., Linde Verlag Wien		
	<u>Business Economics: Financing & Marketing (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 4</u> • Kotler, Armstrong, Wong, Saunders (2010): Grundlagen des Marketing (Fundamentals of Marketing), 5th edition, Pearson Education • Kotler, Keller, Bliemel (2007): Marketing-Management, Strategien für wertschöpfendes Handeln, 12th edition, Pearson Education • Homburg (2012): Marketingmanagement: Strategie-Instrumente-Umsetzung- Unternehmensführung, 4th Edition, Springer Gabler Publisher Wiesbaden • Meffert, Burmann, Kirchgeorg: Marketing, Grundlagen marktorientierter Unternehmensführung. Konzepte – Instrumente - Praxisbeispiele, 11th Edition, Springer Gabler Publisher Wiesbaden • Sander (2011): Marketing-Management: Märkte, Marktinformationen und Markt-bearbeitung, 2nd edition, UTB Stuttgart • Däumler, Grabe (2013): Betriebliche Finanzwirtschaft, 10th edition, nwb Verlag Herne • Grill, Perczynski, Grill (2014): Wirtschaftslehre des Kreditwesens, Bildungsv Verlag 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 • Wöhe, Döring (2013): Einführung in die Allgemeine Betriebswirtschaftslehre, 25th edition, Vahlen Verlag Munich		
	<u>Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 4</u> • Anthony, et al. (2008): The Innovator's guide to growth, Harvard Business Press • Anthony (2012): The little black book of innovation, Harvard Business School Publishing • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag München • Hauschildt, Salomo (2007): Innovationsmanagement, 4. Aufl., Vahlen Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Gudehus (2012): Logistik 1: Grundlagen, Verfahren und Strategien, 4. Aufl., Springer Verlag Berlin • Gudehus (2012): Logistik 2: Netzwerke, Systeme und Lieferketten, 4. Aufl., Springer Verlag Berlin • Ehrlenspiel, Meerkamm (2013): Integrierte Produktentwicklung: Denkabläufe, Methodeneinsatz, Zusammenarbeit, 5. Aufl., Carl Hanser Verlag München • Lindemann (2009): Methodische Entwicklung technischer Produkte: Methoden flexibel und situationsgerecht anwenden, 3. Aufl., Springer Verlag Berlin • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3. Aufl., Carl Hanser Verlag München		
Acquisition of skills	<u>Project Management (E) /ILV / LV-Nr: vzMGM.1 / 3.Semester / ECTS: 2</u> The participants are able to: • understand the importance of project management for a company • describe generic project phases and project results • use methods to define project goals, define project scope and plan tasks, duration and resource requirements • identify roles and participants in a project • understand the importance of communication in projects • apply methods to manage projects • understand the reasons for the failure of projects and the corresponding measures • understand the difference between single and multi-project management • work in a stressful and new environment and are successful in dynamic situations (Work-Life-Management).		
	<u>Business Economics: Financing & Marketing (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 4</u>		

	The participants are able to: • identify market-oriented management. • develop marketing concepts or a marketing plan based on an identified problem. • apply instruments of the marketing mix. • present basic market research methods. • 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
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Acquisition of skills	• apply the usual methods of investment calculation in everyday business
	<u>Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 4</u> The participants are able to: • determine the innovation needs of a company and develop an innovation strategy. • structure the innovation needs and define suitable processes with methods for further processing. • apply creativity methods. • analyze the most important framework conditions for product development and define requirements for the product development process. • design product development processes in line with the requirements. • apply product development methods
Course contents	<u>Project Management (E) /ILV / LV-Nr: vzMGM.1 / 3.Semester / ECTS: 2</u> • 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.
	<u>Business Economics: Financing & Marketing (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 4</u> Marketing: •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 Financing & Investment: • 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
	<u>Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 4</u> • 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
Teaching and learning methods	<u>Project Management (E) /ILV / LV-Nr: vzMGM.1 / 3.Semester / ECTS: 2</u> Lecture
	<u>Business Economics: Financing & Marketing (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 4</u> Integrated course
	<u>Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 4</u> integrated Lecture
Evaluation Methods Criteria	<u>Project Management (E) /ILV / LV-Nr: vzMGM.1 / 3.Semester / ECTS: 2</u>

	Exam
	<u>Business Economics: Financing & Marketing (E) /ILV / LV-Nr: vzMGM2 / 4.Semester / ECTS: 4</u>
	Exam Presentation

Evaluation Methods Criteria	<u>Innovation Management & Product Development (E) /ILV / LV-Nr: vzMGM4 / 4.Semester / ECTS: 4</u> Exam Presentation
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Module number:	Organisation and Management	Scope:	
OMT		11.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	3. Semester		
	4. Semester		
Level	3. Semester: 1. Study Cycle, Bachelor / 4. Semester: First cycle, Bachelor		
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Smart Factory Planning (WP)* /ILV / LV-Nr: vzOMT1 / 3.Semester / ECTS: 5</u> • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag München • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3. Aufl., Carl Hanser Verlag München • Hauschildt, Salomo (2007): Innovationsmanagement, 4. Aufl., Vahlen Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München • Gassmann, O., & Sutter, P. (2016). Digitale Transformation im Unternehmen gestalten: Geschäftsmodelle, Erfolgsfaktoren, Handlungsanweisungen, Fallstudien. München: Carl Hanser Verlag. • Klasen, J. (2019). Business Transformation: Praxisorientierter Leitfaden zur erfolgreichen Neuausrichtung von Unternehmen und Geschäftsfeldern. Wiesbaden: Springer Verlag. • Tokarski, K. O., Schellinger, J., & Berchtold, P. (2019) (Hrsg.). Nachhaltige Unternehmensführung: Herausforderungen und Beispiele aus der Praxis. Wiesbaden: Springer Verlag		
	<u>Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzOMT2 / 4.Semester / ECTS: 2.5</u> • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München • Engelharf, Magerhans (2022) Ecommerce klipp&klar, Ed.1, 2019, Springer Gabler Wiesbaden • Heinemann (2020): B2B eCommerce Grundlagen, Geschäftsmodelle, und Best Practices, Springer, Gabler Verlag Wiesbaden • Deges (2019) Grundlagen des E-commerce, Springer Gabler Verlag Wiesbaden. • Hanlon, A. (2019). Digital marketing: Strategic planning & integration. London, UK: SAGE Publications. • Heinemann, G. (2019). Der neue Online-Handel: Geschäftsmodelle, Geschäftssysteme und Benchmarks im E-Commerce. Wiesbaden: Springer Verlag		
	<u>Management & Leadership (E) (WP)* /ILV / LV-Nr: vzOMT3 / 4.Semester / ECTS: 4</u> • Gummertsbach, et al. (2012): Produktionsmanagement: Lehr- und Nachschlage-werk, 5. Aufl., Verlag Handwerk und Technik Hamburg • Schmid, et al. (2013): Produktionsorganisation: Qualitätsmanagement und Pro-duktpolitik, 8. Aufl., EUROPA Lehrmittelverlag Haan • Schuh, Schmidt (2014): Produktionsmanagement: Handbuch Produktion und Ma-nagement 5, 2. Aufl., Springer Vieweg Verlag Wiesbaden • Abele, Kluge (2010): Handbuch globale Produktion, 2. Aufl., Carl Hanser Verlag München • Brucker-Kley, Elke, (2018) Kundennutzen durch digitale Transformation- Business Model- Management Studie. Status quo und Erfolgsmuster, Cham Springer Nature • Urbach, Nils; Röglinger, Maximilian (Ed.): Digitalization Cases: How Organizations Rethink Their Business for the Digital Age. Springer (latest edition) • Heerwagen Silke et.al, (2023) Digitale Transformation wirksam gestalten, Handlungsimpulse für Strategie, Struktur, Führung und Kultur. Springer Fachmedien Wiesbaden • Maximini, D. (2022) Agile Leadership in Practice: Applying Management 3.0, Cham, Switzerland, Springer • Northhouse, P. G. (2018). Leadership: Theory and practice. Thousand Oaks, CA: SAGE Publications. • Western, S. (2019). Leadership: A critical text. London, UK: SAGE Publications. • Western, S., & Garcia, E.-J. (2018). Global leadership perspectives: Insights and analysis. London, UK: SAGE Publications		
Acquisition of skills	<u>Smart Factory Planning (WP)* /ILV / LV-Nr: vzOMT1 / 3.Semester / ECTS: 5</u>		

	The participants: • can differentiate machines and systems. • can also design systems as a combination of machine groups, considering additional requirements such as conveyor systems and conveyor aids. • can consider the special features of a system from the point of view of the interaction of components, service and assembly. • can plan, clarify and design an entire plant and plant components or machine groups. Consider and document the respective work step (e.g. requirements determination, concept development, evaluation of solutions, design/design). Considering smart models and possibilities. • can simulate smart factory layouts and use learning factories. • develop a plant structured and according to standards and norms, considering collateral. • are able to create a factory layout while optimizing routes and transport systems. • know the basics of lean management.
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Acquisition of skills	<u>Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzOMT2 / 4.Semester / ECTS: 2.5</u> The participants: • are able to analyze and structure business processes in production. • identify actual data and interfaces can accommodate it. • review best practices in production processes. • can verify organizational forms and data in the system. • can optimize processes through system support and apply modern methods (e.g. Lean, Kanban, ...) with system support. • recognize interfaces internally and externally, can analyze and classify them. • can capture data structures. • can ensure quality requirements when introduced. • know and analyze the necessary organizational requirements for successful e-business and the use of systems such as MES, ERP, PP. • know sub-areas of e-business such as e-commerce, e-marketing, e-procurement
	<u>Management & Leadership (E) (WP)* /ILV / LV-Nr: vzOMT3 / 4.Semester / ECTS: 4</u> The participants: • analyze core processes in the production area and can evaluate their status. • by defining goals by means of suitable key figures and using methods/tools (QM approaches), they can track them. • are able to derive measures against the background of the interconnectedness of the core processes and interpret their effects. • know the difference between management and leadership with strategies and their tasks • know skills in management techniques (leadership methods and lean leadership). • identify key performance indicator systems and management tools (e.g. scorecards, portfolio matrix, etc.). • know the impact of digitalization on customers, competition, products and services. • know the basics of the change in companies (structure, leadership, culture, etc.) that is triggered by digitalization. • know the importance of the employee and tasks in HR management for manufacturing companies. • know the essential strategic and operational measures for the analysis and implementation of entrepreneurial change processes.
Course contents	<u>Smart Factory Planning (WP)* /ILV / LV-Nr: vzOMT1 / 3.Semester / ECTS: 5</u> • Practical design exercises using practical examples, in particular for the design of factory units, conveyor systems, machines and systems. Elements of machine components and conveyors are particularly noteworthy for the interaction: • Business processes and their interaction (sales, purchasing, production, HR, finance, ..) and best practice processes • All elements that are also relevant for the connections and conveyor technology • Factory Optimization and layout supported by elements of digitalization and Industry 4.0. Above all, automated guided vehicles. • Agile factory methodologies and tools
	<u>Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzOMT2 / 4.Semester / ECTS: 2.5</u> • Best Practice Processes and KPIs for Production • Product Lifecycle Management • Production planning and control • Corporate Structures and Master Data Structures • Support by ERP (Enterprise Resource Planning) systems • Integration of SCM (Supply Chain Management) and CRM (Customer Relations Management) with production and MES systems • Support methods for optimizing production through information systems, including web applications and mobile devices • E-skills: e-marketing mix, e-procurement, e-commerce • Organizational requirements for digital and online processes • Analysis and optimization of processes and key figures in e-business • Use of appropriate tools and methods to gain insights and identify potential for improvement
	<u>Management & Leadership (E) (WP)* /ILV / LV-Nr: vzOMT3 / 4.Semester / ECTS: 4</u>

	• 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/third-party production, order management, work system design, production planning and control (PPS), personnel management • Lean Management • Interaction between man and machine • Management of the production area with qualitative and quantitative approaches (QM approaches) • Definition and characteristics of leadership • Overview of Leadership Theories, Leadership: Performance; leadership success; leadership efficiency; Leadership Effectiveness • The implementation of leadership approaches in organizations will be discussed and reflected on the basis of case studies • Motivating work design (Job Rotation, Job Enlargement, Job Enrichment) • Modern working world and digitalization
Teaching and learning methods	<u>Smart Factory Planning (WP)* /ILV / LV-Nr: vzOMT1 / 3.Semester / ECTS: 5</u> Integrated course
	<u>Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzOMT2 / 4.Semester / ECTS: 2.5</u> Integrated course
	<u>Management & Leadership (E) (WP)* /ILV / LV-Nr: vzOMT3 / 4.Semester / ECTS: 4</u> Integrated course

Evaluation Methods Criteria	<u>Smart Factory Planning (WP)* /ILV / LV-Nr: vzOMT1 / 3.Semester / ECTS: 5</u> Portfolio Homework Presentation
	<u>Information Systems in Production (WP) (WP)* /ILV / LV-Nr: vzOMT2 / 4.Semester / ECTS: 2.5</u> Report Presentation Portfolio
	<u>Management & Leadership (E) (WP)* /ILV / LV-Nr: vzOMT3 / 4.Semester / ECTS: 4</u> Exam Presentation

Module number:	Product Development	Scope:	
PEE		11.5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	3. Semester		
	4. Semester		
Level	3. Semester: 1. Study cycle, Bachelor / 4. Semester: 1.study cycle bachelor / 4. Semester: 1.Study Cycle Bachelor		
Previous knowledge	3. Semester: not applicable / 4. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Design Project - Product Development (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 5</u> • Corsten, et al. (2006): Grundlagen des Innovationsmanagements, Vahlen Verlag München • Conrad (2005): Grundlagen der Konstruktionslehre: Methoden und Beispiele für den Maschinenbau, 3. Aufl., Carl Hanser Verlag München • Dolmetsch (2011): Metalltechnik Fachbildung. Der Werkzeugbau, Taschenbuch, 15. Aufl., EUROPA Lehrmittelverlag Haan • Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München • Hauschildt, Salomo (2007): Innovationsmanagement, 4. Aufl., Vahlen Verlag München • Hoenow, Meissner (2010): Entwerfen und Gestalten im Maschinenbau, Carl Hanser Verlag München • Kief, Roschiwal (2009): CNC-Handbuch, Hanser Verlag München • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München • Vogel, Ebel (2009): Pro/Engineer und Pro/Mechanica: Konstruieren und Berechnen mit Wildfire 4, 5. Aufl., Carl Hanser Verlag München		
	<u>Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5</u> • Sendler, Wawer (2011): Von PDM zu PLM, 3. Aufl., Carl Hanser Verlag München • Gudehus (2012): Logistik 1: Grundlagen, Verfahren und Strategien, 4. Aufl., Springer Verlag Berlin • Gudehus (2012): Logistik 2: Netzwerke, Systeme und Lieferketten, 4. Aufl., Springer Verlag Berlin • Morgan, Liker (2006): The Toyota Product Development System: Integrating People, Process and Technology, Productivity Press • Scheer, et al. (2005): Prozessorientiertes Product Lifecycle Management, Springer Verlag Berlin • Sendler, Wawer (2007): CAD und PDM: Prozessoptimierung durch Integration, 2. Aufl., Carl Hanser Verlag München • Gebhardt (2007): Generative Fertigungsverfahren, 3. Aufl., Carl Hanser Verlag München		
	<u>R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 4</u> • Hahn, Häusler, Große Austing (2013): Quantitatives Entwicklungsmanagement, Springer Verlag Berlin • Reinertsen (2009): The Principles of Product Development Flow: Second Generation Lean Product Development, Celeritas Publishing • Ries (2011): The Lean Startup: How Constant Innovation Creates Radically Successful Businesses, Portfolio Penguin • Brown, Tim: The Lean Startup: How Constant Innovation Creates Radically Successful Businesses • Reinertsen (1997): Managing the Design Factory, Free Press • McGrath (2004): Next Generation Product Development: How to Increase Productivity, Cut Costs, and Reduce Cycle Times, McGraw-Hill Education • Cooper (2002): Portfolio Management For New Products, 2. Aufl., Basic Books		
Acquisition of skills	<u>Design Project - Product Development (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 5</u> The participants are able to: • understand the fundamentals of the design process and be able to apply them. • evaluate and analyze design methods. • plan, clarify and design a product using the relevant requirements analysis, concept development, evaluation of solutions and designs. • develop a product in a structured manner and according to standards and norms, taking safeguards into account. • decide on and evaluate special features for individual and mass production, taking production, assembly and costs into account. • create the complete documentation for a design (e.g. specifications, functional analysis, specifications, parts lists, technical drawing, assembly instructions, documentation).		

	<u>Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5</u> The participants are able to: • analyze and structure business processes of product development. • record actual data and identify interfaces. • check best practices. • verify organizational forms and data in the system. • 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.
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Acquisition of skills	<u>R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 4</u> The participants: • 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.
Course contents	<u>Design Project - Product Development (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 5</u> Practical design and calculation exercises using practical examples, in particular for the design of simple connecting elements, axles and shafts, as well as sliding and rolling bearing technology, shaft-hub connections, couplings, belt drives and gear drives, elements for supporting, carrying machine components and torque transmission: • Functions and design rules as well as calculation bases for axes and shafts • Design fundamentals and calculation bases of hydrodynamic plain bearings • Bearing types, areas of application, bearing concepts and calculation bases for rolling bearings • Elements for sealing machine components • Elastic springs: Spring types, design rules and calculation bases for springs • Clutches and brakes: Design, functions, mode of operation and calculation bases of selected clutch and brake types • Belt drives: Design principles and calculation bases for flat and V-belt drives and timing belt drives • Gear drives: Gear types and design, gearing law, design and calculation bases for straight, helical, bevel and helical gears
	<u>Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5</u> • 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
	<u>R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 4</u> • 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.)
Teaching and learning methods	<u>Design Project - Product Development (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 5</u> Integrated course
	<u>Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5</u> integrated lecture
	<u>R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 4</u> Integrated course
Evaluation Methods Criteria	<u>Design Project - Product Development (WP)* /ILV / LV-Nr: vzPEE1 / 3.Semester / ECTS: 5</u> Homework Portfolio exam Presentation
	<u>Information Systems in Product Development (WP) (WP)* /ILV / LV-Nr: vzPEE2 / 4.Semester / ECTS: 2.5</u> Report Portfolio Presentation
	<u>R&D Management (WP)(E) (WP)* /ILV / LV-Nr: vzPEE3 / 4.Semester / ECTS: 4</u> Exam Presentation

Module number:	Semester Abroad: Individual and Social Skills	Scope:	
AIS		5	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	5. Semester		
Level	5. Semester: First cycle, Bachelor		
Previous knowledge	5. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5</u> Depending on selected course		
Acquisition of skills	<u>Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5</u> The participants 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	<u>Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5</u> Consolidation through courses such as Business Communication, Negotiation and Conflict Resolution, International Business Communication, Bargaining Behavior.		
Teaching and learning methods	<u>Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5</u> The teaching and learning methods are based on the curricula or specifications of the partner universities concerned.		
Evaluation Methods Criteria	<u>Semester Abroad: Individual and Social Skills /ILV / LV-Nr: vzAIS / 5.Semester / ECTS: 5</u> determined by the respective partner university		

Module number:	Semester Abroad in Engineering	Scope:	
ATE		15	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	5. Semester		
Level	5. Semester: First cycle, Bachelor		
Previous knowledge	5. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15</u> Depending on the subject focus of the respective elective subjects		
Acquisition of skills	<u>Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15</u> The participants 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	<u>Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15</u> 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	<u>Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15</u> Depending on selected courses		
Evaluation Methods Criteria	<u>Semester Abroad: Technology /ILV / LV-Nr: vzATE / 5.Semester / ECTS: 15</u> determined by the respective partner university		

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

Module number:	Internship	Scope:	
BRP		20	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	6. Semester		
Level	6. Semester: First cycle, Bachelor		
Previous knowledge	6. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20</u> • Brenner, D. (2007): Schön, dass Sie da sind!: Karrierestart nach dem Studium, BW Verlag Nürnberg		
Acquisition of skills	<u>Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20</u> The participants are able to: • apply their acquired knowledge in professional practice. • understand processes in the professional environment. • solve problems and implement solutions within the framework of professional projects (practical competence). • work out and further develop arguments, problem solutions and strategies independently (problem solving competence). • deepen, further develop and profitably implement the knowledge of communication with superiors, employees and colleagues (social competence).		
Course contents	<u>Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20</u> • Supplementing the theoretical knowledge of the students with practical activities and questions of commercial law in practice. • At least 500 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 / LV-Nr: vzBPR / 6.Semester / ECTS: 20</u> Internship		
Evaluation Methods Criteria	<u>Internship /PT / LV-Nr: vzBPR / 6.Semester / ECTS: 20</u> Internship report		

Module number:	Thesis	Scope:	
BAS		10	ECTS
Degree program	University of Applied Sciences Bachelor's Program Industrial Engineering & Management full-time		
Position in the curriculum	6. Semester		
Level	6. Semester: First cycle, Bachelor		
Previous knowledge	6. Semester: None / 6. Semester: not applicable		
Blocked	no		
Participant group	A-levels and/or corresponding previous training, beginners		
Literature recommendation	<u>Bachelor Thesis /SE / LV-Nr: v.BAS2 / 6.Semester / ECTS: 6</u> depending on the content		
	<u>Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 4</u> • Sandberg (2013): Wissenschaftliches Arbeiten von Abbildung bis Zitat, 2. Aufl., Oldenbourg Verlag München • Bänsch (2003): Wissenschaftliches Arbeiten: Seminar- und Diplomarbeiten, 8.Aufl., Oldenbourg Verlag München • Chalmers (2007): Wege der Wissenschaft: Einführung in die wissenschaftstheorie, 6. Aufl., Springer Verlag Berlin • Eco (2010): Wie man eine wissenschaftliche Abschlussarbeit schreibt, 13. Aufl., UTB Facultas Universitätsverlag Stuttgart • Karmasin, Ribing (2010): Die Gestaltung wissenschaftlicher Arbeiten, 5. Aufl., UTB Facultas Universitätsverlag Stuttgart • Leopold-Wildburger, Schütz (2010): Verfassen und Vortragen: Wissenschaftliche Arbeiten und Vorträge leicht gemacht, 2. Aufl., Springer Verlag Berlin • Rössl (Hg.) (2008): Die Diplomarbeit in der Betriebswirtschaftslehre: Ein Leitfaden zur Erstellung einer Laureatsarbeit, Bachelorarbeit, Diplomarbeit, Masterarbeit, Dissertation, 4. Auflage, Facultas WUV Universitätsverlag Wien		
Acquisition of skills	<u>Bachelor Thesis /SE / LV-Nr: v.BAS2 / 6.Semester / ECTS: 6</u> The participants are able to: • Scientifically prepare a topic from the faculty of industrial engineering and to develop a central question independently		
	<u>Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 4</u> The participants 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-organize		
Course contents	<u>Bachelor Thesis /SE / LV-Nr: v.BAS2 / 6.Semester / ECTS: 6</u> • 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		
	<u>Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 4</u> • Writing an outline for the Bachelor thesis • Setting up the structure for the Bachelor thesis		
Teaching and learning methods	<u>Bachelor Thesis /SE / LV-Nr: v.BAS2 / 6.Semester / ECTS: 6</u> seminar		
	<u>Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 4</u> Seminar		
Evaluation Methods Criteria	<u>Bachelor Thesis /SE / LV-Nr: v.BAS2 / 6.Semester / ECTS: 6</u> Bachelor's thesis		
	<u>Bachelor Thesis Seminar 2: /SE / LV-Nr: vzBAS1 / 6.Semester / ECTS: 4</u> Participation		

2.4 Internship

Students independently select an internship position. In doing so, they can draw on the extensive range of internship listings offered by Kufstein University of Applied Sciences in Tyrol. The program director verifies that the internship activities align with the program's curriculum and qualification profiles. Subsequently, the program administration assesses whether the professional internship aligns with the program's educational objectives and whether the student can be assigned tasks appropriate to his or her level of qualification. A detailed internship guide assists students with organizing their practical semester; the International Office (IRO) and the program administration are also available to students for questions and support.

Students must apply for the professional internship using a form (= job description). The form includes key information about the student and the internship supervisor, as well as the objectives and tasks/activities at the internship company. The internship is confirmed or approved by the signatures of the program administration and the internship supervisor.

The student must reflect on, document, and present the experiences and insights gained, as well as evaluate the internship site. Conversely, the internship supervisor must evaluate the student. The student must prepare an interim report, a final report, and a presentation, as well as complete an evaluation form. At the beginning of the internship, the student receives an internship guide listing the items to be addressed. A key requirement is to compare the agreed-upon objectives with the actual outcomes. The documentation prepared by the student and the supervisor is evaluated by the program director. If the achievement of the objectives and alignment with the student's skill level are not ensured, the respective internship site will be excluded from future placements. A list of internship sites and the corresponding reports are available to subsequent students via the Moodle learning platform.

2.5 Semester abroad

In the 5th semester, students complete a semester abroad at a partner university of Kufstein University of Applied Sciences, Tyrol. A total workload of 30 ECTS must be documented at the respective partner university.

For the Industrial Engineering program, students are provided with a list of selected institutions that are particularly well-suited to the program as part of their preparation for studying abroad. The list of institutions is based on many years of historical experience. Care is taken to ensure that the institutions offer a sufficient number of technical courses.

This ensures that students gain in-depth knowledge in the relevant subjects, enabling them to develop the desired competencies. Studying abroad also helps develop intercultural and language skills, which are highly relevant in professional practice. In addition, students are expected to organize their stay abroad largely on their own (e.g., finding housing, registering at the partner university, obtaining the necessary documents for registration and travel to the respective country, etc.).

Study places are allocated based on the order of the grade point average. First, the student with the highest grade point average is assigned their first preference. Next, the student with the second-lowest grade point average is assigned their first preference, and so on. If a student's first preference cannot be granted (because it has already been taken by a student with a lower grade point average), the second preference is assigned. If this has also already been taken, the third preference is assigned. If this has also already been taken, the student enters a second allocation round.

Students receive ongoing support during their semester abroad; the International Relations Office (IRO) is available for all information, questions, and concerns regarding studying abroad; arrangements are made in consultation with the program director (STGL).

3 ADMISSION REQUIREMENTS

Einfügen aus Antrag

The admission requirements at Kufstein University of Applied Sciences in Tyrol are governed by the following provisions:

1. The general admission requirements are governed by § 4 FHG, as amended; this applies to **individuals with a general university entrance qualification**.

2. **Individuals without a high school diploma** must take an **entrance qualification examination** in accordance with § 64a of the University Act (UG) of 2002, as amended. In accordance with a regulation issued by the rector's office of a university, these individuals obtain general university entrance qualifications for bachelor's programs within a field of study group by passing the entrance qualification examination. Successful completion of the university entrance qualification examination thus entitles the student to admission to all degree programs within the field of study group for which the qualification was obtained.

The university entrance qualification examination may be taken for specific fields of study in accordance with a regulation issued by a university's rectorate; for Kufstein University of Applied Sciences in Tyrol, the relevant field of study is: Social and Economic Sciences (e.g., Business Administration, Business Education, Statistics, Sociology).

Applicants who have completed a 3-year **vocational secondary school program**, completed an **apprenticeship in the dual system**, or obtained a **subject-specific German Fachhochschulreife** qualify to study at Kufstein University of Applied Sciences, Tyrol, by passing supplementary exams in German, English, and mathematics. In the case of the German Fachhochschulreife, the supplementary exam must be taken only in those of the three subjects in which the grade on the transcript is "Unsatisfactory" or lower. All supplementary exams must be successfully completed before the start of the third semester.

3. For **individuals with relevant dual vocational training, completion of an apprenticeship** in one of **the** following **fields**, as specified in the current announcement by the Federal Ministry of Economy, Family, and Youth, is a prerequisite for admission:

- Construction and Building Services
- Office, Administration, Organization
- Chemistry and Plastics
- Electrical Engineering, Electronics
- Commerce
- Information and Communication Technology
- Metalworking and Mechanical Engineering
- Media Design and Photography
- Paper manufacturing, paper processing, printing
- Transportation and warehousing

4. **Applicants who have graduated** from one of the following relevant **vocational secondary schools** with a program of at least three years may also be admitted:

- Vocational, technical, and arts and crafts schools
- Technical schools for business professions
- Higher vocational school for business professions
- Higher vocational schools for technical professions
- Commercial schools

5. If foreign credentials are not deemed equivalent to an Austrian high school diploma in terms of content and requirements, supplementary exams in English and mathematics must be taken by prior to the start of studies. These exams may be taken either through external providers or at the Kufstein University of Applied Sciences Tyrol International Business School for a fee.

Newly established apprenticeship programs in similar fields must be recognized accordingly.

The **individuals described in sections 3 and 4** must, as an admission requirement, complete **supplementary exams** by the start of the third semester and, if necessary, enroll in corresponding preparatory courses. This is possible at the International Business School of Kufstein University of Applied Sciences Tyrol.

The following supplementary exams are required for this group:

- German
- English
- Mathematics

Below is an overview of which German FOS/BOS specialization is considered a relevant prerequisite for admission. Students must take additional exams in mathematics, German, and English during their first semesters (if they received a "Mangelhafter" or a lower grade in these subjects).

	WING ft
FOS	
- Technology	X
- Business & Administration	X
- Social Services	X
- Agriculture, Biotechnology, and Environmental Technology	X
- Design	
- Health	
- International Business	X
BOS	
- Technology	X
- Business & Administration	X
- Social Services	X
- Agriculture, Biotechnology, and Environmental Technology	X
- Health	
- International Business	X
For internships in relevant fields (marketing, business, administration), other fields of study may also be accepted (upon consultation with the program director).	