ESB BUSINESS SCHOOL

Bachelor of Science International Operations and Logistics Management

Syllabi/Module Handbook Winter Term 2019/20 Version II Curriculum

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Curriculum and Syllabi Handbook BSc International Operations and Logistics Management

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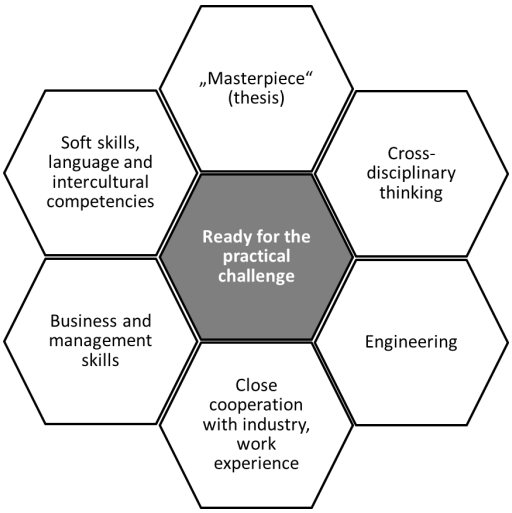
1 Qualification Profile

Aims of the programme

The study programme International Operations and Logistics Management (IOLM) focuses on applicants who have a high affinity both to engineering and mathematics as well as to business subjects. The programme follows the German concept of a “Wirtschaftsingenieur” (business engineering) and puts a special emphasis on international and cross-disciplinary aspects. Students acquire competencies and skills in six complementary fields:



Besides teaching fundamental concepts of business and engineering that are needed by future business engineers, the IOLM programme puts a special emphasis on the dynamic field of logistics and supply chain management. Students not only deepen their competencies in various fields of logistics and supply chain management. Additionally, they specialise in one of the two specialization areas intra-logistics or extra-logistics, respectively.

Special emphasis is put on the international and intercultural aspects of problem solving in the field of operations management and on a comparative view to business and engineering concepts in different world regions. Students deepen their language proficiency and intercultural competencies as well as their methodological and instrumental skills at the interface of business and technology. The program is closely aligned with the curricula of several partner universities offering students the option to acquire a double degree.

Degree awarded

Bachelor of Science (BSc.)

Duration of studies

8 semesters (4 years)

Learning Goals and Objectives

The overall learning goals and objectives of all ESB study programmes are derived from the mission of ESB Business School and are subject to continuous quality assurance processes.The IOLM course follows the mission of ESB Business School to develop leaders in an international environment who will shape our global economy and society in a socially responsible way. Its mission-derived learning goals are as follows:

Learning Goals*

LANGUAGE PROFICIENCY	INTERCULTURAL COMPETENCE	ETHICAL BEHAVIOR	DOMAIN-SPECIFIC PROBLEM SOLVING COMPETENCIES
LEARNING GOAL 1	LEARNING GOAL 2	LEARNING GOAL 3	LEARNING GOAL 4
IOLM graduates are proficient in at least one foreign language	... are interculturally competent	... are able to manage ethical and legal issues in given situations	... are skilled problem solvers in the domain of business engineering
LEARNING OBJECTIVE 1	LEARNING OBJECTIVE 2	LEARNING OBJECTIVE 3	LEARNING OBJECTIVE 4
IOLM graduates communicate proficiently in spoken and written word (2nd language)	... demonstrate an awareness and understanding of cultural issues in a business context	... are aware of the main ethical and legal issues in their professional field and able to analyze these issues based on normative theory or models. They are able to develop viable solutions that conform to ethical behavior in given situations	... select and apply appropriate methods from business and engineering disciplines to create efficient and effective solutions
Measure embedded in Module M 14 Foreign Language 2, Semester 2, assessment by way of a written and oral test	Measure embedded in Module M24 Internship abroad, Semester 6, assessment by way of IES (Intercultural Efficiency Scale) Test	Measure embedded in Module M 21 Corporate Social Responsibility, Semester 4, assessment by group presentation	Measure embedded in Module M 34 Thesis, Semester 8, assessment by first thesis supervisor.

* not in order of priority

These mission-derived learning goals are further complemented by IOLM-specific goals as implemented in the curriculum. IOLM students can choose between two different fields of specialization: intra-logistics and extra-logistics.

Graduates possess a comprehensive knowledge of all fundamental business and engineering topics and are domain experts in their selected specialization (intra- or extra-logistics). They are able to apply major management and engineering concepts / tools in complex problem settings and have first hands-on experience in managing cross-disciplinary projects.

They have broad international experience both in an academic and in an industry environment (technical as well as business experience) and are used to working in a culturally diverse environment. Their pronouncedly interdisciplinary and practice-oriented education qualifies them for positions at the interface between business and engineering in an international work environment.

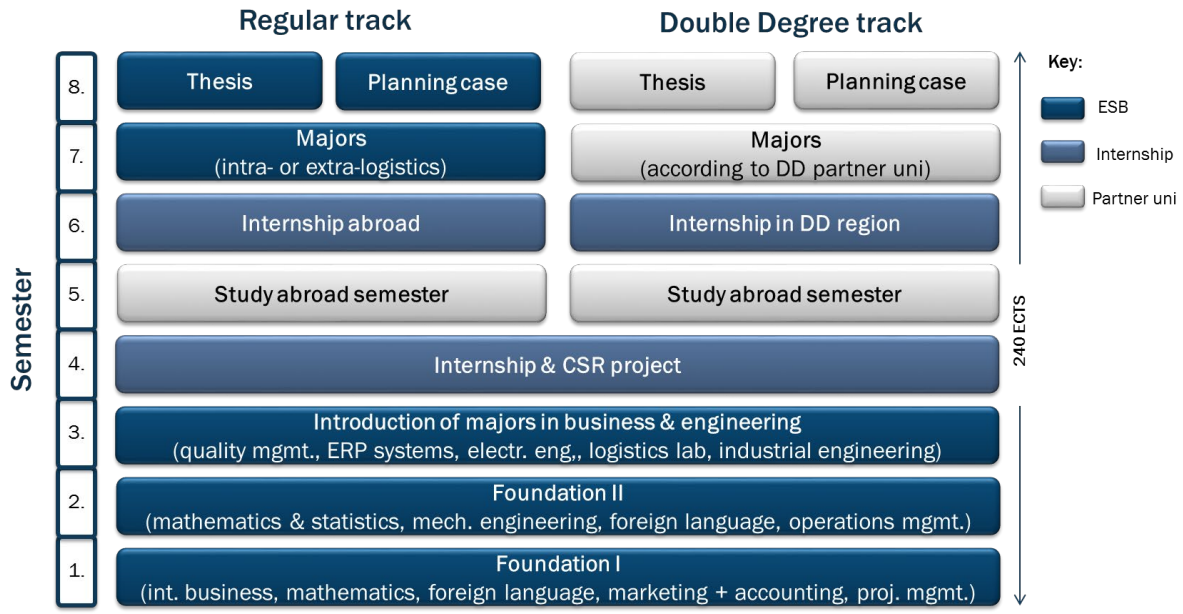
Their profile makes them ideally suited as process and project experts in an international logistics and SCM context. Graduates can assume functions in internationally active manufacturing companies as well as in international consulting.

2 Curriculum Structure

The programme „International Operations and Logistics Management“ is an undergraduate study programme leading to the academic degree of Bachelor of Science. The programme comprises 8 semesters, including 2 internship semesters, at least one compulsory study abroad semester and a final thesis semester which is usually done in close cooperation with a company.

In order to achieve the programme's learning goals the module sequence as outlined in the programme curriculum can be changed by students to a limited extent only.

An application for the double degree option is possible only after 60 ECTS credits from the first two semesters have been successfully attained. Students can start the first internship semester only after having attained at least 80 ECTS credits in the first 3 study semesters. The bachelor thesis can be started only after at least 195 credits have been earned.



The two specialization areas offered in the IOLM programme have the following focus:

Intra-logistics	Network, factory and warehouse planning, identification and communication systems, automation for logistics specialists, layout planning
Extra-logistics	International transport logistics, supply chain management, distribution and trade logistics, public transportation, maritime logistics / port logistics

A significant part of the study program consists of so called **MINT**-subjects.

MINT stands for:

- **M**athematics
- Engl**I**neering
- **N**atural Sciences and
- **T**echnology

These MINT-courses are highlighted in green in the module overview below.

3 Overview: Modules and Courses

Table 1: Curriculum B.Sc. International Operations and Logistics Management

Module	Course	ECTS-Credits in Semester								Workload			Type of course			Weight of grade
		1.	2.	3.	4.	5.	6.	7.	8.	SWS / contact hours	Selbst-studium / Self study	Total work-load	teaching mode	langu-age	assess-ment	
M1	**International Business Environment**	5								4	90	150			Written exam (2h)+PA	graded 5/183
M1.1	Introduction to International Business									2			Lecture	Engl.		
M1.2	Legal Aspects of International Business Transactions									2			Lecture	Engl.		
M2	**Management Fundamentals**	7								2	180	210			CA + Written exam (2 h)	g/ according to credits
M2.1	Accounting 1 - Financial Accounting									2			Lecture	Engl.		
M2.2	Principles of Marketing									2			Lecture	Engl.		
M2.3	Fundamentals of International Project Management									2			Lecture	Engl.		
M3	**Personal Skills**	3								2	60	90	Lecture	Engl.	CA	ungraded
M4	**IT/ Computer Science**	5								4	90	150	Lecture	Engl.	Written exam (2h)	g/ according to credits
M5	**Mathematics 1**	6								4	120	180	Lecture	Engl.	Testat, Written exam (2h)	g/ according to credits
M6	**Foreign Language 1**	3								4	30	90	Seminar	Engl. and other	see table below	g/ according to credits
M7	**Intercultural Management**		4							2	90	120	Seminar	Engl.	CA	g/ according to credits
M8	**Cost Accounting & Corporate Finance**		5							4	90	150		Engl.	CA + KL 2	g/ according to credits
M8.1	Accounting 2 - Comparative Cost Accounting									2			Lecture	Engl.		
M8.2	International Corporate Finance & Investment									2			Lecture	Engl.		
M9	**Engineering Mechanics**		4							4	60	120	Lecture & Lab	Engl.	KL 1	g/ according to credits
M10	**Fundamentals of Technical Design and Bill of Materials**		4							2	90	120	Seminar	Engl.	CA	g/ according to credits
M11	**Mathematics 2**		4							2	90	120	Lecture	Engl.	KL 1	g/ according to credits
M12	**Statistics**		4							2	90	120	Lecture	Engl.	KL 1	g/ according to credits
M13	**Operations Management – Orientation (Fundamentals of Production and Logistics Management)**		3							2	60	90	Seminar	Engl.	CA + KL 1	g/ according to credits
M14	**Foreign Language 2**		3							4	30	90	Seminar	Engl. and other	according to ESB languages	g/ according to credits

M15	**Quality Management**			5						4	90	150	Lecture & Lab	Engl.	L + Written Exam (2h)	g/ according to credits
M16	**Industrial Engineering**			5						4	90	150	Lecture	Engl.	CA + Written Exam (1h)	g/ according to credits
M17	**Business Processes and Business Data**			6						6	90	180			CA + Written Exam (2h)	g/ according to credits
M17.1	ERP Systems and Business Process Management									4			Lecture	Engl.		
M17.2	Data Analysis and Data Mining									2			Lecture	Engl.		
M18	**Automation in Industrial and Materials Handling, Transportation**			5						4	90	150	Lecture & Lab	Engl.	Lab & Oral Exam	g/ according to credits
M19	**Fundamentals of Electrical Engineering**			5						6	60	150	Lecture & Lab	Engl./ D	CA + Written Exam (2h)	g/ according to credits
M19.1	Fundamentals of Electrical Engineering									4			Lecture			
M19.2	Fundamentals of Electrical Engineering - Lab									2			Lab			
M20	**Interdisciplinary Case Study**			5						4	90	150	Seminar	Engl.	CA	g/ according to credits
M21	**Corporate Social Responsibility Project**				2					2	30	60	Project	Engl.	CA	g/ according to credits
M22	**Internship 1**				27					2	780	810			Project work/ report	ungraded
M22.1	Internship									0			Indiv. Assignment	D		
M22.2	Colloquium on Internship									2			Colloquium	Engl./ Ger.		
23	**Study Abroad Semester**					30					900	900		E/ X	Depending on partner university	ungraded
M24	**Internship 2 - Internship Abroad**						30			2	870	900		E/ X	Project work/ report	graded: 3/183
M24.1	Internship Abroad									0		0	Indiv. Assignment			
M24.2	Portfolio on internship									2		0	Portfolio	Engl./ German		
25-28	**Modules in Specialisation Area (Extra- or Intra-Logistics)**							24		18	450	720			see table below	
29	**Interdisciplinary Module 2: International Cross Module Seminar**							6		4	120	180	Lecture	German	CA	g/ according to credits
30	Integrative Module in Specialisation Area (Extra- or Intra-Logistics) – Table 2 and 3								6	4	120	180	Seminar	E/ D		g/ according to credits
31	Elective 1 in Specialisation Area Extra- or Intra-Logistics – Table 2 and 3								2	2	30	60	Lecture			g/ according to credits
32	Elective 2 in Specialisation Area Extra- or Intra-Logistics – Table 2 and 3								2	2	30	60	Lecture			g/ according to credits
33	Module: Individual Study Project								6	1	165	180	Project	E/ D	PA	ungraded

34	Module: Thesis and colloquium								14		420	420				g/ according to credits
34.1	Thesis									0		0	Indiv. Assign-ment	E /D		
34.2	Thesis colloquium									2		0	Collo-quium	E /D		
35	Semester 5-8 for Outgoings Dou-ble Degree						120									graded
	Total	29	31	31	29	30	30	30	30	111						Total: 183 graded cre-dits

Table 2: Modules specialisation area Extra-Logistcs

Module	Course	ECTS-Credits in Semester								Workload			Type of course-teaching modus and Language		assess-ment	weight of grade ac-cording to ECTS-Credits
		1.	2.	3.	4.	5.	6.	7.	8.	SWS	Self study	Total work-load	Type of course	Lan-guage		
25	**Business Aspects of Extra-Lo-gistics**							6			90	180			CA + KL 2	graded
25.1	Supply Chain Controlling							2		2		60	Seminar	Engl.		
25.2	Business to Business Marke-ting							2		2		60	Lecture	Engl.		
25.3	Transport- und Logistikrecht (Logistics Law)							2		2		60	Lecture	Engl.		
26	**Internationale Verkehrs- und Transportlogistik (Internatio-nal Transport Logistics)**							6		4	120	180	Seminar	E / D	CA + KL 2	graded
27	**Fundamentals of Supply Chain Management**							6		4	120	180	Lecture	E / D	KL 1	graded
28	**Distributions- und Han-delslogistik (Distribution and Retail Logistics)**							6		4	120	180	Lecture	E / D	CA + KL 2	graded
30	**Integrative Module Simula-tion Game Logistics**								6	4	90	180	Seminar	E / D	CA	graded
31	**Electives in Extra-Logistics (2 out of 3)**								4	4	60	120				graded
	Branchenspezifische Versor-gungslogistik (Industry-spe-cific Supply Logistics)								2	2		60	Lecture	E / D	KL 1	
	Maritime / Binnen-Logistik / Hafenlogistik (Maritime Logis-tics)								2	2		60	Lecture	E / D	CA + KL 1	
	Operations Research								2	2		60		E / D	CA + KL 1	

Table 3: Modules specialisation area Intra-Logistcs

Module	Course	ECTS-Credits in Semester								Class hours (total=SWS*15), self study			Type of course-teaching modus and Language		assessment	weight of grade according to ECTS-Credits
		1.	2.	3.	4.	5.	6.	7.	8.	SWS	Self study	Total work-load	Type of course	Langu-age		
25	**Business Aspects of Intra-Logistics**							6							KL 2	graded
M25.1	Advanced Innovation Management									2			Lecture	E / D		
M25.2	Lean Management									2			Lecture	E / D		
M25.3	Change Management									2			Lecture	E / D		
26	**Fabrik- und Lagerplanung mit Labor (Factory and warehouse planning)**							6		4			Lecture & Lab	E / D	CA + KL 1 or project	graded
27	**Identifikation- und Kommunikationssysteme mit Labor (Identification and communication systems)**							6		4			Lecture & Lab	E / D	CA + KL 2	graded
28	**Energie- / Ressourceneffizienz / Nachhaltigkeit (Sustainable operations)**							6		4			Lecture & Project	E / D	KL 1 or project report/presentation	graded
30	**Integrative Module in Intra-Logistics: Technical Planning Case Logistics**							6		4			Project	E / D	Project	graded
32	**Electives in Intra-Logistics (2 out of 3)**								4							graded
	Branchenspezifische Versorgungslogistik (Industry-specific Supply Logistics)								2	2			Lecture	E / D	KL 1	
	Anlagenlayoutplanung (Premises layout planning)								2	2			Lab	E / D	CA + KL 1	
	Operations Research								2	2			Lecture	E / D	CA + KL 1	

Table 4: Modules specialisation Double Degree (Incomings)

Module	Course	ECTS-Credits in Semester								Workload			Type of course-teaching modus and Language		assess-ment	weight of grade accord-ing to ECTS-Credits
		1.	2.	3.	4.	5.	6.	7.	8.	SWS	Self study	Total work-load	Type of course	Langu-age		
DD 1-4	Semester 1-4 for Incom-ings Double Degree	Sem 1-4, 120 ECTS-Credits														
Double Degree Major 1																
25	**Business Aspects of Extra-Logistics**					6					90	180			CA + KL 2	graded
25.1	Supply Chain Controlling					2				2		60	Seminar	Engl.		
25.2	Business to Business Mar-keting					2				2		60	Lecture	Engl.		
25.3	Transport- und Logistik-recht (Logistics Law)					2				2		60	Lecture	Engl.		
26	**Internationale Verkehrs- und Transportlogistik (In-ternational Transport Logis-tics)**					6				4	120	180	Seminar	E / D	CA + KL 2	graded
27	**Fundamentals of Supply Chain Management**					6				4	120	180	Lecture	E / D	KL 1	graded
28	**Distributions- und Han-delslogistik (Distribution and Retail Logistics)**					6				4	120	180	Lecture	E / D	CA + KL 2	graded
36	**Electives**					6				4	120	180				
	Business Elective												Seminar	E / D	CA	graded
	Engineering Elective												Seminar	E / D	KL2	graded
Double Degree Major 2																
M9	**Engineering Mechanics**					4				4	60	120	Lecture & Lab	Engl.	KL 1	g/ according to credits
M10	**Fundamentals of Technical Design and Bill of Materials**					4				2	90	120	Seminar	Engl.	CA	g/ according to credits
M13	**Operations Management – Orientation (Fundamentals of Production and Logistics Management)**					3				2	60	90	Seminar	Engl.	CA + KL 1	g/ according to credits
M16	**Industrial Engineering**					5				4	90	150	Lecture	Engl.	CA + Writ-ten Exam (1h)	g/ according to credits
M17	**Business Processes and Business Data**					6				6	90	180			CA + Writ-ten Exam (2h)	g/ according to credits
M17.1	ERP Systems and Business Process Management									4			Lecture	Engl.		
M17.2	Data Analysis and Data Mining									2			Lecture	Engl.		
M18	**Automation in Industrial and Materials Handling, Transportation**					5				4	90	150	Lecture & Lab	Engl.	Lab & Oral Exam	g/ according to credits
M19	**Fundamentals of Electrical Engineering**					5				6	60	150	Lecture & Lab	Engl./D	CA + Writ-ten Exam (2h)	g/ according to credits
M19.1	Fundamentals of Electrical Engineering									4			Lecture			
M19.2	Fundamentals of Electrical Engineering - Lab									2			Lab			
36	**Electives**					6				4	120	180				
	Business Elective												Seminar	E / D	CA	graded
	Engineering Elective												Seminar	E / D	KL2	graded

4 Modules and Courses

4.1 Module: International Business Environment

Module Registration No.	Exam-Reg.-No. 21420011
Semester	1
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	4.4.1. Introduction to International Business 4.4.2. International Business Law
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Joachim Gschwinder
Teaching language	English
Total number of ECTS	5
Learning Outcomes (module)	The module familiarizes students with the basic principles of doing business in an international environment. Students will understand the social, economic, political, technical, legal, financial and cultural environment of international business as well as legal problems arising in the area of international business
Examination/ Type of assessment	Written exam (2hrs.)
Weighting of Grade within overall programme	According to credits

4.1.1 Class: Introduction to International Business

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Ann Wolter
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The class familiarizes students with the basic principles of doing business in an international environment. After successful completion of this course the students should have gained the following knowledge and developed the following competencies:

	Professional competencies: - Understand the complexity of internationalisation and globalisation - Provide a systematic understanding of the environments of international business including social, economic, political, technical, legal, financial and cultural differences and how they impact on business practices and entrepreneurial opportunities. - Analyse current and emerging environments of international business economics, and their likely impact on business and entrepreneurial opportunities **Methodological competencies**: - Apply basic concepts of international business and in real-life examples - Apply key techniques for analysing and evaluating international opportunities, developing entry modes and constructing effective decision-making processes **Social competencies**: - Co-operatively solve problems in small teams **Personal competencies:** - n/a
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Business and Management. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 2.1. (Introduced) The class familiarizes students with the basic principles of doing business in an international cultural diverse environment and how they impact on business practices and entrepreneurial opportunities. LO 4.1. (Introduced)) Apply basic concepts of international business and in real-life examples as well as techniques for analysing and evaluating international opportunities.
Contents/ Indicative syllabus	Functional areas of companies are discussed against broader economic, financial, legal and socio-cultural contexts and international business processes are analysed for companies wishing to embark on global expansion. • Business and International Business • International Business Environment o Economy o Cultural o Financial o Legal aspects o Marketing & logistics
Teaching and learning methology	Lecture/seminar and group work
Miscellaneous	---
Indicative reading list	Hill, C.W.L. (2011). International Business: Competing in the Global Marketplace (8th Edition) McGraw-Hill, New York Leeman, J. (2014). Export Planning, Pearson

	Websites: www.beri.com www.agrifac.com (Case study) www.cia.com (World fact book) www.imf.org www.worldbank.org

4.1.2 Class: Legal Aspects of International Business Transactions

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Joachim Gschwinder
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The lecture provides a comprehensive introduction to the International Business Law. It aims to give students an understanding as well as practical knowledge of legal problems arising in the area of international business and to equip them with the skills needed to prevent and handle these problems. The course serves to provide students with a profound insight into the various legal regimes governing International Business Transactions on the national and on the global level. Students understand general principles of the legal rules underlying international sales transactions. They are able to identify legal requirements in doing international business. The lecture connects the requirements of successful national and international business activities and the legal framework within which they are operating.
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of international law. LO 2.1. (Introduced) Students will understand the legal and cultural environment of international business as well as legal problems arising in the area of business in an international, culturally diverse environment. LO 3.1. (Introduced) Students will understand the conflicts of law and learn to settle disputes. LO 4.1. (Introduced) It aims to give students an understanding as well as practical knowledge of legal problems arising in the area of international business and to equip them with the skills needed to prevent and handle these problems. They are able to identify legal requirements in doing international business.
Contents/ Indicative syllabus	• Introduction to International Business Law • Legal systems • Basics of German Law • Conflict of laws • International sales law • Dispute settlement

Teaching and learning methology	Lecture, case studies
Miscellaneous	
Indicative reading list	*August*, Ray, *Mayer*, Don, *Bixby*, Michael B., International Business Law, International ed of 6th revised ed, Pearson Education Limited, New Jersey 2012. Hand-outs and readers will be provided in the lecture.

4.2 Module: Management Fundamentals

Module Registration No.	Exam-Reg.-No. 21420021
Semester	1
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	4.2.1. Accounting I – Financial Accounting 4.2.2. Principles of Marketing 4.2.3. Fundamentals of International Project Management
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same frame-work and teaching the same level of competences.
Responsible profes-sor/ Module coordinator	Prof. Dr. Andreas Taschner
Credits (ECTS)	7
Learning Outcome (Module)	The module familiarizes students with the basic principles of key manage-ment disciplines, namely financial accounting, marketing, and project management. Special emphasis is put on the international dimension of these functional areas.
Examination/ Type of assessment	CA + Written Exam (2hrs.)
Weighting of Grade within overall programme	According to credits

4.2.1 Class: Accounting I – Financial Accounting

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Andreas Taschner
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The class familiarizes students with the basic principles of financial accounting. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understand relevance of financial accounting for business life and identify effects of business decisions on a company's financial accounts - Understand basic financial accounting concepts and apply them in real-life examples **Methodological competencies:** - transfer theoretical accounting concepts to real-life applications - critically reflect influence of financial accounting regulation on presentation of company accounts **Social competencies:** - co-operatively solve problems in small teams **Personal competencies:** - critically analyse how financial accounting information can give rise to unethical or irrational business behaviour
Contents/ Indicative syllabus	- Accounting as the „language of business" – purpose of financial accounting, need for regulation - Recording business transactions – principles of double-entry accounting - Accrual accounting versus cash-basis accounting - Recording the main types of business transactions: merchandising operations, inventory, PPE investments, liabilities, shareholders' equity - Completing the accounting cycle – closing the books and preparing financial statements - Key elements of financial statements – balance sheet, income statement, statement of cash flows - The effect of business decisions on a company's financial accounts
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Financial Accounting. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 3.1. (Introduced) Students critically analyse how financial accounting information can give rise to unethical or irrational business behaviour

	LO 4.1. (Introduced) Students transfer theoretical accounting concepts to real-life applications and critically reflect influence of financial accounting regulation on presentation of company accounts.
Teaching and learning methology	The class combines lecture-type sessions with exercises and small case studies to exemplify the concepts presented and discussed.
Miscellaneous	None
Indicative reading list	- Anthony, R. / Hawkins, D. / Merchant, K.: Accounting – Text and Cases, McGraw-Hill, latest edition - Collings, B. / McKeith, J.: Financial Accounting and Reporting, McGraw-Hill, latest edition - Harrison, W. / Horngren, C. / Thomas, C.W. / Suwardy, T.: Financial Accounting, Pearson, latest edition - Weygandt, J. / Kimmel, P. / Kieso, D.: Financial Accounting – IFRS Edition, wiley, latest edition

4.2.2 Class: Principles of Marketing

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Kristina Steinbiß
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	After the successful completion of the module the students should have developed the following competencies: • **Professional competencies:** critically discuss the relevance and success factors of different marketing approaches; recapitulate and apply the value based marketing concept in business situations; understand the importance of calculating and capturing the value of the customer. • **Methodological competencies:** develop a marketing strategy; transfer and apply theoretical marketing knowledge to real-life business cases; develop presentation skills, familiarize with basic research methodology. • **Social competencies:** refine their oral communication skills; improve their ability to work in teams in order to solve a given complex marketing situation; give and receive feedback by fellow students in a structured manner. **Personal competencies:** develop the ability to think and act proactively as well as customer/marketing oriented
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Marketing. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 3.1. (Introduced) Students develop the ability to think and act proactively taking under consideration ethical behavior as well as customer/marketing oriented practical problems.

	LO 4.1. (Introduced) Students develop a marketing strategy; transfer and apply theoretical marketing knowledge to real-life business cases; develop presentation skills, familiarize with basic research methodology.
Contents/ Indicative syllabus	The course is an introduction to the language and issues of marketing with an emphasis on learning to develop responsive marketing strategies that meet customer needs. The course focuses on basic marketing concepts, the role of marketing in the organization, and the role of marketing in society. Topics include market segmentation, product development, promotion, distribution, and pricing. Other topics, which will be incorporated into the course, are external environment (which will focus on integrative topics with marketing, such as economics, politics, government, and nature), international/global marketing with relevance to cultural diversity and ethics.
Teaching and learning methology	The course is highly interactive between the class and the instructor. Through case studies/presentations, problems, and specific company client activities, students will have the opportunity to use the concepts, ideas, and strategies presented in class. Problem-solving sessions occur in both individual (primarily) and team (occasionally) settings. This course will incorporate a lecture and project-based approach to the principles of marketing.
Miscellaneous	None
Indicative reading list	• Principles of Marketing, 17th ed. by Kotler/Armstrong, Pearson Education 2017

4.2.3 Class: Fundamentals of International Project Management

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr.-Ing, Harald Augustin
Teaching language	English
Contact hours per week	2 SWS
Learning outcomes	This module is designed to serve two main objectives: 1. To raise the individual's knowledge and skill levels in team building and team working skills. Gain skills using methods, techniques and tools, which will improve participants' effectiveness as team leaders and team members. 2. To raise students' knowledge of project management in terms of their ability to plan, organize, execute and control projects. Upon successful completion, students will have developed the following competencies: – Professional competencies: Students have developed the basic competencies in project management such as project definition and evaluation; planning and scheduling; resource selection, communication and feedback issues and cultural considerations – Methodological competencies: ability to analyze processes, methods and systems used to plan, schedule and monitor projects.

	– Social competencies: perform effectively as a team member while having also developed the project leadership skills within a project team – Personal competencies: increase personal and work effectiveness in communication; exercise self-reflection; improve self-awareness and self-management; become aware of complexity of working within a project team.
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Project Management. They are constantly able to practice their written and oral language skills in English. LO 4.1. (Introduced) Students get ability to analyze processes, methods and systems used to plan, schedule and monitor projects. They have developed the basic competencies in project management such as project definition and evaluation; planning and scheduling; resource selection, communication
Contents/ Indicative syllabus	- Changing World and Skill Requirements - Introduction to Project Management - Project Selection - Project Life Cycle and Organisation - Project Goals and the Project Manager - Develop Project Charter - Project Integration Management - Project Scope Management - Project Time Management - Project Cost Management - Project Quality Management - Project Human Resource Management - Project Communication Management - Project Procurement Management - Project Executing - Project Monitoring & Controlling - Project Closing
Teaching and learning methology	Lecture and workshops
Miscellaneous	None
Indicative reading list	Basics: – Meredith, Jack R. / Samual A. Mantel (2012): Project Management: A Managerial Approach. Hoboken, NJ: Wiley, 8th edition. ISBN 978-0470533024 – Köster, Kathrin (2009): International Project Management. London: Sage Publications. ISBN 978-1412946216 Further readings: – Rad, Parviz F. / Ginger Levine (2006): Metrics for project management : formalized approaches. Vienna, VA : Management Concepts. ISBN 1-56726-166-3 – Jakoby, Walter (2010): Projektmanagement für Ingenieure: Gestaltung technischer Innovationen als systemische Problemlösung in strukturierten Projekten. Wiesbaden: Vieweg + Teubner. ISBN 978-3-8348-0918-6, eBook – Wanner, Roland (2007): Earned Value Management: so machen Sie Ihr Projektcontrolling noch effektiver. Norderstedt: Books on demand. ISBN 978-3-8370-0657-5

	– Braehmer, Uwe (2009): Projektmanagement für kleine und mittlere Unternehmen: Das Praxisbuch für den Mittelstand. München : Hanser Verlag, 2. überarbeitete Auflage. ISBN 978-3-446-42160-8, eBook – Drees, Joachim / Conny Lang / Marita Schöps (2014): Tipps, Tools und Tricks aus der Praxis für die Praxis. München: Hanser. ISBN 978-3-446-44225-2, eBook – Drews, Günter (2014): Praxishandbuch Projektmanagement. Freiburg; München: Haufe-Lexware. ISBN 978-3-648-05090-3

4.3 Module: Personal Skills

Module Registration No.	Exam-Reg.-No. 21420031
Semester	1
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	4.3. Personal Skills
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any international programme requiring students to be familiar with the concepts of applied research and to be competent in presentation techniques.
Responsible professor/ Module coordinator	Prof. Dr. Steinbiß
Total number of ECTS	3
Learning outcomes of module	The module fosters students‘ personal competencies in effectively preparing and presenting arguments, lines of reasoning and research results. Students learn to conduct scientific research, write academic texts, and give clear and convincing presentations to a public audience.
Examination/ Type of assessment	CA (ungraded)
Weighting of Grade within overall programme	n/a

4.4 Module: IT / Computer Science

Module Registration No.	Exam-Reg.-No. 21420041
Semester	1
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	IT / Computer Science
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same frame-work and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Volker Reichenberger
Lecturers name (contact details see ESB-website)	Prof. Dr. Volker Reichenberger
Teaching language	engl.
Credits (ECTS)	5
Total work load	150 hours
Contact hours per week	4 SWS
Examination/ Type of assessment	Written Exam (2hrs)
Weighting of Grade within overall programme	According to credits
Learning outcomes	The class familiarizes students with basic principles of computer. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understanding of computer architecture and operating systems. - Writing computer programs - Developing and analyzing algorithms **Methodological competencies:** - The programming language Python - Procedural Programming - Object-oriented Programming - UML **Social competencies:** - Co-operatively solve problems in small teams

	Personal competencies: n/a
Module-specific contribution to AoL learning objectives	LO 1.1. (Introduced)Students get familiar with specific terms from the field of computer science. They are constantly able to practice their written and oral language skills in English. LO 4.1. (Introduced) Students apply the basic methods of requirements gathering and structure requirements in Use Cases and Activity Diagrams. They have a basic proficiency at casting queries in SQL and applying them in typical logistical work environment.
Contents/ Indicative syllabus	• Computer architecture • Operating Systems • The Python Programming Language • Procedural Programming • Object-Oriented Programming and UML • Algorithms and Data Structures • Algorithmic Complexity • Computer Security
Teaching and learning methology	Lecture/seminar and computer lab exercises
Miscellaneous	None
Indicative reading list	• Robert Sedgewick und Kevin Wayne : Computer Science: An Interdisciplinary Approach • John M. Zelle: Python Programming: An Introduction to Computer Science • Abelson und Sussman: Structure and Interpretation of Computer Programs

4.5 Module: Mathematics 1

Module Registration No.	Exam-Reg.-No. 21420051
Semester	1
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Mathematics 1
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same frame-work and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Dirk Schieborn
Lecturers name (contact details see ESB-website)	Prof. Dr. Dirk Schieborn
Teaching language	engl.
Credits (ECTS)	6
Total work load	150 hours
Contact hours per week	4 SWS
Examination/ Type of assessment	Written Exam (2hrs.)
Weighting of Grade within overall programme	According to credits
Learning outcomes	The aim of the course is to acquire basic mathematical skills through practical examples which need to be used during the time of study. After these classes, students should: – have understood the mathematical terms, their context and uses for the economics part of the programme – have understood engineering maths as a basis for working as an engineer and also to have laid the foundations for electrical engineering and mechanics through practical examples
Module-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Mathematics. They are constantly able to practice their written and oral language skills in English. LO 4.1. (Introduced) Students understand engineering maths and learn to use matrices, functions, differentiation and integration and adapt them to practical problems.

Contents/ Indicative syllabus	Topics: – Sequences and series – Number systems – Complex numbers – Real functions of real numbers – Differentiation and Integration – Matrices and determinants
Teaching and learning methology	Lecture and tutorials
Miscellaneous	None
Indicative reading list	Basics: – Papula, Lothar: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler, Vieweg Verlag, 2003. - Knut Sydsaeter, Peter Hammond, Arne Strom: Essential Mathematics for Economic Analysis, Prentice Hall, 2012. - Karl Bosch: Mathematik für Wirtschaftswissenschaftler: Einführung. Oldenbourg, 2011. – Knut Sydsaeter, Peter Hammond: Mathematik für Wirt-schaftswissenschaftler, Pearson, 2002.

4.6 Module: Foreign Language 1

Module Registration No.	Exam-Reg.-No. variable
Semester	1
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	English or Second Foreign Language
How frequently is the module offered	Every semester
Admission requirements	C 1 level of English and C1 level of German for other languages. Placement test for the second business language at the beginning of the student's studies to determine their initial course level.
Level	Undergraduate
Transferability of the module to other programmes	As each level offered is based on the levels of the CEFR (Common European Framework of Reference for Languages), these modules are transferable to any programme following this framework.
Responsible professor/ Module coordinator	Prof. Yoany Beldarrain, Ph.D
Lecturers name (contact details see ESB-website)	Seasonal lecturers, all are native speakers.
Teaching language	Various. The following languages are available: Spanish, French, Chinese (Mandarin) or German

Credits (ECTS)	3
Total work load	120 hours (60 hours lecture time, 60 hours self-study)
Contact hours per week	4 SWS
Examination/ Type of assessment	For Business English, Spanish, Chinese, French & German: Continuous assessments (CA) All CAs are determined based on the specific language and proficiency level. CAs include written and oral assessments, active participation and attendance.
Weighting of Grade within overall programme	According to credits
Learning outcomes	**After successful completion of the module students should have developed the following competencies, as appropriate for their instructional level:** **Professional competence:** • Ability to talk and write about business topics relevant to their business degree programme in the target language using appropriate business vocabulary, register and structures. • Understanding of the current business, political and economic environment of the country in which they will spend the second part of their studies. • Development of an appreciation of the cultural differences between Germany and this country and how these impact doing business. • Acquisition of the academic writing skills necessary for the second part of their studies in the foreign country. Job application and interview skills in the foreign language. **Methodological competence:** • Students will identify and select communication methods best suited for specific business scenarios. • Students work in teams, sometimes even virtual teams. They have a chance to use a variety of presentation, facilitation and meeting methods. • E-learning elements are part of some of the courses and these require good self-organisation and discipline **Social competence:** • Through group work, students will improve their networking and teambuilding skills. • Students will have to present complex topics in the chosen target language and will gain more self-confidence in expressing themselves and making themselves understood. **Personal competence:** • Students will improve self-confidence using their foreign-language business skills for different purposes

Module-specific contribution to AoL learning objectives	LO 1.1: (Reinforced) Students identify and select communication methods best suited for specific business and technical scenarios. They get familiar with specific terminology in the field of business and operations management. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English and contains written and oral exercises, role-plays, conversation, case studies etc. LO 2.1: (Introduced) Students improve their language competency which helps them understand cultural traits such as habits, customs, proverbs, etc.
Contents/ Indicative syllabus	****Level-specific language competencies for Spanish, French & Chinese are located in the ESB Sprachkonzept module descriptions in Relax. All language competencies are taught in a business context, using business-related resources. For example:** The world of work and the economies where the target language is spoken. Acquisition of vocabulary for business presentations, expansion and development of business vocabulary, reading strategies (specialist press) and summary writing, listening strategies and taking notes during lectures in the target language, company presentations and papers on business issues. Additional topics might include communication exercises to improve pronunciation and expand vocabulary, consumption, and advertising, marketing strategies, legal forms of companies, company start-ups and corporate culture in the target language among others. **Business English**: Introduction to business subjects in English; development of Business English vocabulary for degree subjects (International Operations Management and Logistics) as well as vocabulary necessary to read relevant business publications; Writing skills: business correspondence and report writing, including reading comprehension and responding critically. Special focus will be given to verb tense and register. The verbal and written communication exercises will be customized depending on the needs of the group. **Students will gain the following additional skills irrespective of target language:** **Business Soft Skills:** • Development of business soft skills combined with sensitivity to international business cultures. **Intercultural Competence/Intercultural Communication:** • Preparation of students for living, working and studying abroad; insights into the national and business cultures of these countries; identification of differences to Germany • Introduction to intercultural terminology. How we perceive ourselves and how others see us. • Dealing with stereotypes critically. Comparison of educational objectives. Basic cultural differences between Germany and Spain, France, China, and business relations with those countries.

	• Introduction business culture, differences in styles of business negotiations
Teaching and learning methology	Case studies, short papers, presentations, projects, discussions, role plays, videos, news articles, etc. Activities include both individual and small group tasks. Some oral elements may be filmed. Interactive online exercises, e-learning elements, problem-based learning, flipped classroom elements.
Miscellaneous	None
Indicative reading list	The indicative reading list is specific to each target language, each level, and each teacher. Full details are provided to the students during the first week of class. **Business English:** Students will receive all necessary literature via handouts. These will include extracts, for example, from magazine or newspapers such as *The Economist*, *Time*, *Business Spotlight*. Access to good grammar book is recommended: - Murphy, Raymond: English Grammar in Use, 4th Edition; Klett, 2012 **For Business Spanish:** -Meta Profesional A1-A2 Spanisch für den Beruf (2015)/Klett -Meta Profesional B1 Spanisch für den Beruf (2015)/ Klett -Additional literature will be announced in class (depends on the course level). **For Business French, Business Chinese, Business German:** -To be announced in class (depends on the course level).

4.7 Module: Intercultural Management

Module Registration No.	Exam-Reg.-No. 21420061
Semester	2
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Intercultural Management
How frequently is the module offered	Every semester
Admission requirements	Good English language ability, some initial experience with other cultures or for those coming from a non-German cultural background
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any international programme requiring students to be interculturally competent.

Responsible professor/ Module coordinator	Prof. Dr. Hazel Grünewald
Lecturers name (contact details see ESB-website)	Prof. Dr. Hazel Grünewald
Teaching language	engl.
Credits (ECTS)	4
Total work load	120 hours
Contact hours per week	2 SWS
Examination/ Type of assessment	Continuous assessment + oral presentation
Weighting of Grade within overall programme	According to credits
Learning outcomes	Raising awareness of foreign cultures and behaviour patterns is the primary aim of the class. After this class students should be in the position to: - Evaluate the influence of intercultural differences in international business relationships and adapt their behaviour according to these differences. - Prepare themselves appropriately in advance for new intercultural situations. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - knowledge and application of current intercultural management concepts and approaches; competence to analyse the influence and the consequences of cultural differences in specific international business situations. **Methodological competencies**: - problem-solving skills (how to use theoretical concepts to solve problems in case studies). **Social competencies**: - advanced presentation and teamworking skills (through group discussions and group presentations); - basic competence to interact successfully in an intercultural business environment. **Personal competencies:** - awareness of the own cultural profile, the individual strength and weaknesses in intercultural business situations.
Module-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Culture in an international context. They are constantly able to practice their written and oral language skills in English. LO 2.1. (Reinforced) Students evaluate the influence of intercultural differences in international business relationships and adapt their behaviour according to these differences. They prepare themselves appropriately in advance for new intercultural situations.

	LO 3.1. (Reinforced) Students get an awareness of the own cultural profile, ethical behaviour, the individual strengths and weaknesses in intercultural business situations. They seek advice, integrate suggestion and reflect what they are doing. The learn how to cope with conflict situations.
Contents/ Indicative syllabus	Fundamentals of intercultural communication; approaches to intercultural management, culture-specific examples, intercultural communication and management in practice
Teaching and learning methology	Lecture, discussions, case studies, film extracts, movies, E-Learning, simulations and exercises.
Miscellaneous	
Indicative reading list	Basics: - Deresky, Helen (2011): International Management, Managing Across Borders and Cultures, 7th ed., Pearson - Gesteland, Richard R.(1999): Global Business Behaviour, Orel Füssli - Adler, Nancy J. (2008): International Dimensions of Organizational Behavior. 5thEdition. Stanford: Cengage Learning Services. - Bennett, M.J. (Ed.) (1998): Basic Concepts of Intercultural Communication. Yarmouth: Intercultural Press. - Bolten, J. (2007): Einführung in die Interkulturelle Wirtschaftskommunikation.UTB. - Browaeys, Marie-Joëlle; Price, Roger (2011): Understanding Cross-Cultural Management. Second Edition. Essex: Pearson. - Deardorff, Darla K. (2009): The SAGE Handbook of Intercultural-Competence. Thousand Oaks: Sage. - Chhokar, J.S.; Brodbeck, F.C.; House, R.J. (Eds.) (2008): Culture and Leadership Across the World: The GLOBE Book of In-Depth Studies of 25 Societies. New York: Lawrence Erlbaum. - Hofstede, Geert; Hofstede, Geert Jan, Michael Minkov: Cultures and Organizations –Software of the Mind, 2010 - Schein, Edgar H. (2010): Organizational Culture and Leadership. 4th Edition. San Francisco: Jossey-Bass - Schmidt, Wallace V.; Conaway, Roger N.; Easton, Susan S.; Wardrope, William J. (2007): Communicating Globally. Intercultural Communication and International Business. Thousand Oaks: Sage. - Thomas, Alexander; Kammhuber, Stefan; Schroll-Machl, Sylvia (Ed.)(2010): Handbook of Intercultural Communication and Cooperation. Basics and Areas of Application. Göttingen: Vandenhoeck & Ruprecht.

4.8 Module: Cost Accounting and Corporate Finance

Module Registration No.	Exam-Reg.-No. 21420071
Semester	2
Duration of module	1 Semester
Type of module	Compulsory

Courses included in the module	4.8.1. Accounting II – Comparative Cost Accounting 4.8.2. International Corporate Finance & Investment
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any international programme requiring students to possess good knowledge of the fundamentals of cost accounting and corporate finance.
Responsible professor/ Module coordinator	Prof. Dr. Andreas Taschner
Credits (ECTS)	5
Learning outcomes of module	The module familiarizes students with the basic concepts and main methods of cost accounting and corporate financial management. After successful completion of the module students know how to solve practical problems by applying cost accounting and investment appraisal tools.
Examination/Type of Asssessment	CA + written examination (2 hrs.)
Weighting of Grade within overall programme	According to credits

4.8.1 Class: Accounting II – Comparative Cost Accounting

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Andreas Taschner
Teaching language	engl.
Contact hours per week	4 SWS
Learning outcomes	After having attended the class students will have a thorough understanding of the principles of cost accounting and will be able to apply these principles in typical practical business settings. Special emphasis is put on the comparison of the differences between German cost accounting and Anglo-American concepts. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understand basic cost accounting concepts and apply them in real-life examples - Understand relevance of cost accounting concepts in business life and identify appropriate costing method in a given situation **Methodological competencies:** - transfer theoretical costing concepts to real-life applications

	- reflect strengths and weaknesses of different cost accounting approaches and their applicability in business practice **Social competencies**: - co-operatively solve problems in small teams **Personal competencies:** - critically analyse conflicts between commercially attractive options and ethical behaviour
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with further specific terms from the field of Accounting. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 3.1. (Introduced) Students critically analyse conflicts between commercially attractive options and ethical behaviour. LO 4.1. (Introduced) Students transfer theoretical costing concepts to real-life applications. They reflect strengths and weaknesses of different cost accounting approaches and their applicability in business practice
Contents/ Indicative syllabus	Introduction to Cost Accounting – an overview o Differentiate between Cost Accounting, Management Accounting, Financial Accounting and Corporate Finance o The role of cost accounting in business o A short introduction to the discipline of comparative management accounting Cost Accounting - Cost terms and cost purposes o German accounting measures (“Auszahlung, Ausgabe, Aufwand, Kosten”) and their (partly non-existing) Anglo-American counterparts o Cost behavior and cost terms: Variable costs vs. fixed costs, cost functions, direct costs vs. indirect costs, total costs vs. unit costs, capitalized costs vs. period costs o Definition cost of goods sold (COGS), Manufacturing costs Cost accounting – Product Costing, Cost Allocation o Principles of cost allocation o The basic (German) cost accounting system (Allocation according to cost types (Kostenartenrechnung), according to cost centers (Kostenstellenrechnung), according to cost objects (Kostenträgerrechnung)) o Marginal costing, direct costing (“Teilkostenrechnung”), cost-volume-profit analysis, break-even analysis o Activity Based Costing (and differences to German process costing) Applying costing concepts for decision making o Relevant information for decision making o one-time only special order, o customer emphasis (customer profitability analysis), o equipment replacement, o insourcing vs. outsourcing o product-mix decisions

Teaching and learning methology	The class combines lecture-type sessions with small exercises and an accompanying case study that is used to exemplify the concepts presented and discussed.
Miscellaneous	None
Indicative reading list	• Coenenberg, Adolf / Fischer, Thomas / Günther, Thomas: Kostenrechnung und Kostenanalyse, 8. Aufl., Stuttgart 2012 • Friedl, Gunther / Hofmann, Christian / Pedell, Burkhard: Kostenrechnung – Eine entscheidungsorientierte Einführung, 2. Aufl., München 2013 • Horgren, Charles / Datar, Srikant / Rajan, Madhav: Cost accounting – a managerial emphasis, 14. Aufl., Boston 2012 Further reading suggestions will be made available to participants at the beginning of the class.

4.8.2 Class: International Corporate Finance and Investment

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Johanna Bath
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	After having attended the class students will have a thorough understanding of the principles of investment appraisal and corporate finance. They will be able to apply these principles in typical practical business settings. Special emphasis is put on the application in an international context. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understand basic concepts of investment appraisal and corporate finance and apply them in real-life examples - Understand relevance of investment and financing decisions in business life and identify possible alternatives in a given situation **Methodological competencies:** - transfer theoretical investment and finance concepts to real-life applications - reflect strengths and weaknesses of different investment and finance approaches and their applicability in business practice **Social competencies:** - co-operatively solve problems in small teams **Personal competencies:** - critically analyse conflicts between commercially attractive options and ethical behaviour

Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with further specific terms from the field of Finance and Investment. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 3.1. (Introduced) Students critically analyse conflicts between commercially attractive options and ethical behaviour. LO 4.1. (Introduced) Students transfer theoretical investment and finance concepts to real-life applications. They reflect strengths and weaknesses of different investment and finance approaches and their applicability in business practice.
Contents/ Indicative syllabus	- The role of finance and investment decisions in the enterprise, relevance of finance and investment for company management and company goals - Fundamentals of corporate financial management - Management of corporate capital, types of capital - Cost of capital - Financing options, overview of main sources of capital - Investment appraisal techniques - Measures of investment attractiveness (NPV, IRR, pay-back, etc.) - Fundamentals of capital budgeting - The role of risk in corporate finance
Teaching and learning methology	The class combines lecture-type sessions with small exercises and an accompanying case study that is used to exemplify the concepts presented and discussed.
Miscellaneous	None
Indicative reading list	• Brealey, Richard A./ Myers, Steward C. / Marcus, Alan J.: Funda-mentals of Corporate Finance, McGraw-Hill, latest edition • Perridon, L. / Steiner, M.: Finanzwirtschaft der Unternehmung, Vahlen, latest edition • Götze, U. / Northcott, D. 7 Schuster, P.: Investment Appraisal – methods and Models, Springer, latest edition Further reading suggestions will be made available to participants at the beginning of the class.

4.9 Module: Engineering Mechanics

Module Registration No.	Exam-Reg.-No. 21420081 DD Exam-Reg.-No. 21424611
Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. A. Braun/Florian Fleißner
Credits (ECTS)	4
Contact hours per week	4 SWS

Learning outcomes	After this lecture students should have the following knowledge and competencies: • **Technological knowledge**: acquisition of the basic theories of Engineering Mechanics for rigid bodies in the areas Statics and Dynamics. • **Methodological knowledge:** acquisition of the competence to attack in a systematic way simple tasks of Statics and Dynamics which can be found in Logistics Operations. This includes the analysis of the problems, the modelling and the necessary calculations. • **Practical competencies/skills/abilities**: the lecture is accompanied by close to practise exercises which serve the students to analyse and model physical processes in Logistics Operations and finally perform numerical calculations. Students will be able after this class to solve simple tasks out of the industrial context. • **Social competencies:** students are encouraged to solve the above mentioned exercises in small groups in order to stimulate and to promote the ability to work in a team.
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Engineering Mechanics. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1.(Introduced) Students acquire the competence to attack in a systematic way simple tasks of Statics and Dynamics which can be found in Logistics Operations. This includes the analysis of the problems, the modelling and the necessary calculations.
Contents/ Indicative syllabus	Engineering Mechanics in the context of Logistics Operations: <u>Statics</u> – Rigid-body, forces, action-reaction-principle, – Equilibrium of forces and momentums, free body diagram. – central planar and general force systems – support requirements, moment of forces – internal force variables – adhesion and friction <u>Dynamics</u> – Rectilinear Kinematics of a particle, – Kinematics of planar motion of rigid bodies, – Kinetics of planar movements of concentrated masses and bodies, – Law of inertia, accelerated motion – Energy laws – Power and Efficiency
Teaching and learning methology	Lecture (70%), practical examples and exercises which are taylored for the logistics operations area (30%).
Examination/Type of Asssessment	Written Exam 2 hrs.
Miscellaneous	None
Indicative reading list	Hibbeler R.C.(2013): Engineering mechanics: statics and dynamics, Pearsons Education, Upper Saddle River, NJ, 13th edition, ISBN 978-0-13-291548-9 Gabbert, U. et.al. (2013): Technische Mechanik für Wirtschaftsingenieure, Fachbuchverlag Leipzig, München-Wien, 7. Auflage, ISBN13 978-3446432536

4.10 Module: Fundamentals of Technical Design and Bill of Materials

Module Registration No.	Exam-Reg.-No. 21420091 DD Exam-Reg.-No. 21424621
Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr.-Ing. Jochen Orso
Teaching language	engl.
Credits (ECTS)	4
Total work	60 hours
Contact hours per week	2 SWS
Learning outcomes	Ability to read and understand engineering drawings including drawing annotations e.g. dimensions, tolerances,.., to provide drawings by hand sketching, to interpret Bill of Materials and to know the basics of 3 Dimensional Computer Aided Design (CAD).
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field of Technical Design. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Introduced) Students learn hand sketching, to interpret Bill of Materials and to use three Dimensional Computer Aided Design (CAD). They learn how to adapt these concepts in real business life situations.
Contents/ Indicative syllabus	Fundamentals of engineering drawings, including: - line styles and types - the arrangement of multiple views and projections - scales - dimensions - sectioning Freehand sketches for engineering drawings Basics of Computer Aided Design (CAD)
Teaching and learning methology	Lecture with practical exercises and CAD-Laboratory
Examination/Type of Asssessment	CA
Indicative reading list	Green: The Geometrical Tolerancing Desk Reference – Creating and Interpreting ISO Standard Technical Drawings, Elsevier, Amsterdam, 2005 Simmons: Manual of Engineering Drawing - Technical product specification and documentation to British and international standards, Butterworth-Heinemann, Burlington, 2012 Childs: Mechanical Design Engineering Handbook, Butterworth-Heinemann, 2014 Henzold: Geometrical dimensioning and tolerancing for design, manufacturing and inspection: a handbook for geometrical product specifications using ISO and ASME standards, Butterworth-Heinemann, Burlington, 2006

	Griffiths: Engineering drawing for manufacture, Kogan Page Science, London, 2003

4.11 Module: Mathematics II

Module Registration No.	Exam-Reg.-No. 21420101
Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Dirk Schieborn
Teaching language	engl.
Credits (ECTS)	4
Contact hours per week	2 SWS
Learning outcomes	The aim of the class is to obtain mathematical skills through practical examples which will be used more deeply during the course of study. After this class students will be able to • understand the mathematical terms and their context and use, as required for the economics part of the degree programme. • understand engineering mathematics as the basis for engineering work and to master the basic skills of electrical and mechanical engineering through practical examples
Course-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with further specific terms from the field of Mathematics. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Reinforced). Students understand more complex mathematical concepts such as vector analysis, Fourier and Laplace transforms etc. in order to master subsequent electrical and mechanical engineering tasks through practical examples.
Contents/ Indicative syllabus	Topics: – Vector analysis – Fourier and Laplace transforms – Common differential equations – Numerical analysis
Teaching and learning methology	lecture and tutorials
Miscellaneous	None
Indicative reading list	- Papula, Lothar: Mathematische Formelsammlung für Ingenieure und Naturwissenschaftler, Vieweg Verlag, 2003. - Knut Sydsaeter, Peter Hammond, Arne Strom: Essential Mathematics for Economic Analysis, Prentice Hall, 2012. - Karl Bosch: Mathematik für Wirtschaftswissenschaftler: Einführung. Oldenbourg, 2011.

	– Knut Sydsaeter, Peter Hammond: Mathematik für Wirt-schaftswissen-schaftler, Pearson, 2002.

4.12 Module: Statistics

Module Registration No.	Exam-Reg.-No. 21420111
Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Reichenberger/Hermawan
Teaching language	engl.
Contact hours per week	2 SWS
Credits (ECTS)	4
Learning outcomes	In this module three aims are essentially pursued: – Students should develop an overall basic understanding of statistical data analysis and learn the necessary procedures – Students should be able to master the instruments of quantitative analysis – Students should gain an insight into statistical prognosis and test methods and should be able to use standard methods After completing this class students will: – Know about statistical methods, – Be able to successfully make use of techniques and tools to solve business problems.
Course-specific contri-bution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with specific terms from the field Statistics. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in Eng-lish. LO 4.1. (Reinforced) Students understand discrete frequency distribu-tions, regression analysis, time-dependent variables etc. and learn to suc-cessfully make use of these techniques and tools to solve business prob-lems.
Contents/ Indicative syllabus	– Introduction to statistics – Discrete frequency distributions, – Summary statistics, statistical dispersion. – Independence, – Correlation, – Regression analysis, – Time-dependent variables, – Probability, – Random variable, – Discrete and continuous probability distributions

Teaching and learning methology	Lecture and tutorials
Miscellaneous	None
Indicative reading list	Basics: – Rainer Fischbach, Ernst Unsinn: Betriebliche Statistik. Expert Verlag Grafenau, 2002. – McClave, J.; Benson, P.; Sincich, T.: Statistics for business and economics. Prentice Hall 2002. Further, current literature will be made available to students on a server accessible via the internet.

4.13 Module: Operations Management – Orientation

Module Registration No.	Exam-Reg.-No. 21420121 DD Exam-Reg.-No. 21424631
Semester	2
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Fundamentals of Production and Logistics Management
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr.-Ing. Dominik Lucke
Lecturers name (contact details see ESB-website)	Prof. Dr.-Ing. Dominik Lucke
Teaching language	engl.
Credits (ECTS)	3
Total work load	150 hours
Contact hours per week	2 SWS
Examination/ Type of assessment	CA + KL 1
Weighting of Grade within overall programme	According to credits

Learning outcomes	The students learn the foundations of production and logistics as well as the interaction and interference between both – complemented by trends and strategies that have a significant impact on each of the areas. The concept of holistic planning, design and control of production systems and of logistical systems is imparted. After successful completion of this course the students will have gained the following knowledge and developed the following competencies: **Professional competencies:** - Explain the prime elements and structures of production systems by the means of example and match real solutions from the industry in a global context - Reason the impact of the initiative "Industrie 4.0" to value stream chains and explain hybrid production systems on the basis of examples - Recognize that calculated decisions for sourcing strategies and the design of long-term, cooperative relationships with suppliers lead to market-conform logistical concepts that improve the performance of logistical systems substantially. - Evaluate and select suitable suppliers within an international sourcing process that supports a logistical strategy. - Assess different options of organizing cross-border sourcing processes. - Design and scale the logistics for production systems in accordance with the market requirements. - Know elements of green logistics and holistic sustainability and understand the interferences **Methodological competencies**: - Systematically apply basic concepts of operations management to typical real-life questions - Understand strengths and weaknesses of different concepts in operations management **Social competencies**: - --- **Personal competencies:** - reflect own career intentions and assess desired personal specialisation area
Module-specific contribution to AoL learning objectives	LO 1.1. (Introduced) Students get familiar with further specific terms from the field of Operations Management. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Reinforced) Students learn to systematically apply diverse concepts of operations management to typical real-life questions. They understand strengths and weaknesses of different concepts in operations management.
Contents/ Indicative syllabus	<u>Production:</u> ▪ Introduction, terms and definition ▪ Materials ▪ Product development

	▪ Production, manufacturing procedures, operations, types, organisation, ▪ Additive manufacturing ▪ Production systems and management concepts <u>Logistics:</u> ▪ Material management ▪ Intake, storage, commissioning, transport ▪ Information systems (Business application systems, PPS,) ▪ Sustainablity and faire trade
Teaching and learning methology	Lecture and practical exercises in ESB Logistics-Learning-Factory
Miscellaneous	
Indicative reading list	▪ Produktionsmanagement (Springer-Lehrbuch) from Günter Fandel, Allegra Fistek and Sebastian Stütz, Springer (7. Oktober 2010) ▪ Produktion und Logistik (Springer-Lehrbuch) (German Edition) from Hans-Otto Gunther, Springer (22. November 2011); ISBN-13: 978-3642251641; Auflage: 9. Aufl. 2012 ▪ Logistik: Wege zur Optimierung der Supply Chain from Christof Schulte, Vahlen (20. Dezember 2012); ISBN-13: 978-3800639953 | Auflage: 6., überarbeitete und erweiterte Auflage

4.14 Module: Foreign Language – 2

Module Registration No.	Exam-Reg.-No. variable
Semester	2
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Business English or German 2 or Second Foreign Language
How frequently is the module offered	Every semester
Admission requirements	Business English or German 1 or Second Foreign Language 1
Level	Undergraduate
Transferability of the module to other programmes	As each level offered is based on the levels of the CEFR (Common European Framework of Reference for Languages), these modules are transferable to any programme following this framework.
Responsible professor/ Module coordinator	Prof. Yoany Beldarrain, Ph.D.
Lecturers name (contact details see ESB-website)	Seasonal lecturers, all are native speakers.
Teaching language	Various. The following languages are available: Spanish, French, Chinese (Mandarin) or German

Credits (ECTS)	3
Total work load	120 h (60 h contact, 60h self-study)
Contact hours per week	4 SWS
Examination/ Type of assessment	For Business English, Spanish, Chinese, French & German: Continuous assessments (CA) All CAs are determined based on the specific language and proficiency level. CAs include written and oral assessments, active participation and attendance.
Weighting of Grade within overall programme	According to credits
Learning outcomes	**After successful completion of the module students should have developed the following competencies, as appropriate for their instructional level:** **Professional competence:** • Expansion of business vocabulary in the target foreign language. Improved oral and written skills in the foreign language particularly tailored to business situations. • Insights into specific industrial branches/companies, intercultural insights into the relevant business environment. • Understand a wide range of business-related texts and apply a variety of reading techniques. • Actively take part in discussions and debates on familiar topics, as well as justify their opinions and express agreement or disagreement. • Make satisfactory notes while someone is talking. • Write a range of business correspondence including emails, reports, proposals and summaries. • Understand the main points and more detailed information when listening to telephone calls, interviews, discussions, instructions and presentations. • Work effectively in teams or alone to solve business-related problems. • Give a presentation on a familiar topic and deal with unpredictable questions. • Collaborate with peers effectively; give and accept feedback use business vocabulary and grammar at CEFR level C1. **Methodological competences:** • Presentation skills both individual and group. Greater grammar knowledge **Social competence:** • Improved communication skills (oral and written) and ability to work under time pressure in the foreign language in intercultural groups. **Personal competences:** • Be equipped to function in a business setting in the given foreign language. Level of achievement depends on the CEFR levels taken

	by the individual students. Have a good basis on which to build further fluency in the future.
Module-specific contribution to AoL learning objectives	LO 1.1. (Assesment Embedded) Students collaborate with peers effectively; give and accept feedback, use business and technical vocabulary and grammar at CEFR level C1. They actively take part in discussions and debates on familiar topics, as well as justify their opinions and express agreement or disagreement and make satisfactory notes while someone is talking. LO 2.1. (Reinforced) Students are equipped to function in a business setting in the given foreign language taking into account diverse cultural expectations.
Contents/ Indicative syllabus	****Level-specific language competencies for Spanish, French & Chinese are located in the ESB Sprachkonzept module descriptions in Relax. All language competencies are taught in a business context, using business-related resources.** The content is dependent on the target language and specific language level, and builds on content from *Foreign Language I*. **Students will gain the following additional skills irrespective of target language:** **Business Soft Skills:** • Understand business etiquette and expectations when participating in business meetings, face-to-face or virtual. **Intercultural Competence/Intercultural Communication:** • Increased awareness and ability to adapt to different cultural contexts, in personal and professional contexts. • Understand the source of potential intercultural conflict in business communication and how to mitigate it.
Teaching and learning methology	Case studies, short papers, presentations, projects, discussions, role plays, videos, news articles, etc. Activities include both individual and small group tasks. Some oral elements may be filmed. Interactive online exercises, e-learning elements, problem-based learning, flipped classroom elements.
Miscellaneous	None
Indicative reading list	The indicative reading list is specific to each target language, each level, and each teacher. Full details are provided to the students during the first week of class. **For Business Spanish:** -Meta Profesional A1-A2 Spanisch für den Beruf (2015)/Klett -Meta Profesional B1 Spanisch für den Beruf (2015)/ Klett -Additional literature will be announced in class (depends on the course level). **For Business English, Business French, Business Chinese and Business German,:** -To be announced in class.

4.15 Module: Quality Management

Module Registration No.	Exam-Reg.-No. 21420131
Semester	3
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	M15: Quality Management (Lecture and Lab)
How frequently is the module offered	every semester
Admission requirements	principles of statistics
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same frame-work and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr.-Ing. Manfred Estler
Lecturers name (contact details see ESB-website)	Schlosske, Alexander
Teaching language	English
Credits (ECTS)	5
Total work load	150 hours
Contact hours per week	4 SWS
Examination/ Type of assessment	KL 2 + L
Weighting of Grade within overall programme	According to credits
Learning outcomes	Aim of the course is the acquirement of the theoretical basis of modern quality management with its most important methods and tools as well as their practical application within an industrial environment. At the end of the course, students shall be able to cope with the fundamentals of mod-ern quality management and understand the importance of quality man-agement for organisations and companies. In addition, students can select and apply important methods and tools of quality management correspond-ing to a specific problem. At the end of the course, students have achieved the following compe-tences: • **Professional competences**: acquisition of the theoretical fundamentals of modern quality management including important statistical methods of quality management

	• **Methodological competences**: acquisition of the ability to select and properly apply adequate methods of QM corresponding to a specific problem • **Practical competences:** During the lab, students learn the practical application of selected QM methods by practical exercises and lab experiments and therefore will be able to apply these methods within an industrial context • **Social competences:** group work during practical exercises and lab experiments support to ability to work in teams • **Normative competences:** students recognize that quality is a matter of course, which can be expected from everybody and which is nothing else than probity („Qualität ist das Anständige“, Theodor Heuss, 1884-1963).
Module-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students build on their available terminology from the field of business engineering and complement it with specific terms from the field of Quality management. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Reinforced) Students build on their available domain knowledge and acquire the ability to select and properly apply adequate methods of QM corresponding to a specific problem. They learn the practical application of selected QM methods by practical exercises and lab experiments and therefore will be able to apply these methods within an industrial context.
Contents/ Indicative syllabus	• Introduction to quality management according to ISO 9000:2008 • Total Quality Management (TQM) • management and supervision of measurement systems • measurement system analysis, R&R Gage Analysis • introduction to various quality methods (QFD, FMEA, etc.) • introduction to various statistical methods (SPC, Design of Experiments, etc.) • performance figures, performance management systems, Balanced Scorecard • quality management and information technology
Teaching and learning methology	• lecture • group exercises applying selected QM methods (e.g. QFD, FMEA) • conduction of lab experiments applying statistical methods of QM (e.g. R&R Gage Analysis, SPC, etc.)
Miscellaneous	
Indicative reading list	Fundamentals: • Pfeifer, T.: Quality Management, Hanser Verlag, München, 2002. • Schmitt, R., Pfeifer, T.: Qualitätsmanagement, Hanser Verlag, München, 2010 • Linß, G.: Qualitätsmanagement für Ingenieure, Hanser Fachbuchverlag, Leipzig, 2011.

	Further reading: • Kleppmann, W.: Versuchsplanung – Produkte und Prozesse optimieren, Hanser Verlag, München, 2011.

4.16 Module: Industrial Engineering

Module Registration No.	Exam-Reg.-No. 21420141 DD Exam-Reg.-No. 21424661
Semester	3
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	M16 Industrial Engineering
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same frame-work and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr.-Ing. Vera Hummel
Lecturers name (contact details see ESB-website)	Prof. Dr.-Ing. Vera Hummel Geb. 17, Raum 019, Tel.: 07121 271 3031
Teaching language	engl.
Credits (ECTS)	5
Total work load	150 hours
Contact hours per week	4 SWS
Examination/ Type of assessment	PA + KL 1
Weighting of Grade within overall programme	According to credits
Learning outcomes	The students learn to design, realize and optimize industrial work systems for different enterprise environments. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Systematically develop production- and work systems, understand foundations of work place and work system design - Understand the interconnections of economic, organizational and technical aspects of work systems

	- Understand chances and risks innovative methods and tools of *advanced Industrial Engineering* - Understand the impact of the initiative "Industry 4.0" on the future work environment **Methodological competencies:** - Apply typical methods and tools of Industrial Engineering - Test and assess different human-machine-interfaces (HMI) in hybrid work systems **Social competencies:** - Co-operatively solve problems in an industry-like environment (Logistics Learning Factory) **Personal competencies:** - Experience and reflect own performance in an industry-like environment (Logistics Learning Factory)
Course-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students build on their available terminology from the field of business engineering and complement it with specific terms from the field of Industrial Engineering. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Reinforced) Students build on their available domain knowledge and learn to systematically develop production and work systems, understand foundations of work place and work system design. They apply typical methods and tools of Industrial Engineering. They test and assess different human-machine-interfaces (HMI) in hybrid work systems.
Contents/ Indicative syllabus	Design, planning and optimization of changeable work systems ▪ Introduction ▪ Production and work systems ▪ Time determination and measurement systems ▪ Part lists and working plan ▪ Work place design, ergonomics and environmental influences ▪ Physical work load and stress ▪ Work place analysis ▪ Motivation ▪ Industry 4.0 ▪ Hybride working systems ▪ Technical assistance systems ▪ Digital Engineering – holistic approach, overview, examples and demonstrations, digital twin
Teaching and learning methology	Lecture and practical exercises in Werk150
Miscellaneous	None
Indicative reading list	▪ Bokranz, Rainer, Landau, Kurt: Produktivitätsmanagement von Arbeitssystemen: MTM-Handbuch; Schäffer-Poeschel 2013 zweite Auflage ; ISBN-13: 978-3791021331 ▪ Kleine ergonomische Datensammlung, Hrsg. von der Bundesanstalt für Arbeitsschutz (16. überarbeitete Auflage 2017); ISBN978-3-7406-0132-4

	▪ Vom Taylorismus zur Humanisierung der Arbeit. Möglichkeiten und Grenzen moderner Arbeitsplatzgestaltung [Taschenbuch]; Verlag: Grin Verlag Gmbh (19. Juli 2013); ISBN-13: 978-3640693443 Additionally: ▪ Ergonomie (Technologiemanagement - Wettbewerbsfähige Technologieentwicklung und Arbeitsgestaltung) from Hans-Jörg Bullinger, Vieweg+Teubner Verlag (31. Dezember 2013); ISBN-13: 978-3663120957

4.17 Module: Business Processes and Business Data

Module Registration No.	Exam-Reg.-No. 21420151
Semester	3
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	4.17.1. ERP Systems and Business Process Management 4.17.2. Data Analysis and Data Mining
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Dirk Schieborn
Total number of ECTS	6
Learning outcomes of the module	The module familiarizes students with the basic principles of modern integrated information systems and their relevance for business process management as well as data processing and data analysis in an operational environment.
Examination/ Type of assessment	CA + Written Examination (2hrs.)
Weighting of Grade within overall programme	According to credits

4.17.1 Class: ERP Systems and Business Process Management

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Manfred Estler
Teaching language	engl.

Contact hours per week	4 SWS
Learning outcomes	Aim of the course is the acquirement of basic principles of modern integrated information systems and their application within a company. Here it is of special importance, to develop the overall context between business process management and the supporting task of integrated information systems for the business processes. At the end of the course, students will have gained the following competences: • **Professional competences:** Acquirement of theoretical basic knowledge of modern ERP systems as well as knowledge about its essential functions and typical application within companies. • **Methodological competences:** At the end of the course, students will be able to describe the relation between business process management and the applied ERP system. • **Practical competences:** During a detailed case study, students will learn the comprehensive application ability for the SAP ERP system
Course-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students build on their available terminology from the field of business engineering and complement it with specific terms from the field of ERP-Systems and Process Management. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Reinforced) Students build on their available domain knowledge and learn about modern ERP systems as well as about their essential functions and typical application within companies. They will be able to describe the relation between business process management and the applied ERP system.
Contents/ Indicative syllabus	• fundamentals of modern ERP systems • configuration of business processes • introduction to the ERP system SAP ERP • introduction to selected topics in information technology (e.g. Advanced Planning and Scheduling for Supply Chain Management, Customer Relationship Management, e-Business, Manufacturing Execution Systems, etc.) • Business process optimization and business process reengineering with respect to introduction and implementation of integrated information systems • new trends: service oriented architectures, web services, SAP Netweaver, etc. • information management
Teaching and learning methology	• lecture • successful completion of a SAP case study
Miscellaneous	---
Indicative reading list	• Benz, J., Höflinger, M.: Logistikprozesse mit SAP, Vieweg+Teubner Verlag, Wiesbaden, 2011 • Schulz, O.: Using SAP, Galileo Press, 2014 • Kurbel, K.: Enterprise Resource Planning and Supply Chain Management. Springer Verlag, 2013

	• Weske, M.: Business Process Management, Springer Verlag, 2012 • Stadtler, H., Kilger, C., Meyr, H.: Supply Chain Management and Advanced Planning, Springer Verlag, 2014 • Schmelzer, H., Sesselmann, W.: Geschäftsprozessmanagement in der Praxis, Hanser Verlag, 2013 • Dickersbach, J., Keller. G., Weihrauch, K.: Produktionsplanung und -steuerung mit SAP, Galileo Press, 2014 • Laudon, K.C., Laudon, J.P.: Management Information System, Pearson Studium, 14th edition, 2015

4.17.2 Class: Data Analysis and Data Mining

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Dirk Schieborn
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	Students are able to collect, process, and analyze data using computers. They have gained some insight into the theory behind the basic methods and are able to develop own methods based on this body of knowledge.
Course-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students build on their available terminology from the field of business engineering and complement it with specific terms from the field of Data Management. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1.(Reinforced) Students build on their available domain knowledge and are able to collect, process, and analyze data using computers. They have gained insight into the theory behind the basic methods and are able to develop own methods based on this body of knowledge.
Contents/ Indicative syllabus	- Relational Databases, MapReduce, NoSQL - Statistical Analysis using R. Regression methods, hypothesis tests, explorative analysis, visualization. - Machine learning and data mining. Supervised learning (rules, trees, forests, nearest neighbor, regression), Optimierung (gradient descent, ...), unsupervised learning. - Data privacy
Teaching and learning methology	Lecture and computer lab excercises
Miscellaneous	None
Indicative reading list	Witten, Frank, Hall: *Data Mining*. Morgan Kaufmann, 2011.

4.18 Module: Automation in Industrial & Materials Handling, Transportation

Module Registration No.	Exam-Reg.-No. 21420161 DD Exam-Reg.-No. 21424641
Semester	3
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	M 18 Automation in Industrial & Materials Handling, Transportation
How frequently is the module offered	Every Semester
Admission requirements	None

Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Wolfgang Echelmeyer
Lecturers name (contact details see ESB-website)	Prof. Dr. Wolfgang Echelmeyer
Teaching language	engl.
Credits (ECTS)	5
Total work load	150 hours
Contact hours per week	4 SWS
Examination/ Type of assessment	Laboratory Project & Oral Exam
Weighting of Grade within overall programme	According to credits
Learning outcomes	Target of the lecture is a basic understanding of material handling in production and logistics processes. Starting with handling of parts in production lines, and with storing and shipping in warehouses or distribution centers. Students are able to understand and analyze basics and advanced state of the art technical logistics systems. Learning outcome: - Knowledge about logistics equipment and automated systems, robotics and handling technologies. - Mapping and analysis of material and information flow - Knowledge about different transport systems including Automated Guided Vehicles (AGV) - Competence in 3D simulation for automated logistics processes
Course-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students build on their available terminology from the field of business engineering and complement it with specific terms from the field of Automation and Materials Handling. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1 (Reinforced) Students build on their available domain knowledge and acquire advanced knowledge about logistics equipment and automated systems, robotics and handling technologies, mapping and analysis of material and information flow, AGV and how to adapt them in real business life.
Contents/ Indicative syllabus	- Robot systems - Handling technologies - Automated Guided Vehicle (AGV) - Sorting technologies and distribution centers - Autonomous material handling systems - Simulation software 3D Create

Teaching and learning methology	Lecture, exercises and Simulation Lab
Miscellaneous	None
Indicative reading list	Nof, Shimon Y.: Material Handling Automation in Production and Warehouse Systems in: Springer Handbook of Automation; Springer; ISBN: 978-3-540-78831-7 Furmans, Kai: Material Handling and Production Systems Modelling - based on Queuing Models; Springer, Dec. 2014

4.19 Module: Fundamentals of Electrical Engineering

Module Registration No.	Exam-Reg.-No. 21420171 DD Exam-Reg.-No. 21424651
Semester	3
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Fundamentals of Electrical Engineering: Lecture Fundamentals of Electrical Engineering: Laboratory
How frequently is the module offered	every semester
Admission requirements	Mathematics I and II
Level	Undergraduate
Transferability of the module to other programmes	Prerequisite for the lecture identification systems and communication networks
Responsible professor/ Module coordinator	Prof. Dr. Albrecht Oehler
Total number of Credits (ECTS)	5
Learning outcomes of module	Target of the lecture is a basic understanding of electrical engineering. Starting with Ohm's law and with resistors the electric and magnetic fields are introduced. After the lecture the students have the competence to consider complex systems. Either to analyze them by analytical methods or to synthesize complex systems based on a structured consideration of the impact of each component. Learning outcome is • knowledge and usage of electronic parts • determination of electric and magnetic fields • calculation of AC circuits • realisation of electronic circuits Target of the lab is the application of electrical engineering in the laboratory. Learning outcome is

	• measurement techniques • synthesis of electronic circuits analysis of circuits.
Module-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students build on their available terminology from the field of business engineering and complement it with specific terms from the field of Electrical Engineeering. They are constantly able to practice their written and oral language skills in English since the course is entirely conducted in English. LO 4.1. (Reinforced) Students build on their available domain knowledge and acquire advanced knowledge about usage of electronic parts, determination of electric and magnetic fields, calculation of AC circuits, measurement techniques etc. and how to use them.
Examination/ Type of assessment	CA + Written Exam (2hrs) ("Testate" graded + 2 hrs. written examination)
Weighting of Grade within overall programme	According to credits

4.19.1 Class: Fundamentals of Electrical Engineering – Lecture

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Albrecht Oehler and Laboratory Assistant
Teaching language	English / German
Contact hours	4 SWS
Learning outcomes	Target of the lecture is a basic understanding of electrical engineering. Starting with Ohm's law and with resistors the electric and magnetic fields are introduced. After the lecture the students have the competence to consider complex systems. Either to analyze them by analytical methods or to synthesize complex systems based on a structured consideration of the impact of each component. Learning outcome is • knowledge and usage of electronic parts • determination of electric and magnetic fields • calculation of AC circuits • realisation of electronic circuits
Contents/ Indicative syllabus	• DC circuits • Kirchhoff's laws • passive electronic parts and transistors • electric and magnetic fields • Faraday's and Ampere's law • AC circuits • filters and oscillators

Teaching and learning methology	Lecture and exercises
Miscellaneous	None
Indicative reading list	• Hagmann, Gert: Grundlagen der Elektrotechnik, AULA-Verlag, 14. durchges. u. korr. Aufl. 2009. • Moeller: Grundlagen der Elektrotechnik, Vieweg+Teubner-Verlag, 22. Auflage, 2008

4.19.2 Fundamentals of Electrical Engineering – Laboratory

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Albrecht Oehler and Laboratory Assistant
Teaching language	English / German
Contact hours per week	2 hours per week laboratory Supervision by Prof. Dr.-Ing. Albrecht Oehler and Laboratory-assistant
Learning outcomes	Target of the lab is the application of electrical engineering in the laboratory. Learning outcome is • measurement techniques • synthesis of electronic circuits • analysis of circuits
Contents/ Indicative syllabus	Experiments • Ohm's law • Oscilloscope • filter • oscillator • amplifier
Teaching and learning methology	Laboratory
Miscellaneous	None
Indicative reading list	Descriptions of the experiments are provided

4.20 Module: Interdisciplinary Module I: Project/Case

Module Registration No.	Exam-Reg.-No. 21420181
Semester	3
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	international Cross Module Seminar I: Quest 3C – cross-disciplinary web-based simulation for developing global team competencies

How frequently is the module offered	Every semester
Admission requirements	Good English-language skills
Level	Undergraduate
Transferability of the module to other programmes	Interdisciplinary team competences
Responsible professor/ Module coordinator	Prof. Dr. Hazel Grünewald
Lecturers name (contact details see ESB-website)	DR. LYUBOMYR MATSEKH-UKRAYINSKYY
Teaching language	engl.
Credits (ECTS)	5
Total work load	150 hours
Contact hours per week	3 SWS
Examination/ Type of assessment	CA (Business Proposal +E-Portfolio + Simulation Game [in equal shares})
Weighting of Grade within overall programme	According to credits
Learning outcomes	By the end of this simulation, students will: - exhibit responsible decision-making and personal accountability - collaborate and communicate more effectively with team members, including those who think and behave very differently from you - have honed your analytical, problem-solving critical and reflective thinking abilities - have developed your intercultural competence - be better able to manage difficult tasks and everyday business under uncertain conditions - have developed a range of leadership capabilities - be able to think and act in an interdisciplinary way - have improved your financial and business acumen - have expanded your repertoire of media and technical skills
Course-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students apply the specific terms from the field of Business and Engineering and engage in active discussions and negotiations. LO 2.1. (Reinforced) The simulation is designed to improve team performance and develop leadership skills in an international environment. Students learn to communicate, negotiate and collaborate successfully across hierarchies, disciplines and cultural borders. LO 3.1. (Reinforced) Students learn to respect each other and to integrate conflicting stakeholder interests in order to develop a sustainable solution. LO 4.1. (Reinforced) Students apply their knowledge from various business- and engineering-related courses and own practical experience to successfully execute tasks.
Contents/ Indicative syllabus	Quest 3C is an interdisciplinary simulation game devised for business engineering students. It is also suited to other business learners who currently

	or potentially face the challenge of working in global teams (be they real or virtual). The simulation is designed to improve team performance and develop leadership skills in an international environment. The simulation is offered as part of a blended-learning seminar which means that you work partly online and partly in the classroom. By creating a business proposal for a fictional company with worldwide operations, you get a chance to apply your knowledge from other business-related courses and experience gained from internships to successfully execute tasks. You will be expected to communicate, negotiate and collaborate successfully across hierarchies, disciplines and cultural borders. The game seeks to provide you with a protected (virtual) environment: - in which you can deal with complex situations in a risk-free way - which fosters international networking and collaboration - which accelerates learning, but leaves a lasting effect. The simulation can be broken down into the following phases: - Theoretical input & instruction - Simulation & decision-making - Presentation of results - Debriefing and evaluation - Individual reflection In between instructors may provide background information to the participants or give feedback and input.
Teaching and learning methology	Project / Simulation game in blended-learning format.
Miscellaneous	None
Indicative reading list	Will be presented in lecture. The following books will be referred to: Adizes, Ichak. (2004) *Management/Mismanagement styles: How to identify a style and what to do about it.* Santa Barbara, CA: The Adizes Institute Publications. Adizes, Ichak. (1985): *How to solve the mismanagement crisis*. Homewood, IL: Dow Jones/ Irwin (1979). Reprints by Adizes Institute.

4.21 Module: Corporate Social Responsibility

Module Registration No.	Exam-Reg.-No. 21420191
Semester	4
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	International CSR Project
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate

Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Kristina Steinbiß
Lecturers name (contact details see ESB-website)	Dr. Carl Ulrich Gminder
Teaching language	English
Credits (ECTS)	2
Total work load	90 hours
Contact hours per week	2 SWS
Examination/ Type of assessment	CA (Group: Case studies/ Exercises with presentation ,Individual: Participation)
Weighting of Grade within overall programme	According to credits
Learning outcomes	Today companies have to take full responsibility in order to solve environmental and social problems linked with their business. Examples are climate change, social dumping/ sweatshops, waste, overuse of resources etc. The drivers are various: legal and/ or market requirements, image and reputation or owner-driven ethics. Therefore companies have to respond by setting up strategies and taking them into action – otherwise they get stuck in NGO confrontation or window-dressing. Those strategies and their implementation are subsumed by the term “Corporate Social Responsibility” (CSR). Aim of the class is to give the students in an interactive manner an understanding of applied CSR in industry. Starting with the need of action, students learn about the design of relevant CSR strategies and their implementation by measures, systems and actions. Students will research and develop their own solutions and present them to the class. The learning outcome is to have a basic know-how of CSR. In addition the students exercise the “St. Galler approach” from problem to solution by strategy based CSR management.
Course-specific contribution to AoL learning objectives	LO 1.1. (Reinforced) Students apply the specific terms from the field of Business and Engineering and engage in active discussions and negotiations. LO 3.1. (Assessment Embedded) Students learn to get in an interactive manner an understanding of applied CSR in industry. They learn about relevant CSR strategies and their implementation by measures, systems and actions. They learn that companies have to take full responsibility in order to solve environmental and social problems linked with their business.
Contents/ Indicative syllabus	• Why are environment & society relevant for companies? • What are strategies of Corporate Social Responsibility (CSR) • Specific CSR markets, e.g. Renewable energy, Fair trade, Emission trade, Environmental technology • Measures, management systems and reporting of CSR

	• Standards and Labels for CSR-Marketing
Teaching and learning methology	Seminar with exercises and case studies
Miscellaneous	
Indicative reading list	Will be presented in lecture

4.22 Module: Internship 1

Module Registration No.	Exam-Reg.-No. 21420201
Semester	4
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	4.22.1. Internship 4.22.2. Colloquium on Internship
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	The module is transferable to other business engineering programmes requiring students to gain practical work experience in an industrial environment.
Responsible professor/ Module coordinator	Prof. Dr. Manfred Estler
Total number of ECTS	27
Learning outcomes of the module	**During their first** industrial training phase students gain practical experiences and skills from the field of work of industrial engineers. They actively deal with tasks that involve business as well as technical aspects of work and also learn how to take into account ecological, ethical and technical safety aspects of work. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - apply the basic skills and knowledge learned through study to the more complex interdisciplinary problems faced in practice **Methodological competencies:** - work in an independent and responsible manner on practical tasks with a limited degree of complexity **Social competencies:** - apply and improve social, language and communication skills obtained simultaneously or before the internship - co-operatively solve problems and tasks - adapt to a new work culture in an industrial environment

	Personal competencies: - reflect on the practical experience gained to help them more consciously make their decision on the personal future career path develop independent critical thinking and first-hand insights into the varied consequences of technical, business and social decisions. ***After their return*** *from the internship students present their report to the class lecturer and class mates.* *After successful completion of this course the students should have gained the following knowledge and developed the following competencies:* ***Professional competencies:*** - *master presentation software (e.g. MS PowerPoint, Prezi)* ***Methodological competencies:*** - *prepare and give a clear and concise presentation on own experiences* ***Social competencies:*** - *reflect on feedback from class participants* ***Personal competencies:*** *reflect on the practical experience gained*
Examination/ Type of assessment	Individual Assignment and Colloquium (Written internship report, oral report presentation)
Weighting of Grade within overall programme	Ungraded

4.22.1 Class: Internship

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Manfred Estler
Teaching language	var.
Contact hours per week	Not applicable
Learning outcomes	During their first industrial training phase students gain practical experiences and skills from the field of work of industrial engineers. They actively deal with tasks that involve business as well as technical aspects of work and also learn how to take into account ecological, ethical and technical safety aspects of work. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - apply the basic skills and knowledge learned through study to the more complex interdisciplinary problems faced in practice **Methodological competencies:** - work in an independent and responsible manner on practical tasks with a limited degree of complexity

	Social competencies: - apply and improve social, language and communication skills obtained simultaneously or before the internship - co-operatively solve problems and tasks - adapt to a new work culture in an industrial environment **Personal competencies:** - reflect on the practical experience gained to help them more consciously make their decision on the personal future career path - develop independent critical thinking and first-hand insights into the varied consequences of technical, business and social decisions
Course-specific contribution to AoL learning objectives	LO 4.1 (Reinforced) Students reflect on the practical experience gained to help them more consciously make their decision on the personal future career path. They develop independent critical thinking and first-hand insights into the varied consequences of technical, business and social decisions.
Contents/ Indicative syllabus	Knowledge of work procedures in a business environment; independent execution of typical business tasks. Contents vary depending on the organisation providing the internship.
Teaching and learning methology	Support / guidance by the internship company's direct supervisor / team. Continuous support & feedback by faculty members.
Miscellaneous	None
Indicative reading list	Depending on topic

4.22.2 Class: Colloquium on Internship

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Manfred Estler
Teaching language	engl. / ger.
Contact hours per week	1 SWS
Learning outcomes	After their return from the internship students present their report to the class lecturer and class mates. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - master presentation software (e.g. MS PowerPoint, Prezi) **Methodological competencies**: - prepare and give a clear and concise presentation on own experiences **Social competencies**: - reflect on feedback from class participants **Personal competencies:**

	- reflect on the practical experience gained
Course-specific contribution to AoL learning objectives	LO 4.1 (Reinforced) Student learn to reflect on feedback from class participants and on practical experience as well as they master presentation software and prepare and give a clear and concise presentation on own work experiences.
Contents/ Indicative syllabus	Var.
Teaching and learning methology	Individual Assignment and Colloquium
Miscellaneous	None
Indicative reading list	Depending on Topic

4.23 Module: Study Abroad Semester

Module Registration No.	Exam-Reg.-No. 21420211
Semester	5
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Depending on programme of partner university
How frequently is the module offered	Every semester
Admission requirements	Successful completion of min. 78 ECTS credits from the first 3 semesters of curriculum
Level	Undergradutate
Transferability of the module to other programmes	This module is transferable to any programme requiring students to spend a semester at a partner university abroad.
Responsible professor/ Module coordinator	Prof. Dr. Andreas Taschner
Lecturers name (contact details see ESB-website)	Various lecturers of host institution
Teaching language	Various (depending on host institution)
Credits (ECTS)	30
Total work load	900
Contact hours per week	Depending on host institution curriculum
Examination/ Type of assessment	Various
Weighting of Grade within overall programme	Ungraded

Learning outcomes	After the successful completion of this module the students should have developed the following competencies: - **Professional competencies**: advanced knowledge in the various fields of international business and engineering (depending on courses chosen); understanding of different university systems. - **Methodological competencies**: advanced methodological competencies in the various fields of international business and engineering (depending on courses chosen). - **Social competencies**: advanced communication skills in the language of the host country; advanced intercultural communication skills, sensitivity for cultural differences and importance of culture in business practice. - **Personal competencies**: development of own personality and personal profile through study abroad experience; reflection and learning from own international experience, reflection on envisaged own professional career path.
Course-specific contribution to AoL learning objectives	LO 2.1. (Reinforced) Students learn advanced communication skills in the language of the host country; advanced intercultural communication skills, sensitivity for cultural differences and importance of culture in business practice. LO 3.1. (Reinforced) Students gain first-hand experience in how other cultures deal with conflicting interests and develop an understanding for different concepts of “right” and “wrong”. LO 4.1. (Reinforced) students learn advanced methodological competencies in the various fields of international business and engineering (depending on courses chosen).
Contents/ Indicative syllabus	Depending on host institution
Teaching and learning methology	Depending on host institution
Miscellaneous	None
Indicative reading list	Depending on courses taken at host institution

4.24 Module: Internship 2

Module Registration No.	Exam-Reg.-No. 21420221
Semester	6
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	4.24.1. Internship Abroad 4.24.2. Colloquium on Internship Abroad
How frequently is the module offered	Every semester
Admission requirements	None

Level	Undergraduate
Transferability of the module to other programmes	The module is transferable to other business engineering programmes requiring students to gain work experience abroad.
Responsible professor/ Module coordinator	Prof. Dr. Anja Braun
Total number of ECTS	30
Learning Outcomes of the module	**During their second** industrial training phase students deepen practical experiences and skills from the field of work of industrial engineers in a foreign work environment. They take responsibility for tasks with a limited complexity and deal with language and cultural differences in their day-to-day work. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - apply advanced skills and knowledge learned through study to the more complex interdisciplinary problems faced in practice **Methodological competencies**: - work in an independent and responsible manner on practical tasks with a limited degree of complexity - reflect class contents learned in the first five semesters of study **Social competencies**: - co-operatively solve problems and tasks - adapt to a foreign work culture **Personal competencies:** - language and communication skills at an expert level in the language of internship - reflect on the practical experience they have gained to help them more consciously make their decision on the personal future career path develop independent critical thinking and first-hand insights into the varied consequences of technical, business and social decisions. **After their return** from the internship abroad students present their report to the class lecturer and class mates. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Master presentation software (e.g. MS PowerPoint, Prezi) **Methodological competencies**: - prepare and give a clear and concise presentation in English langauge **Social competencies**: - reflect on feedback from class participants **Personal competencies:**

	- reflect on the practical experience gained, identify own strong and weak points, determine personal needs for further improvement
Examination/ Type of assessment	Individual Assignment and Colloquium (Written internship report, oral report presentation)
Weighting of Grade within overall programme	Graded: 3 ECTS

4.24.1 Class: Internship Abroad

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Anja Braun
Teaching language	Various, depending on country of internship
Contact hours per week	Not applicable
Learning outcomes	During their second industrial training phase students deepen practical experiences and skills from the field of work of industrial engineers in a foreign work environment. They take responsibility for tasks with a limited complexity and deal with language and cultural differences in their day-to-day work. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - apply advanced skills and knowledge learned through study to the more complex interdisciplinary problems faced in practice **Methodological competencies:** - work in an independent and responsible manner on practical tasks with a limited degree of complexity - reflect class contents learned in the first five semesters of study **Social competencies:** - co-operatively solve problems and tasks - adapt to a foreign work culture **Personal competencies:** - language and communication skills at an expert level in the language of internship - reflect on the practical experience they have gained to help them more consciously make their decision on the personal future career path - develop independent critical thinking and first-hand insights into the varied consequences of technical, business and social decisions
Course-specific contribution to AoL learning objectives	LO 2.1. (Reinforced) Students learn advanced communication skills in the language of the host country; advanced intercultural communication skills, sensitivity for cultural differences and importance of culture in business practice.

	LO 4.1. (Reinforced) Students work in an independent and responsible manner on practical tasks with a certain degree of complexity. They reflect and critically apply class contents learned in the first five semesters of study.
Contents/ Indicative syllabus	Knowledge of work procedures in a business environment; independent execution of typical business tasks. Contents vary depending on the organisation providing the internship.
Teaching and learning methology	Individual Assignment and Colloquium (Support / guidance by the internship company's direct supervisor / team. Continuous support & feedback by faculty members)
Miscellaneous	None
Indicative reading list	Not applicable

4.24.2 Class: Portfolio on Internship Abroad

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Anja Braun
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes of Course	After their return from the internship abroad students present their report to the class lecturer and class mates. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Master presentation software (e.g. MS PowerPoint, Prezi) **Methodological competencies**: - prepare and give a clear and concise presentation in English langauge **Social competencies**: - reflect on feedback from class participants **Personal competencies:** - reflect on the practical experience gained, identify own strong and weak points, determine personal needs for further improvement
Course-specific contribution to AoL learning objectives	LO 2.1 (Assessment Embedded) Students have acquired advanced communication skills in the language of the host country; advanced intercultural communication skills, sensitivity for cultural differences and importance of culture in business practice and are able to critically reflect on cultural differences.
Contents/Indicative Syllabus	Not applicable
Teaching and learning methology	Individual portfolio, coaching during preparation phase

Miscellaneous	None
Indicative reading list	Not applicable

4.25a Module: Business Aspects of Extra-Logistics

Module Registration No.	Exam-Reg.-No. 21423011 DD Exam-Reg.-No. 21424011
Semester	7
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Supply Chain Controlling Business to Business Marketing Logistics Law
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Responsible professor/ Module coordinator	Prof. Dr. Andreas Taschner
Credits (ECTS)	6
Learning outcomes of module	The module provides a deepened understanding of business issues in extra-logistics and supply chain management. Students build on their know-how gained in previous semesters. After successfully attending the module, students can identify and implement solutions for managing and controlling supply chains, marketing products and services along supply chains in B-2-B industries and structuring appropriate contractual arrangements in supply chain relationships.
Module-specific contribution to AoL learning objectives	LO 4.1 (Reinforced) Students build on their know-how gained in previous semesters. After successfully attending the module, students can identify and implement solutions for managing and controlling supply chains, marketing products and services along supply chains in B-2-B industries and structuring appropriate contractual arrangements in supply chain relationships.
Examination/ Type of assessment	CA + Written Examination (2hrs.)
Weighting of Grade within overall programme	According to credits

4.25a.1 Class: Supply Chain Controlling

Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr. Andreas Taschner
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The course familiarizes students with the basic concepts and tools of management accounting and focuses on their use within in supply chains. Special emphasis is put on the particular problems of applying these tools and concepts in an inter-organizational setting. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - critically reflect and apply the main tools of management accounting in simplified real-life settings - analyse the particular problems arising when management accounting & control is performed in an inter-organizational setting such as supply chains - develop a suggestion for a management accounting & control system in a particular supply chain setting **Methodological competencies:** - transfer theoretical management accounting concepts to real-life applications - reflect strengths and weaknesses of different management accounting and control instruments and their applicability in supply chains **Social competencies:** - co-operatively solve problems in small teams **Personal competencies:** - critically analyse conflicts between commercially attractive options and ethical behaviour
Course-specific contribution to AoL learning objectives	See 2.23 Business Aspects of Extra-Logistics
Contents/ Indicative syllabus	Overview Logistics and Supply Chains Management Accounting & Control Information Management Management Accounting & Control (MAC) Goals of MAC The typical MAC system institutional setup of MAC Supply Chain Cost and Supply Chain Performance Types of cost related to logistics and supply chains

	Cost drivers in logistics Logistical performance Problems of measuring logistical cost and performance Problems of assigning logistical cost and performance to the right objects Product costing and process costing traditional costing schemes - overview problems when applying trad. Costing schemes in a supply chain environment Cost management in supply chains cost management - overview instruments of cost management ABC in supply chains supply chain target costing life cycle costing in supply chains Information management in supply chains information management - overview specific information needs in supply chains management reporting in supply chains Supply chain performance management performance measurement vs. performance management performance indicators in Supply Chains Balanced Scorecard for supply chains
Teaching and learning methology	Mix of lecture and case studies with group exercises
Miscellaneous	None
Indicative reading list	- Weber, J. / Wallenburg, C.M.: Logistik- und Supply Chain Controlling, 6th ed., Stuttgart 2010 - Seuring, S. / Goldbach, M. (eds.): Cost Management in Supply Chains, Heidelberg 2002 - Cooper, R. / Slagmulder, R.: Supply Chain Development for the lean enterprise: interorganizational cost management, Portland 1999

4.25a.2 Class: Business to Business Marketing

Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr. Kristina Steinbiß
Teaching language	german/ engl.
Contact hours per week	2 SWS
Learning outcomes	After the successful completion of the module the students should have developed the following competencies: • **Professional competencies:** identify the industrial, marketing, and business terms and concepts that are significant within the field of

	business-to-business marketing. Critically discuss the relevance and success factors of different approaches. • **Methodological competencies:** develop a business-to-business marketing strategy; transfer and apply theoretical marketing knowledge to real-life business cases; develop presentation skills, familiarize with basic research methodology. • **Social competencies:** refine their oral communication skills; improve their ability to work in teams in order to solve a given complex marketing situation; give and receive feedback by fellow students in a structured manner. • **Personal competencies:** develop the ability to think and act proactively as well as marketing oriented
Course-specific contribution to AoL learning objectives	See 4.25. Business Aspects of Extra-Logistics
Contents/ Indicative syllabus	The course is an introduction to the language and issues of business to business marketing with an emphasis on the study of the nature and scope of business-to-business markets: product management, pricing, promotion, and distribution. It also covers assessing industrial marketing opportunities and industrial competitive strategies.
Teaching and learning methology	The course is highly interactive between the class and the instructor. Through case studies/presentations, problems, and specific company client activities, students will have the opportunity to use the concepts, ideas, and strategies presented in class. Problem-solving sessions occur in both individual (primarily) and team (occasionally) settings. This course will incorporate a lecture and project-based approach to the principles of business to business marketing.
Miscellaneous	None
Indicative reading list	• Business Marketing Management B2B by Hutt/Speh 2013 • Business to Business Marketing by Vitale/Pfoertsch/Giglierano 2010

4.25a.3 Class: Logistics Law

Type of Course	Lecture
Lecturers name; contact details see ESB-website	Christian Völker
Teaching language	German
Contact hours per week	2 SWS
Learning outcomes	Die Vorlesung führt die Studierenden in die wesentlichen Bereiche des Transport- und Logistikrechts ein. Dabei erwerben die Studierenden ein Grundverständnis für die rechtlichen Zusammenhänge der Logistik auf nationaler und internationaler Ebene. Nach dem Besuch der Lehrveranstaltung sind die Studierenden sensibilisiert, rechtliche Fragestellungen in Logistikprozessen zu erkennen, zu analysieren und erste eigene Lösungsansätze zu entwickeln. • **Fachspezifisches Wissen und Kenntnisse**: Nach Belegung des Moduls verfügen die Studierenden über Kenntnisse des (nationalen

	und internationalen) Transportrechts, der Gestaltung von Logistik- und Lieferverträgen sowie der vielfältigen Haftungstatbestände im Transport- und Logistikrecht. **Methodenwissen**: Die Studierenden sind in der Lage, mit Gesetzen zu arbeiten und diese konkret auf Lebenssachverhalte anzuwenden. Insbesondere sind die Studierenden in der Lage, Sachverhalte juristisch zu bearbeiten und die sich daraus ergebenden Rechtsfragen herauszuarbeiten. • **Fachpraktische/ Praxisbezogene Kompetenzen/ Fertigkeiten/ Können**: Nach Besuch des Moduls sind die Studierenden in der Lage, die Wechselwirkung zwischen Recht und logistischer Praxis zu erkennen und einfache Rechtsfragen selbst zu beantworten bzw. zu lösen. Bei komplexen Fällen sind sie in der Lage, eine richtige Einordnung vorzunehmen und – in Zusammenarbeit mit internen oder externen Rechtsberatern – entsprechende Lösungen zu erarbeiten und in Verhandlungssituationen durchzusetzen. Dies beinhaltet auch die Kompetenz, über juristische Themen schriftlich und mündlich verständlich kommunizieren zu können. • **Sozialkompetenz**: Gruppenarbeit bei der praktischen Falllösung und der Erarbeitung und Verhandlung von Elementen eines Logistikvertrags. • **Normative Kompetenzen**: Die Studierenden erkennen die Notwendigkeit berechenbarer normativer Regelungen in einem modernen Rechtsstaat sowie deren Bedeutung als Grundlage wirtschaftlichen bzw. logistischen Handelns.
Course-specific contribution to AoL learning objectives	See 4.25 Business Aspects of Extra-Logistics
Contents/ Indicative syllabus	- Recht der nationalen und internationalen Transport- und Kontraktlogistik - Haftung und Versicherung in der Logistik - Transportrechtliche Wertpapiere und Zahlungssicherung im Auslandsgeschäft - Charakter und Verwendung von INCOTERMS - Allgemeine Geschäftsbedingungen und Vertragsgestaltung im Bereich der Transport- und Kontraktlogistik
Teaching and learning methology	Seminaristische Vorlesung mit Übungen
Miscellaneous	
Indicative reading list	Grundlagen: – Wieske, Thomas, Transportrecht, 3. Auflage, Springer, Berlin 2012 – Lommatzsch, Jutta, Transportrecht, Kohlhammer, Stuttgart 2011 Weiterführend: – Pokrant, Günther/Gran, Andreas, Transport- und Logistikrecht, 10. Auflage, RWS Kommunikationsforum, Köln 2013

	– Hartenstein, Olaf/Reuschle, Fabian, Handbuch des Fachanwalts – Transport- und Speditionsrecht, 3. Auflage, Carl Heymanns Verlag, Neuwied 2014

4.25b Module: Business Aspects of Intra-Logistics

Module Registration No.	Exam-Reg.-No. 21423201
Semester	7
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Advanced Innovation Management Lean Management Change Management
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences
Responsible professor/ Module coordinator	Prof. S. Busch
Total number of ECTS	6
Learning outcomes of module	The module provides a deepened understanding of business issues in intra-logistics. Students build on their know-how gained in previous semesters. After successfully attending the module, students are able to plan and implement innovation-fostering processes and structures, use lean management instruments to effectively organise internal processes and master change management instruments to initiate continuous improvements.
Course-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) After successfully attending the module, students are able to plan and implement innovation-fostering processes and structures, use lean management instruments to effectively organise internal processes and master change management instruments to initiate continuous improvements.
Examination/ Type of assessment	CA + written examination (2x1hrs.)
Weighting of Grade within overall programme	According to credits

4.25b.1 Class: Advanced Innovation Management

Type of Course	
Lecturers name; contact details see ESB-website	Prof. S. Busch
Teaching language	Deutsch
Contact hours per week	2 SWS
Learning outcomes	Nach Absolvierung dieses Moduls werden die Studierenden in der Lage sein, die praktischen Probleme des Innovationsmanagements zu erkennen und zu bewältigen. Die Bedeutung von Innovationen für das Überleben von Unternehmen ist verstanden. Die Studierenden verstehen, dass der Markt am Anfang der Innovationskette steht und können marktorientierte Strategien bewerten und optimieren.
Course-specific contribution to AoL learning objectives	See Module 4.25 Business Aspects of Extra-Logistics
Contents/ Indicative syllabus	• Grundlagen des Innovationsmanagements: Begriff und Arten, Ziele und Merkmale der Innovation • Innovationsstrategien: Kundenprobleme lösen. • Kundenprobleme erkennen, definieren und Lösungen erarbeiten • Innovationsprozess und seine Gestaltung • Produktkonzept und Markteinführung mit unternehmensübergreifenden Konzepten • Innovationskultur und Führung. Widerstände gegen Innovation
Teaching and learning methology	Seminaristische Vorlesung sowie Fallstudienarbeit
Miscellaneous	Keine
Indicative reading list	Christensen, C., e.a.: Besser als der Zufall, Kulmbach, 2017 Technologiemanagement: Grundlage, Konzepte, Methoden. Stuttgart Fraunhofer IAO (Herausgeber), Dieter Spath (Autor), u.a. Stuttgart 2011

4.25b.2 Class: Lean Management

Type of Course	
Lecturers name; contact details see ESB-website	Erhard Wagner
Teaching language	Deutsch
Contact hours per week	2 SWS
Learning outcomes	Gestaltung von Veränderung ist eine Schlüsselkompetenz für angehende Produktionsmanager im internationalen Umfeld. Lean Thinking innerhalb eines Unternehmens erlaubt es Unternehmen, schnell und flexibel auf neue operative Herausforderungen zu reagieren und Komplexität zu minimieren. Die Studierenden sind nach erfolgreichem Abschluss des Moduls

	für diese Bedeutung sensibilisiert. Sie kennen die Werkzeuge und Maßnahmen zur Schaffung von schlanken Prozessen und können diese anwenden. Zudem ist ihnen bewusst, wie ein ganzheitliches Lean Thinking innerhalb eines Unternehmens verankert werden kann und nachhaltig sichergestellt werden kann. • **Fachliche Kompetenzen** Die Studierenden kennen die Philosophie des Lean Managements sowie die wichtigsten Werkzeuge und Maßnahmen zur Schaffung von schlanken Prozessen in der Produktion, Administration und der Entwicklung. • **Fachübergreifende Kompetenzen, Berufsbefähigung** Durch praxisnahe Fallstudien, Simulationen und Fallbeispiele können Sie diese Werkzeuge anwenden, ihren Erfolg bewerten und bei Bedarf adaptieren. • **Soziale Kompetenzen, Schlüsselkompetenzen** Die Erarbeitung der Ergebnisse im Team mit anschließender Präsentation fördert die Entwicklung der Studierenden im Bezug auf Teamarbeit und Kommunikation. • **Persönliche Kompetenzen** Die Vorlesung und die Präsentationen finden in englischer Sprache statt, was die Sprachkompetenz der Teilnehmer fördert.
Course-specific contribution to AoL learning objectives	See Module 4.25 Business Aspects of Extra-Logistics
Contents/ Indicative syllabus	1. Supply Chain Management 2. Lean Enterprise Management 3. Lean Manufacturing 4. Lean Administration 5. Lean Development 6. Management of Change
Teaching and learning methology	Es kommen verschiedene Lehrmethoden zum Einsatz. Parallel zur Vermittlung von theoretischen Grundlagen wird der Stoff in praktischen Fallübungen und Fallstudien von den Studierenden in Teams angewandt und vertieft. Eine umfassende Supply Chain und Produktionsprozess-Optimierung auf Basis eines realen Problems stellt den Abschluss dar. In ihrer Lösungsentwicklung müssen die Studierenden die gelernten Inhalte praxisnah umsetzen und gleichzeitig anhand dieses Falles erneut über die Anwendung von Lean Methoden in Verbindung mit der Gestaltung eines geeigneten Veränderungsmanagements reflektieren.
Miscellaneous	Keine
Indicative reading list	• Rother, Mike: Die Kata des Weltmarktführers. Campus Verlag 2013. • Womack, James P., Jones, Daniel T.: Lean Thinking – Ballast abwerfen, Unternehmensgewinne steigern, Campus 2013. • Meier, David; Liker, Jeffrey: Der Toyota Weg. Finanzbuchverlag 2007.

	• Regber, Holger; Zimmermann, Klaus: Change Management in der Produktion. MI Fachverlag Landsberg, 2007. • A. Smalley: Produktionssysteme glätten: Anleitung zur Lean Production nach dem Pull-Prinzip - angepasst an die Kundennachfrage, Lean Enterprise Institute, 1. Auflage 2005. • Goldratt, Eliyahu Moshe; Cox, Jeff: The Goal- A process of ongoing improvement. 3rd revised edition (1st Edition 1984), 20th Anniversary Edition. The North River Press, Great Barrington,MA,USA. 2004. • May, Constantin; Schimek, Peter: Total Productive Management: Grundlagen und Einführung von TPM - oder wie Sie Operational Excellence erreichen. Ansbach: CETPM Publishing, 2008. • Höfer, Stephan; Geldmann, Udo; Spanagel, Stefanie:: Wertstromdesign Lean Production. Das Handbuch für die Praxis. Herausgeber Effizient zum Erfolg GbR, Böhmenkirch. Auflage 2, 2011. Wiegand, Bodo; Franck, Philip: Lean Administration. Lean Management Institut Aachen, 2006.

4.25b.3 Class: Change Management

Type of Course	
Lecturers name; contact details see ESB-website	Frau Claudia Drews
Teaching language	Deutsch/Englisch
Contact hours per week	2 SWS
Learning outcomes	Nach erfolgreicher Teilnahme an dieser Veranstaltung kennen die Teilnehmer die historische Entwicklung und die zukünftige Bedeutung des Change Managements für den Unternehmenserfolg im globalisierten Umfeld. Sie verstehen das Zusammenspiel der drei Eckpfeiler des Change Managements: Mensch, Prozess und Organisation. • **Fachliche Kompetenzen** Sie verstehen die typischen Phasen eines Veränderungsprozesses und lernen, adäquat darauf zu reagieren. Sie sind in der Lage, Verhaltensmuster von Betroffenen gegenüber Veränderungen zu erkennen, die psychologischen Zusammenhänge zu verstehen und adäquat auf diese Situation einzugehen. Hierzu erwerben sie ein Methodenwissen, Veränderungsprojekte durchzuführen, Widerständen präventiv und bei Auftreten zu begegnen, kontinuierliche Verbesserungsprozesse einzurichten und eine nachhaltige Kultur der Veränderung aufzubauen. • **Fachübergreifende Kompetenzen, Berufsbefähigung** Die Gestaltung von Veränderung ist eine Schlüsselkompetenz von Führungskräften in der Praxis. Die Teilnehmer werden durch diese Veranstaltung darauf vorbereitet, selbst aktiv die Rolle eines Change Agents zu übernehmen.

	• **Soziale Kompetenzen, Schlüsselkompetenzen** Die Gestaltung von Veränderung erfordert ein hohes Maß an Sozialkompetenz, sei es in den Bereichen Kommunikation, Verhandlung, Moderation und emotionale Intelligenz. Diese werden durch diese Veranstaltung gefördert. **Persönliche Kompetenzen** Die Studierenden erkennen, dass die Gestaltung von Veränderung entscheidend mit der persönlichen Einstellung und inneren Haltung zu fortlaufender Verbesserung zusammenhängt.
Course-specific contribution to AoL learning objectives	See Module 4.25. Business Aspects of Extra-Logistics
Contents/ Indicative syllabus	1) Grundlagen des Change Managements 2) Die Gestaltung des Veränderungsprozesses 3) Der Mensch im Veränderungsprozess 4) Der Einfluss der Organisation auf den Change Erfolg 5) Die Entwicklung eines Change Management Konzeptes 6) Werkzeuge und Methoden des Change Managements 7) Die Grenzen des Change Managements
Teaching and learning methology	Es kommen verschiedene Lehrmethoden zum Einsatz. Parallel zur Vermittlung von theoretischen Grundlagen wird der Stoff in praktischen Fallübungen und Fallstudien von den Studierenden in Teams angewandt, erarbeitete Lösungen präsentiert und auf diese Art die Inhalte vertieft.
Miscellaneous	Keine
Indicative reading list	Doppler, Klaus; Lauterburg, Christoph: Change Management: den Unternehmenswandel gestalten. Campus Verlag 2014. Kotter, John: Leading Change: Wie Sie Ihr Unternehmen in 8 Schritten erfolgreich verändern. Vahlen Verlag 2011. Lauer, Thomas: Change Management: Grundlagen und Erfolgsfaktoren. Springer Verlag 2010. Becker-Kolle, Christel; Kraus, Georg; Fischer, Thomas: Handbuch Change Management. Cornelsen Verlag Berlin 2004. Winkelhofer, Georg: Kreativ managen. Springer Verlag 2006. Kreyenberg, Jutta: Konflikt-Management. Cornelsen Verlag Berlin, 2005.

4.26a Module: International Transport Logistics

Module Registration No.	Exam-Reg.-No. 21423021. DD Exam-Reg.-No. 21424021
Type of course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Vera Hummel /Michael Kugel
Teaching language	German/English
Credits (ECTS)	6

Contact hours per week	4 SWS
Learning outcomes of the course	The students are enabled to assess the relevance, advantages and disadvantages of different transportation modes in international transport logistics and learn to design transportation networks purposefully. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Know and understand different transportation modes, traffic infrastructures and –systems that have relevance for the design of cross-company transportation networks. This concerns especially the foundations of forwarding and business models in international transport logistics - Assess relevance of future aspects of reverse logistics - Plan logistical- and transport networks, assess their economic consequences and organize forwarding processes **Methodological competencies**: - Apply acquired knowledge in a simulation game on transport logistics **Social competencies**: - Interact with fellow students in small teams to resolve simulated problems **Personal competencies:** - Experience and reflect own performance in a simulated problem environment
Module-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) Students build on their know-how gained in previous semesters. After successfully attending the module, students know and understand different transportation modes, traffic infrastructures and –systems that have relevance for the design of cross-company transportation networks. They are able to assess the relevance of reverse logistics aspects and can plan logistical and transport networks.
Content/ Indicative syllabus	Road-, rail-, air- and sea freight transport ▪ Requirements and KPIs for logistical service providers and actors in road, rail, air and sea freight transport ▪ Transport carriers, traffic infrastructure and its systems; targets and target conflicts of transport logistics ▪ Services and business models of forwarding companies, shipping companies and ocean carriers ▪ Intermodal and multimodal transport ▪ Production factors, performance and service provision of forwarders and shipping companies ▪ Essential standards and guidelines for the international transport of goods, also compared to the national transport. ▪ Reverse logistics: processes, carriers, players and systems ▪ Entsorgungslogistik: Prozesse, Verkehrsträger, Akteure und Systeme

	Transport simulation game with the transport modes: road, air and sea
Teaching and learning methodology	Lectures and simulation game
Miscellaneous	None
Indicative reading list	Verkehrs- und Transportlogistik (VDI-Buch) by Uwe Clausen and Christiane Geiger, Springer Vieweg (7. Oktober 2013); ISBN-13: 978-3540342984 | Auflage: 2. Aufl. 2013
Contact hours per week	4 SWS
Examination/ Type of assessment	CA + Written Examination (2hrs.)
Weighting of Grade within overall programme	According to credits

4.27a Module: Fundamentals of Supply Chain Management

Module Registration No.	Exam-Reg.-No. 21423031 DD Exam-Reg.-No. 21424031
Type of course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Palm/Guldin/Espinosa
Teaching language	English
Credits (ECTS)	6
Contact hours per week	4 SWS
Learning outcomes of the course	The class familiarizes students with the basic principles of Supply Chain Management. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understand basic concepts and methods of Logistics and Supply Chain Management - Understand the role of Supply Chain Management in the Company and the interdependencies between marketing, engineering, production and logistics - Understand basic Supply Chain Management concepts and apply them in real-life examples **Methodological competencies:** - Understand and apply methods to plan, control and optimize the supply chain - Refine their oral communication and presentation skills **Social competencies:** - co-operatively solve problems in small teams **Personal competencies:** develop the ability to think and act holistic and integrating

Course-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) Students build on their know-how gained in previous semesters. After successfully attending the module, students know and understand concepts and methods of Logistics and Supply Chain Management, the role of SCM in a company can apply SCM concepts in real-life situations.
Content/ Indicative syllabus	- Introduction to Supply Chain Management - Integrated logistics, procurement, materials management and production - Material inventory and material requirements in the enterprise - Procurement strategies - Supply Chian Risk Management - Push and Pull Supply Chains - Material Control Strategies - Delivery Forms - Global logistic structures and value chains - Supplier Assessment - Cooperation - Supply Chain Design - Supply Chain Planning
Teaching and learning methodology	Lecture, group work, student presentations
Miscellaneous	None
Indicative reading list	Chopra, Sunil/Meindl, Peter: Supply Chain Management. Strategie, Planning, and Operation. Neueste Auflage.
Examination/ Type of assessment	CA + Written Examination (1hrs.)
Weighting of Grade within overall programme	According to credits

4.28a Module: Distribution and Retail Logistics

Module Registration No.	Exam-Reg.-No. 21423041 DD Exam-Reg.-No. 21424041
Type of course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Wolfgang Echelmeyer
Teaching language	English
Credits (ECTS)	6
Contact hours per week	4 SWS
Learning outcomes of the course	After successful completion of this course the students should have gained basic knowledge, concepts and methods in Distributions- und Retail Logistics
Course-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) Students build on their know-how gained in previous semesters. After successfully attending the module, students know and understand concepts and methods distribution and retail logistics.

Content/ Indicative syllabus	1. Basics of Distribution logistics; 2. Technical Logistics for distribution processes; 3. Supply Chain in retail logistics; Use cases from the retail logistics
Teaching and learning methodology	Lecture, group work and scientific paper
Miscellaneous	None
Indicative reading list	Specht: Distributionsmanagement; Kohlhammer 2005
Examination/ Type of assessment	CA + Written Examination (2hrs.)
Weighting of Grade within overall programme	According to credits

4.26b Module. Factory and Warehouse Planning

Module Registration No.	Exam-Reg.-No. 21423211
Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr.-Ing. Harald Augustin/D. Bothor
Teaching language	English / German
Credits (ECTS)	6
Total work	180
Contact hours per week	4 SWS lecture
Examination/ Type of assessment	Written Exam: 1 hr Project (attendance in lecture for review appointments is mandatory)
Weighting of Grade within overall programme	
Learning outcomes	Lecture: Students are familiar with process models, methods and design options for the new construction, and expansion planning of factories and warehouses in the international context. Laboratory: Students are familiar with two VR (Virtual Reality) systems for factory planning (visTable) and warehouse planning (taraVRbuilder) and specialised in there use in the context of the lecture topics. After this class, the students have the following skills: Subject-specific knowledge and skills: Acquisition of theoretical foundations for factory and warehouse planning, including important calculation methods and algorithms as well as the legal frameworks. Acquistion and application of practical knowledge in VR systems for factory and warehouse planning. Methodological competencies: Acquisition of analytical and synergistic expertise based on structured approaches and algorithms for analysis and synthesis of complex factory and warehouse systems.

	Specialised / practical competencies / skills/ abilities: In the lecture accompanying tasks, students learn the application of selected aspects of the location, factory and warehouse planning. Social competence: Promotion of social skills through group work at the lecture accompanying tasks. Normative competencies: Students will recognize that factory and warehouse planning in the industrial environment has complex challenges of technology and business, is a very communication-intensive project environment due to the extensive trades. They also recognize the importance for society and the environment and the responsibility of factory planners to consider this.
Module-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) Students build on their knowledge gained in previous semesters. After successfully attending the module, students know and understand process models, methods and design options for the new construction, and expansion planning of factories and warehouses in the international context.
Contents/ Indicative syllabus	Lecture: Location planning – Qualitative and quantitative parameters for locations – Analysis and evaluation of foreign locations Factory planning – Development trends and approaches for future factory systems – Project structuring of factory planning – General Development Planning – Building construction and static aspects therefore – Production and logistics system design in a factory – Material flow analysis and design – Regulations in factory, facilities and warehouse planning. Amongst others HOAI (German law on payment of architects and engineers), ISO, DIN (German Institute for Standardisation), VDI (German Institute of Engineers) code of practice, FEM – Specifics of project management of trades in the international factory implementation Warehouse planning: – Warehouse types and structures – Warehouse planning for the areas of incoming goods, racking systems, picking, packaging and dispatch with focus on processes and automation technologies – Technical and static design of automated racking systems in accordance with relevant standards and guidelines, such as DIN, VDI, FEM, etc. – IT in warehouses: material flow control and warehouse management systems Laboratory: - Introduction and application of VR factory planning software: visTable - Introduction and application of VR warehouse planning software: taraVRbuilder

Teaching and learning methology	Lecture, laboratory, project work
Miscellaneous	The following classes are the requirements for participation in this class: Accounting I - Financial Accounting Accounting II - Comparative cost accounting Engineering Mechanics Operations Management – Orientation: Fundamentals of Production and Logistics Management Industrial Engineering Automation in Industrial and Materials Handling, Transportation
Indicative reading list	Basics: Grundig, Claus-Gerold (2018): Fabrikplanung: Planungssystematik, Methoden, Anwendungen. 5. Aufl., München u.a.: Hanser. Helbing, Kurt (2009): Handbuch Fabrikprojektierung. Berlin: Springer. Kinkel , Steffen (2004): Erfolgsfaktor Standortplanung. In- und ausländische Standorte richtig bewerten. Berlin: Springer. Martin, Heinrich (2011): Transport- und Lagerlogistik. 8. Aufl., Wiesbaden: Vieweg. Mallon, Jürgen / Sebastian Dannenberger (2011): Produktionsaufbau in China. Handlungsempfehlungen als Ergebnis einer empirischen Analyse. Heidelberg: Springer. Schenk, Michael / Siegfried Wirth (2013): Fabrikplanung und Fabrikbetrieb: Methoden für die wandlungsfähige und vernetzte Fabrik. Berlin u.a.: Springer. Ten Hompel, Michael et al. (2007): Materialflusssysteme: Förder- und Lagertechnik. 3. Aufl., Berlin: Springer. Ten Hompel, Michael / Volker Sadowsky / Maria Beck. (2011): Materialflusssysteme 2: Planung und Berechnung der Kommissionierung in der Logistik. Berlin: Springer. Ten Hompel, Michael / Hubert Büchter / Ulrich Franzke (2008): Identifikationssysteme und Automatisierung. Berlin: Springer. Ten Hompel, Michael / Thorsten Schmidt (2007): Warehouse Management: Organisation und Steuerung von Lager- und Kommissioniersystemen. 3. Aufl., Berlin: Springer, Wiendahl, Hans.-Peter. / Jürgen Reichardt /Peter Nyhuis (2014): Handbuch Fabrikplanung: Konzept, Gestaltung und Umsetzung wandlungsfähiger Produktion. 2. Auflg. München: Hanser. Further reading: Will be discussed in lecture Laboratory Material: Handbooks for the VR software packages being used will be made available on a web server.

4.27b Module: Identification and Communication Systems

Module Registration No.	Exam-Reg.-No. 21423221
Type of course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Dr. Albrecht Oehler and Laboratory Assistant/W. Tenten albrecht.oehler@reutlingen-university.de
Teaching language	English/German
Credits (ECTS)	6
Contact hours per week	4 SWS
Examination/ Type of assessment	CA + Written Examination (2hrs.)
Weighting of Grade within overall programme	According to credits

4.27b.1 Identification and Communication System: Lecture

Learning outcomes	Target of the lecture is a basic understanding of communication networks and identification systems. On one hand different identification systems and communication networks are introduced. On the other hand the students are enabled to understand and to evaluate complex networks. Learning outcome is • knowledge and practical experience with identification systems • knowledge of transmission characteristics of four-poles as lines, amplifiers etc. • understanding of radio networks • planning of communication networks • Routing algorithms • technical solutions for identification within supply chains
Contents/ Indicative syllabus	Communication networks • signals and systems • information and services • data transmission and protocols • international standadization Identification systems • Barcode • RFID • Track and trace systems in logistics
Teaching and learning methology	Lecture
Miscellaneous	None

Indicative reading list	• Hagmann, Gert: Grundlagen der Elektrotechnik, AULA-Verlag, 14. durchges. u. korr. Aufl. 2009. • Werner, Martin: Nachrichtentechnik, Vieweg-Verlag, 5.Auflage, 2006. • Finkenzeller, Klaus: RFID-Handbuch, Hanser-Verlag, 5.Auflage, 2008

4.27b.2 Identification and Communication Systems: Lab

Learning outcomes	Target of the lecture is the application of communication networks and identification systems in the laboratory and in the field. Learning outcome is • realisation of electonic networks • measurement of radio networks (GSM, UMTS) • measurement and optimization of communication networks (V.24, WiFi) • evaluation of identification systems • implementation of identification systems in logistic systems
Module-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) Students build on their know-how gained in previous semesters. After successfully attending the module, students know and understand communication networks and identification systems. They are familiar with routing algorithms and technical solutions for identification within supply chains.
Contents/ Indicative syllabus	Experiments • Radio transmission and receiver • Digital transmission • WiFi and collaborative work • GSM: benefits and constraints • RFID and material flow systems
Teaching and learning methology	Laboratory
Miscellaneous	None
Indicative reading list	Descriptions of the experiments are provided

4.28b Module: Sustainable Operations

Module Registration No.	Exam-Reg.-No. 21423231
Type of course	Compulsory
Lecturers name; contact details see ESB-website	Prof. Peter Kleine-Möllhoff (lecture), Prof. Anja Braun (project) peter.kleine-moellhoff@reutlingen-university.de
Teaching language	English
Credits (ECTS)	6

Contact hours per week	4
Learning outcomes of the course	After this lecture students will have acquired the following knowledge and competencies: • **Technological knowledge**: mastering of the basic theories of sustainability aspects in Logistics Operations from environmental, economic and social points of view. Participants should know the possibilities for systems improvement in transportation, intralogistics and along the supply chain. • **Methodological knowledge:** acquisition of the competence to attack in a systematic way sustainability aspects in operations by analysing the relevant processes, modelling the logistics system, acquiring necessary defining key performance indicators, calculating and presenting key data for decision makers. • **Practical competencies/skills/abilities**: students will have to apply the acquired theoretical knowledge and methods to a real case in logistics operations and will summarize and present their findings in a report. **Social competencies:** students will have to solve the above mentioned real case problem in small groups in order to stimulate and to promote the ability to work in a team and to exchange and share interdisciplinary knowledge.
Course-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) Students build on their know-how gained in previous semesters. After successfully attending the module, students know and understand theories of sustainability aspects in Logistics Operations from environmental, economic and social points of view. Participants know the possibilities for systems improvement in transportation, intralogistics and along the supply chain.
Content/ Indicative syllabus	- Introduction into the topic sustainability - Triple bottom line approach in logistics operations - Sustainability trends in logistics - Green transportation - green warehousing - sustainable supply chains - energy and resource efficiency - project: improving a real logistics operation under sustainability aspects
Teaching and learning methodology	Lecture (50%), project (50%)
Miscellaneous	None
Indicative reading list	Emmet S. et al. (2010):, Green Supply Chains, an action manifesto, Wiley, Chichester, ISBN: 978-0-470-68941-7 Gregori G. et al. (2011): Grünbuch der nachhaltigen Logistik, Handbuch für die Ressourcenschonende Gestaltung logistischer Prozesse, BVL, 1. Auflage, Wien, Bremen, ISBN: 978-3-200-02146-4 Bode W. et al. (2011). Praxisleitfaden „Grüne Logistik“, Hochschule Osnabrück, RIS-Kompetenzzentrum für Verkehr und Logistik der Weser-Ems-Region (LOGIS.NET) VDI (2014): VDI 4075 part 1, Cleaner production (PIUS) – Basic principles and area of application, Beuth, Berlin

	VDI (2016): VDI 4070 part 1, Sustainable management in small and medium-sized enterprises - Guidance notes for sustainable management, Beuth, Berlin
Examination/ Type of assessment	Project Report & Written Exam (1hrs.)
Weighting of Grade within overall programme	According to credits

4.29 Module: Interdisciplinary Cross Module Seminar

Module Registratrion No.	Exam-Reg.-No. 21420231
Semester	7 Semester
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Interdisciplinary Cross Module
How frequently is the module offered	Every semester
Admission requirements	Tbd.
Level	Undergraduate
Transferability of the module to other programmes	The module is transferable to any other programme requiring students to prove the ability to apply cross-disciplinary thinking in solving logistics problems in a simulated business environment.
Responsible professor/ Module coordinator	Prof. Dr. Vera Hummel
Credits (ECTS)	6
Total work load	180 hrs.
Contact hours	4 SWS
Learning outcomes of module	Students apply their know-how from different business disciplines in a simulated business environment. After successful completion of the module students have acquired the following competencies: **Professional competencies:** - Apply know-how from various business disciplines to a complex simulated business environment **Methodological competencies:** - transfer theoretical business concepts to real-life applications **Social competencies:** - co-operatively solve problems in small teams - work under time pressure and in a competitive environment **Personal competencies:**

	- critically analyse conflicts between commercially attractive options and ethical behaviour
Module-specific contribution to AoL learning objectives	LO 4.1. (Assessed): Students know how to apply their knowledge in a complex simulated business environment and how to transfer theoretical business concepts to real-life applications.
Contents/ Indicative syllabus	Based on the competences learned in semesters 1 to 6, students will generate and design a new product with potential for smart components and produce prototypes in the ESB logistics learning factory. The learning factory exemplifies a production operation with all assembly- and logistics-side process steps of a variant-rich small batch and single piece production between product and process development as well as all incoming and outgoing goods with the entire value added process. The assembly and logistics system infrastructure includes i.a. flexible, mobile storage systems, ten manual assembly stations, driverless transport systems and a modular, self-controlled roller conveyor system. Furthermore, various collaborative robot systems (Rethink Robotics type Baxter and Sawyer, Universal Robots UR10 (CB2 - old), UR5 (CB3), UR3 (CB3), KUKA IIWA) for the realization of MRK applications, a Wibond pick-by-light System for employee assistance and an industrial IO-Link communication system with various sensors and programmable logic controllers for solving automation tasks. The LLF also has an app and cloud-based collaborative engineering, planning and simulation platform (Dassault Systemès 3DExperience) and a constantly evolving Manufacturing Self-Execution System (MSES) specifically designed for transformable scenarios in the context of Industry 4.0 was developed and implemented In addition, marketing, procurement, quality management, sales, cost accounting and controlling will be part of the task. At the beginning of the project, pre-defined framework conditions are announced in a separate kick off meeting.
Teaching and learning methology	Group work, presentations, lectures, hand-on training in learning factory
Miscellaneous	None
Indicative reading list	All lecture notes of the semester 1-6
Examination/ Type of assessment	CA
Weighting of Grade within overall programme	According to credits

4.30a Module: Integrative Module in Extra-Logistics: Simulation Game Logistics

Module Registratrion No.	Exam-Reg.-No. 21423051
Semester	8 Semester
Duration of module	1 Semester
Type of module	Compulsory

Courses included in the module	Simulation Game Logistics
How frequently is the module offered	Every semester
Admission requirements	None
Level	Undergraduate
Transferability of the module to other programmes	The module is transferable to any other programme requiring students to prove the ability to apply cross-disciplinary thinking in solving logistics problems in a simulated business environment.
Responsible professor/ Module coordinator	Prof. Dr. Andreas Taschner/Sven Bauer
Credits (ECTS)	6
Total work load	180 hrs.
Contact hours	4 SWS
Learning outcomes of module	Students apply their know-how from different business disciplines in a simulated business environment. After successful completion of the module students have acquired the following competencies: **Professional competencies:** - Apply know-how from various business disciplines to a complex simulated business environment **Methodological competencies**: - transfer theoretical business concepts to real-life applications **Social competencies**: - co-operatively solve problems in small teams - work under time pressure and in a competitive environment **Personal competencies:** - critically analyse conflicts between commercially attractive options and ethical behaviour
Module-specific contribution to AoL learning objectives	LO 4.1. (Assessed): Students know how to apply their knowledge in a complex simulated business environment and how to transfer theoretical business concepts to real-life applications.
Contents/ Indicative syllabus	Students form small groups to manage a virtual company active in four different world regions: EU (European Union), NAFTA (North American Free Trade Agreement), MERCOSUR (Mercado Común del Sur) and ASEAN (Association of Southeast Asian Nations). They must apply concepts and instruments from all business disciplines covered in the programme in order to successfully steer their company through a competitive business environment: • Strategic management • Marketing and sales • Research and development • Procurement and purchasing • Unternehmensziele und -strategien • Manufacturing • HR management

	• Financial accounting and management accounting
Teaching and learning methology	Combination of lecture (approx. 60%) and group work using simulation software (approx. 40%)
Miscellaneous	---
Indicative reading list	"Handbook TopSim General Management" of Business Simulation Game
Examination/ Type of assessment	CA
Weighting of Grade within overall programme	According to credits

4.30b Module: Integrative Module in Intra-Logistics: Technical Planning Case Logistics

Module Registration No.	Exam-Reg.-No. 21423241
Semester	8
Duration of module	1 semester
Type of module	Compulsory
Courses included in the module	– Planning Case: Supply Chain and Logistics Engineering
How frequently is the module offered	Each semester
Admission requirements	The following modules/ classes must be passed successfully: – Industrial Engineering – Automation in Industrial and Materials Handling, Transportation – Factory and Warehouse Planning
Level	Undergraduate
Transferability of the module to other programmes	
Responsible professor/ Module coordinator	Prof. Dr.-Ing. Harald Augustin
Lecturers name (contact details see ESB-website)	Frank Hallfell
Teaching language	English
Credits (ECTS)	6
Total work load	180
Contact hours per week	4 SWS lecture
Examination/ Type of assessment	Technical Planning Case (100%)

Weighting of Grade within overall programme	
Learning outcomes	Planning Case: Students apply their knowledge in a real data based planning of a global manufacturing and logistics network in a virtual planning team. After this class, the students have the following skills: – Subject-specific knowledge and skills: Application of planning procedures for factories and warehouses in a real example using VR planning tools for virtual teamwork. – Methodological competencies: Deepening of analytical and synergistic expertise on hand structured solution models for the analysis and design of complex factory and warehouse systems. – Specialised / practical competencies / skills/ abilities: Students will deepen practical skills in the field of VR-based factory and warehouse planning in virtual teams with the following contents – Planning of a global production and logistics networks. – Detailed factory planning and warehouse planning with all relevant trades and their integrative character in terms of a holistic approach due to the planning constraints. – Social competence: The social competence is developed in the context of the ongoing teamwork with a focus on the handling and solution of communication and social conflicts that arise in virtual teams. – Normative competencies: Students will recognize the importance of the observance of human and cultural differences in the context of virtual planning, and know the application potential and risks of information and communication technologies in the context of virtual collaborative engineering. Upon completion of the course the students have the following skills: – Subject-specific knowledge and skills: Application of VR planning tools in the factory and warehouse planning and their application in specific planning tasks. – Methods knowledge: Acquisition of application competencies to use using VR planning systems and in existing planning tools in the factory and warehouse planning. – Specialised / practical competencies / skills/ abilities: Students will acquire practical skills in the field of 3D VR planning and data management in the context of a factory and warehouse planning. They are thus able to apply the following content in an industrial context: Planning, design and digital illustration of a factory and a warehouse area with technical equipment by means of a 3D VR planning tool. – Social competence: Promotion of social skills through group work at the lecture accompanying tasks. – Normative competencies: The students recognize the importance of compliance with government rules and design guidelines for human-centered and sustainable forms of work systems in factories and warehouses.
Course-specific contribution to AoL learning objectives	LO 4.1. (Assessed): Students know how to apply their knowledge in a real data based planning of a global manufacturing and logistics network in a virtual planning team using VR planning tools for virtual teamwork.

Contents/ Indicative syllabus	Planning Case: Factory planning – Development of a production strategy – Assembly system planning – Planning of supply and production logistics – Planning the interaction of production and distribution warehouse – Building Design Warehouse planning – Building and material flow planning for all warehouse areas as incoming goods, storage, picking and sending – Calculation and design of the automation concept Economic calculation
Teaching and learning methology	Planning Case, Laboratory
Miscellaneous	
Indicative reading list	Basics: – Grundig, Claus-Gerold (2018): Fabrikplanung: Planungssystematik, Methoden, Anwendungen. 5. Aufl., München u.a.: Hanser. – Helbing, Kurt (2009): Handbuch Fabrikprojektierung. Berlin: Springer. – Kinkel , Steffen (2004): Erfolgsfaktor Standortplanung. In- und ausländische Standorte richtig bewerten. Berlin: Springer. – Martin, Heinrich (2011): Transport- und Lagerlogistik. 8. Aufl., Wiesbaden: Vieweg. – Schenk, Michael / Siegfried Wirth (2013): Fabrikplanung und Fabrikbetrieb: Methoden für die wandlungsfähige und vernetzte Fabrik. Berlin u.a.: Springer. – Ten Hompel, Michael et al. (2007): Materialflusssysteme: Förder- und Lagertechnik. 3. Aufl., Berlin: Springer. – Ten Hompel, Michael / Volker Sadowsky / Maria Beck. (2011): Materialflusssysteme 2: Planung und Berechnung der Kommissionierung in der Logistik. Berlin: Springer. – Ten Hompel, Michael / Hubert Büchter / Ulrich Franzke (2008): Identifikationssysteme und Automatisierung. Berlin: Springer. – Ten Hompel, Michael / Thorsten Schmidt (2007): Warehouse Management: Organisation und Steuerung von Lager- und Kommissioniersystemen. 3. Aufl., Berlin: Springer, – Wiendahl, Hans.-Peter. / Jürgen Reichardt /Peter Nyhuis (2014): Handbuch Fabrikplanung: Konzept, Gestaltung und Umsetzung wandlungsfähiger Produktion. 2. Aufl., München: Hanser. Further reading: – Will be discussed in lecture

4.31 Electives in Extra-Logistics

Module Registration No.	None (see course exam registration numbers)
Type of Course	Elective

Semester	1 Semester
Duration of module	See classes
Type of module	Elective (Select 2 out of 3)
Courses included in the module	4.31/32 A1: Industry-Specific Supply Logistics 4.31/32 A2: Maritime Logistics 4.31/32.A3: Operations Research
How frequently is the module offered	Every Semester
Admission requirements	none
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme following the same framework and teaching the same level of competences.
Total number of ECTS	4
Learning outcomes of the module	The module provides students with the opportunity to deepen their know-how in selected fields of extra-logistics. After successfully completing the module, students will understand the specific conditions, challenges and solution approaches relevant for different logistical environments and will be able to implement practice-oriented solutions for specific problems appearing in these environments.
Course-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) After successfully completing the module, students will understand the specific conditions, challenges and solution approaches relevant for different logistical environments and will be able to implement practice-oriented solutions for specific problems appearing in these environments.
Examination/ Type of assessment	CA + Written Examination (1hrs.)
Weighting of Grade within overall programme	According to credits

4.31.1 Class: Industry-specific Supply Logistics

Module Registration No.	Exam-Reg.-No. 21423101
Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr. Daniel Palm/M. Gulding
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The class familiarizes students with the basic principles of Automotive Logistics. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understand basic concepts and methods of Logistics and Supply Chain Management in Automotive Industry - Understand the role of Logistics in the Company and the interdependencies between marketing, engineering, production and logistics - Understand basic logistics concepts in Automotive Industry and apply them in real-life examples **Methodological competencies**: - Understand and apply methods to plan, control and optimize the automotive supply chain - Refine their oral communication and presentation skills **Social competencies**: - co-operatively solve problems in small teams **Personal competencies:** develop the ability to think and act holistic and integrating
Course-specific contribution to AoL learning objectives	See Module 4.31/32A
Contents/ Indicative syllabus	▪ Automotive Industry ▪ Brand Management ▪ Automotive Production ▪ Supply Chain Structure ▪ Complexity Management / Drivers and Solutions ▪ Supply Management ▪ Sourcing Strategies ▪ Supplier Management ▪ Logistics Planning • Supply Concepts • Material Flow and Processes from Supplier to Assembly Line Information Flow and IT-Systems

Teaching and learning methology	Lecture, group work, simulation game, student presentation
Miscellaneous	None
Indicative reading list	• Klug, Florian: Logistikmanagement in der Automobilindustrie, Springer-Verlag, Berlin, Heidelberg, 2010. • Ihme, Joachim: Logistik im Automobilbau: Logistikkomponenten und Logistiksysteme im Fahrzeugbau, Hanser, München 2006

4.31.2 Class: Maritime Logistics

Module Registration No.	Exam-Reg.-No. tbd.
Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr. Wolfgang Echelmeyer
Teaching language	german / engl.
Contact hours per week	2 SWS
Learning outcomes	After successful completion of this course the students should have gained basic knowledge, concepts and methods in maritime Logistics
Course-specific contribution to AoL learning objectives	See Module 4.31/32A
Contents/ Indicative syllabus	• Harbour logistics Autonomous material handling systems • Handling of cargo at the seaport and transport technology • Maritime Supply Chain • Use cases
Teaching and learning methology	Lecture, group work
Miscellaneous	None
Indicative reading list	Jahn: Maritime Logistik; Springer 2015 Dong-Wook Song: Maritime Logistics: A Guide to Contemporary Shipping and Port Management; Kogan Page2015

4.31.3 Class: Operations Research

Module Registration No.	Exam-Reg.-No. 21423121
Type of Class	
Lecturers name; contact details see ESB-website	Prof. Dr. Volker Reichenberger
Teaching language	german / engl.

Contact hours per week	2 SWS
Learning outcomes	Students are able to build elementary mathematical models for optimization problems and to apply established solution methods to these problems. They can apply their knowledge for scientific research as well as for practical purposes in engineering applications. They are able to judge the qualitiy of mathematical models and of solutions provided by computer programs. They know about the possibilities of modelling as well as their shortcomings.
Course-specific contribution to AoL learning objectives	See Module 4.31/32A
Contents/ Indicative syllabus	- Linear problems and linear programming - Special linear problems (transportations problems, ...) - Graph-based problems - Simulation methods
Teaching and learning methology	Lecture and computer lab excercises
Miscellaneous	None
Indicative reading list	Hillier, Liebermann: Introduction to Operations Research. McGrawHill 2010

4.32 Electives in Intra-Logistics

Module Registration No.	None (see course exam registration numbers)
Semester	8
Duration of module	See classes
Type of module	Mandatory (two out of 3)
Courses included in the module	4.31/32 B1: Industry-Specific Supply Logistics 4.31/32. B2: Premises Layout Planning 4.31/32 B3: Operations Research
How frequently is the module offered	Every semester
Admission requirements	none
Level	Undergraduate
Transferability of the module to other programmes	Prof. Dr. Daniel Palm
Responsible professor/ Module coordinator	Prof. Dr. Daniel Palm
Total number of ECTS	6
Learning outcomes of the module	The module provides students with the opportunity to deepen their know-how in selected fields of intra-logistics. After successfully completing the

	module, students will understand the specific conditions, challenges and solution approaches relevant for different logistical environments and will be able to implement practice-oriented solutions for specific problems appearing in these environments.
Course-specific contribution to AoL learning objectives	LO 4.1. (Reinforced) After successfully completing the module, students will understand the specific conditions, challenges and solution approaches relevant for different logistical environments and will be able to implement practice-oriented solutions for specific problems appearing in these environments.
Examination/ Type of assessment	CA + written examination (1hrs.)
Weighting of Grade within overall programme	According to credits

4.32.1 Industry-Specific Supply Logistics

Module Registration No.	Exam-Reg.-No. 21423301
Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr. Daniel Palm/M. Guldin
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The class familiarizes students with the basic principles of Automotive Logistics. After successful completion of this course the students should have gained the following knowledge and developed the following competencies: **Professional competencies:** - Understand basic concepts and methods of Logistics and Supply Chain Management in Automotive Industry - Understand the role of Logistics in the Company and the interdependencies between marketing, engineering, production and logistics - Understand basic logistics concepts in Automotive Industry and apply them in real-life examples **Methodological competencies:** - Understand and apply methods to plan, control and optimize the automotive supply chain - Refine their oral communication and presentation skills **Social competencies:** - co-operatively solve problems in small teams **Personal competencies:** develop the ability to think and act holistic and integrating

Course-specific contribution to AoL learning objectives	See Module 4.31/32B
Contents/ Indicative syllabus	▪ Automotive Industry ▪ Brand Management ▪ Automotive Production ▪ Supply Chain Structure ▪ Complexity Management / Drivers and Solutions ▪ Supply Management ▪ Sourcing Strategies ▪ Supplier Management ▪ Logistics Planning • Supply Concepts • Material Flow and Processes from Supplier to Assembly Line Information Flow and IT-Systems
Teaching and learning methology	Lecture, group work, simulation game, student presentation
Miscellaneous	None
Indicative reading list	• Klug, Florian: Logistikmanagement in der Automobilindustrie, Springer-Verlag, Berlin, Heidelberg, 2010. • Ihme, Joachim: Logistik im Automobilbau: Logistikkomponenten und Logistiksysteme im Fahrzeugbau, Hanser, München 2006

4.32.2 Class: Premises Layout Planning

Module Registration No.	Exam-Reg.-No. 21423311
Type of Course	
Lecturers name; contact details see ESB-website	Dr. Darko Sucic Geb. 16, Raum XXX, Tel.: 0172 736 1489 darko.sucic@reutlingen-university.de
Teaching language	engl.
Contact hours per week	2 SWS
Learning outcomes	The students learn how to build digital models of Virtual Factory. The Virtual Factory's models connect the product development (CAD/PDM/PLM) with factory's information systems by providing a digital thread and continuity between these systems which serves as a basis for simultaneous engineering and factory planning and simulation. In addition, the students become acquainted with the basics features of the Digital Manufacturing Planning and Simulation in 3DEXPERIENCE (DELMIA) of Dassault Systèmes.
Course-specific contribution to AoL learning objectives	See Module 4.31/32B

Contents/ Indicative syllabus	- Product Development and Virtual Factory principles and methods - Virtual Factory modelling with comprehensive 3D process and resource planning tools of 3DEXPERIENCE (DELMIA). - Optimization of manufacturing assets through simulation
Teaching and learning methology	Accompanied laboratories
Miscellaneous	None
Indicative reading list	- VDI 4499: 2008-02 Digital Factory – Fundamentals Bracht U, Geckler D, Wenzel S. Digitale Fabrik. Methoden und Praxisbeispiele. Springer Vieweg; 2018

4.32.3 Class: Operations Research

Module Registration No.	Exam-Reg.-No. 21423321
Type of Course	
Lecturers name; contact details see ESB-website	Prof. Dr. Volker Reichenberger
Teaching language	german / engl.
Contact hours per week	2 SWS
Learning outcomes	Students are able to build elementary mathematical models for optimization problems and to apply established solution methods to these problems. They can apply their knowledge for scientific research as well as for practical purposes in engineering applications. They are able to judge the qualitiy of mathematical models and of solutions provided by computer programs. They know about the possibilities of modelling as well as their shortcomings.
Course-specific contribution to AoL learning objectives	See Module 4.31/32B
Contents/ Indicative syllabus	- Linear problems and linear programming - Special linear problems (transportations problems, ...) - Graph-based problems - Simulation methods
Teaching and learning methology	Lecture and computer lab excercises
Miscellaneous	None
Indicative reading list	Hillier, Liebermann: Introduction to Operations Research. McGrawHill 2010

4.33 Module: Individual Study Project

Module Registration No.	Exam-Reg.-No. 21420241
Semester	8
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module	Individual Study Project (ISP) on Comparative Topic
How frequently is the module offered	Every semester
Admission requirements	
Level	Undergraduate
Transferability of the module to other programmes	This module is transferable to any programme requiring students to prove individual in-depth research capabilities with a cross-disciplinary focus.
Responsible professor/ Module coordinator	Prof. Dr. Andreas Taschner
Lecturers name (contact details see ESB-website)	Several lecturers with international cultural background
Teaching language	Various
Credits (ECTS)	6
Total work load	180 hours
Contact hours per week	1 SWS
Examination/ Type of assessment	ungraded
Weighting of Grade within overall programme	n/a
Learning outcomes	The individual study project focuses the student's attention on one single company or organization. The student can suggest the company and must then analyze it in a holistic manner taking into account at least the following dimensions: innovativeness (of products and processes), strategy, degree of implementation of lean philosophy, commercial position, corporate social responsibility, image / public relations. The student must combine knowledge from various disciplines and must apply different research techniques in order to prepare a comprehensive, interdisciplinary and critical report on the selected company. After successful completion of this course, students should have developed the following competences: - **Professional competence:** Deepen knowledge about a selected company and industry, strengthen cross-disciplinary thinking. - **Methodological competences:** Combine data and information from various sources into a structured analytical description of a company (analytical thinking).

	- **Social competence:** --- - **Personal competences:** Critically reflect information and put it into relation to other sources in order to develop a personal critical view point on a given company or organization (critical thinking). Arrive at own suggestions for improving the position of the company analysed (creative thinking).
Course-specific contribution to AoL learning objectives	LO 4.1. (Assessed) Student knows how to combine knowledge from various disciplines and to apply different research techniques in order to prepare a comprehensive, interdisciplinary and critical report on the selected company, taking into account the following dimensions: innovativeness (of products and processes), strategy, degree of implementation of lean philosophy, commercial position, corporate social responsibility, image / public relations.
Contents/ Indicative syllabus	The ISP follows a general sequence of steps that are further detailed in each individual case: • Selection of company • Conceptualization & Methodology • Research phase • Data analysis phase • Industry comparison • Improvement analysis • Report preparation • Presentation of case study
Teaching and learning methology	Individual coaching and small group seminars for methodological discussions, guided self-study
Miscellaneous	None
Indicative reading list	Depending on selected topic

4.34 Module: Thesis and colloqium

Module Registration No.	Exam-Reg.-No. 21428011
Semester	8
Duration of module	1 Semester
Type of module	Compulsory
Courses included in the module/Module components	Thesis Thesis colloquium
How frequently is the module offered	Every semester
Admission requirements	Successful completion of modules with at least 195 ECTS credits
Level	Undergraduate

Transferability of the module to other programmes	The module is transferable to any programme requiring students to write a final thesis at the end of the study programme.
Responsible professor/ Module coordinator	Prof. Dr. Andreas Taschner
Total number of ECTS	14
Learning outcomes of the module	After successful completion of the module students can develop clear research goals and derive an appropriate research method, develop an effective solution for the defined problem using methods and instruments from the subject areas covered in the study programme and can prepare a concise and clear presentation of their work.
Module-specific contribution to AoL learning objectives	LO 3.1. (Reinforced) Students identify possible conflicts of interest embedded in the developed solution and reflect ways to deal with them. LO 4.1. (Assessment Embedded) Students can develop clear research goals and derive an appropriate research method, develop an effective solution for the defined problem using methods and instruments from the subject areas covered in the study programme and can prepare a concise and clear presentation of their work.
Examination/ Type of assessment	Thesis & Colloquium
Weighting of Grade within overall programme	According to credits

4.34.1 Thesis

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Several individual thesis evaluators
Teaching language	Various
Contact hours per week	0
Learning outcomes	The thesis shows that the student is able to independently work on a problem from the subject areas of the programme using academic methods. It should deal in a self-contained manner with a practical problem based on empirical data and/or theory. The problem should be systematically presented and developed and solutions proposed. - **Professional competence:** develop clear research goal and define appropriate research method, critically reflect available theory when working on a given research question. - **Methodological competences:** understand the most important concepts and techniques in business research methodology, select appropriate theories, methodologies and sources, apply the principles of academic writing and empirical research. - **Social competence:** liaise with supervisor and discuss research problems in a structured way, communicate with third parties for data and advice

	- **Personal competences:** organize own work in an adequate way to achieve the planned output within given time and resource constraints, critically reflect own achievements.
Course-specific contribution to AoL learning objectives	See Module 4.32 Bachelor Thesis
Contents/ Indicative syllabus	Depending on selected topic
Teaching and learning methology	Individual mentoring by supervisors, self-study
Miscellaneous	Not applicable
Indicative reading list	Depending on selected thesis topic

4.34.2 Thesis Colloquium

Type of Course	Compulsory
Lecturers name; contact details see ESB-website	Several individual thesis evaluators
Teaching language	Various
Contact hours per week	2
Learning outcomes	- **Professional competence:** prepare concise and clear presentation of research goal, method applied and achieved work results. - **Methodological competences:** --- - **Social competence:** liaise with supervisor and discuss research problems in a structured way, conduct a topic-centered scientific conversation. - **Personal competences:** organize preparatory work in an adequate way to achieve the planned output at a defined deadline, critically reflect own achievements, present own achievements in a concise and clear manner to others.
Course-specific contribution to AoL learning objectives	See Module 4.34 Bachelor Thesis
Contents/ Indicative syllabus	Depending on selected topic
Teaching and learning methology	Individual mentoring by supervisors, self-study
Miscellaneous	None
Indicative reading list	Depending on individual topic