Handbook of Modules for the Degree Programme

Mobility and Logistics, B.Sc.

Faculty of Communication and Environment

Version 5.10

05.03.2015

Dokumentenhistorie

Version	Bemerkung
1.0	Version für die Akkreditierung
1.1	ML_2.06: Project management and Intercultural Competence Anpassung/Ergänzung Beschreibungen “Learning outcomes“ und “Content“ an/um internationale/ interkulturelle Anforderungen
2.0	ML_5.01 Traffic Systems Namensänderung in “Traffic Logistics and Mobility”
2.1	ML_5.01 Traffic Logistics and Mobility Anpassung/Ergänzung der Beschreibungen “Learning outcomes“ und “Content“ an/um Inhalte des ÖPNV und Mobilität
3.0	ML_5.02 Legal Regulations and Customs Requirements Namensänderung in “ Legal requirements and international regulations ”
3.1	ML_5.02 Legal requirements and international regulations Anpassung/Ergänzung der Beschreibungen “Learning outcomes“ und “Content“ an/um internationale Anforderungen und Regelungen
3.2	ML_5.02 Legal requirements and international regulations Änderung„Person in charge“ in: Prof. Dr. Schwind
4.0	Vertauschung ML_3.03 “Identification and Automation“ mit ML_4.3 ”Technical Innovations in Logistics and Society”
5.0	ML_3.03 : ”Technical Innovations in Logistics and Society” Namensänderung in “Technical Innovations in Logistics and Mobility”
5.1	ML_3.03 Technical Innovations in Logistics and Mobility - Anpassung/Ergänzung der Beschreibungen “Learning outcomes“ und “Content“ an/um Inhalte des ÖPNV und Mobilität - Änderung von ”Type of assessment“ in “Certificate (Testat)” - Änderung von “Requirements for credits” in “presentation of an assigned topic” - Änderung“Person in charge“ in: Prof. Dr. Schürholz
5.2	ML_1.06 Introduction to Scientific working Änderung“Person in charge“ in: Prof. Dr. Michael Schwind

5.3	ML_3.01 Accounting Änderung“Person in charge“ in: Prof. Dr. Franka Ruhwedel
5.4	ML_4.01 Controlling Änderung“Person in charge“ in: Prof. Dr. Franka Ruhwedel
5.5	Curriculum angepasst (Namensänderung)t
5.6	Abschnitt „Assessment Strategies and Methods“ eingefügt
5.7	Kleinere Korrekturen
5.8	Überschrift geändert (Degree Programm)
5.9	ML_3.01 Accounting: Inhaltliche Überarbeitung
5.10	ML_4.01 Controlling Inhaltliche Überarbeitung

Assessment Strategies and Methods

In consultation with the examiners, the Examination Board decides on the form of assessment and in case of a written examination on its duration, before the beginning of each course. The decisions of the Examination Board are binding and apply uniformly to all examination candidates. They are either to be announced by notices displayed on the faculty's notice board or communicated electronically (According to the General Examination Regulations, Section 14, Paragraph 1, this is sufficient).

In the first semesters the core knowledge and understanding is usually assessed through written examinations. In advanced semesters the assessment of learning outcomes is mainly focused on seminar papers, coursework reports, project work and/or oral examinations.

Index

HOCHSCHULE RHEIN-WAAL
Rhine-Waal University of Applied Sciences

Curriculum of the Bachelor Degree Programme Mobility and Logistics, B.Sc.

Version vom 19.06.2013

Code No (Kennnummer)	Module	SW (SWS)	Type (Veranstaltungsart) L (V)	SL (SL)	S (S)	Ex (Ü)	PT (Pra)	Pro (Pro)	TE (Prü)	CP (CP)	WS1	SS2	WS3	SS4	WS5	SS6	WS7
ML_1.01	**Fundamentals of Business Administration** (Grundlagen der Betriebswirtschaft)	4	2			2			E (P)	5	4					**ML_6.01: Internship or semester abroad (30 CP; TE: C(T))** (Praxis- oder Auslandssemester)	**ML_7.01: Workshop 1: Research Methods** (Forschungsmethoden) (4 SW; 5 CP; type S; TE: C(T)) **ML_7.02: Workshop 2: Scientific Writing** (Wissenschaftliches Schreiben) (4 SW; 5 CP; type S; TE: C(T)) **ML_7.03: Workshop 3: Advanced Seminar** (Hauptseminar) (4 SW; 5 CP; type S; TE: C(T)) **ML_7.04: Bachelor Thesis** (Bachelorarbeit) (12 CP) **and Colloquium** (Kolloquium) (3 CP)
ML_1.02	**Fundamentals of Logistics** (Grundlagen der Logistik)	4	2			2			E (P)	5	4						
ML_1.03	**Technical Fundamentals** (Technische Grundlagen)	4	2			2			E (P)	5	4						
ML_1.04	**Fundamentals of Computer Science and Networks** (Grundlagen der Informatik)	4	3			1			E (P)	5	4						
ML_1.05	**Analysis and discrete mathematics** (Analysis und diskrete Mathematik)	4	2			2			E (P)	5	4						
ML_1.06	**Introduction into Scientific Working** (Einführung in das wissenschaftliche Arbeiten)	4		4					C (T)	5	4						
ML_2.01	**Technical Logistic Systems** (Technische Logistik Systeme)	4	2			2			E (P)	5		4					
ML_2.02	**Planning Logistics Systems and Processes** (Logistische System- und Prozessplanung)	6	2			4			E (P)	5		6					
ML_2.03	**Electrical Circuits and Systems** (Grundlagen der Schaltungstechnik)	4	2			2			E (P)	5		4					
ML_2.04	**Object Oriented Programming** (Objektorientierte Programmierung)	6	2			4			E (P)	5		6					
ML_2.05	**Linear algebra and graph theory** Lineare Algebra und Graphentheorie	4	2			2			E (P)	5		4					
ML_2.06	**Project Management and Intercultural Competence** Projektmanagement und Interkulturelle Kompetenz	4		4					C (T)	5		4					
ML_3.01	**Accounting** (Rechnungswesen)	4	2			2			E (P)	5			4				
ML_3.02	**Production Logistics** (Produktionslogistik)	4	2			2			E (P)	5			4				
ML_3.03	**Technical Innovations in Logistics and Mobility** (Technische Innovationen in der Logistik und Mobilität)	4		4					C (T)	5			4				
ML_3.04	**Data Management** (Datenmanagement)	4	2			2			E (P)	5			4				
ML_3.05	**Linear optimization and operations research** (Lineare Optimierung und Operations Research)	4	2			2			E (P)	5			4				
ML_3.06	**Statistics** (Statistik)	4	2			2			E (P)	5			4				
ML_4.01	**Controlling** (Controlling)	4	2			2			E (P)	5				4			
ML_4.02	**Supply Chain Management** (Supply Chain Management)	4	2			2			E (P)	5				4			
ML_4.03	**Identification & Automation** (Identifikation & Automatisierung)	4	2			2			E (P)	5				4			
ML_4.04	**Business Information Systems** (Betriebliche Informationssysteme)	4		4					C (T)	5				4			
ML_5.01	**Traffic Logistics and Mobility** (Verkehrslogistik und Mobilität)	4	2			2			E (P)	5					4		
ML_5.02	**Legal requirements and international regulations** (Rechtliche Anforderungen und internationale Richtlinien)	4	2			2			E (P)	5					4		
ML_5.03	**Interdisciplinary Project** (Interdisziplinäres Projekt)	6						6	E (P)	10					6		
	Elective courses * Wahlpflichtkurse *	16								20				8	8		
	Semester hours per week (total)	**122**								**150**	24	28	24	24	22	30	30

122 SW — 12 SW
150 CP — **60 CP**
Credit Points: 210

				WS1	SS2	WS3	SS4	WS5	SS6	WS7
Allocation	SW	total	134	24	28	24	24	22		12
	CP	total	210	30	30	30	30	30	30	30

Code No (Kennnummer)	Elective Courses (Wahlpflichtkurse)	SW (SWS)	CP (CP)	TE (Prü)
ML_W.01	**Logistic Simulations** Logistik Simulation	4	5	E (P)
ML_W.02	**Lean Management** Lean Management	4	5	E (P)
ML_W.03	**Harbour and Airport Logistics** Hafen und Flughafen Logistik	4	5	E (P)
ML_W.04	**Procurement and Distribution Logistics** Beschaffungs- und Distributions-Logistik	4	5	E (P)
ML_W.05	**Strategic Managment and Business Planning** Strategisches Management und Businessplanung	4	5	E (P)
ML_W.06	**Quality and Risk Management** Qualitäts- und Risikomanagement	4	5	E (P)
ML_W.07	**Ambient Intelligent Systems** Ambient Intelligent Systems	4	5	E (P)

ML_1.01 Fundamentals of Business Administration

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_1.01	150 h	5 CP	1st semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Exercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Students have gained an understanding of fundamental concepts of business administration and the basic functions of organizations. They have a good grasp of important terms, concepts, and methods and are able to apply them to real-life problems. They have discussed the impacts of globalization and can describe its influence on business processes.

Content

- An organization and its goals
- Corporate organization and organizational structure
- Principles of strategic management and planning
- The operations function: the process of production, costs and planning, production logistics
- Fundamentals of marketing: the marketing mix
- Principles of finance
- The controlling function
- Fundamentals of human resource management and leadership

Teaching methods

Lectures, accompanied by exercises in which case studies and problems in practice are presented

Entry requirements

None

Types of assessment

Graded examination

Requirements for the award of credit points Passed examination
Use of module (in other study programs) Same module in "Environment and Energy", "Industrial Engineering - Specialization Communication and Information Engineering", "International Business and Social Sciences" and "Mobility and Logistics"
Weight towards final grade 3.45%
Person in charge of module Prof. Dr. Daniel H. Scheible
Additional information Reading: Gamble, J. E. / Thompson, A. A. (2011): Essentials of Strategic Management. The Quest for Competitive Advantage. 2nd edition. New York: McGraw-Hill. Hill, C. W. L. (2009): International Business. Competing in the Global Marketplace. 7th edition. New York: McGraw-Hill. Kotler, P. / Armstrong, G. (2010): Principles of Marketing. 13th edition. Upper Saddle River: Pearson Prentice Hall. Luthans, F. / Doh, J. P. (2009): International Management. Culture, Strategy, and Behavior. 7th edition. New York: McGraw-Hill. Robbins, Stephen P. / DeCenzo, David A. / Coulter, Mary (2011): Fundamentals of Management. Essential Concepts and Applications. 7th edition. Upper Saddle River: Pearson Prentice Hall. Slack, N. / Chambers, S. / Johnston, R. (2010): Operations Management. 6th edition. Harlow: Pearson Prentice Hall.

ML_1.02 Fundamentals of Logistics

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_1.02	150 h	5 CP	1st semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

This module has introduced students to the main fields of logistics of a productive company such as:

procurement-logistics, production-logistics and distribution-logistics

Students have gained a sound understanding of external transport modes (road, train, ship, rail) and of logistic organization structures.

They are able to understand the main tasks, objectives, structures and processes in these areas as well as the interdependencies of material and information flows.

They are also able to analyse the main objectives of a company and define Key Performance Indicators (KPI) to measure the cost, service and performance of logistics.

Students can acquire the skills they need to calculate logistics costs for road and container transports depending on the packing schemes and different load structures of the capacities.

The successful student can apply his knowledge of cost calculation as well as analyzing and structuring of logistic systems in the above mentioned areas in a professional context.

Content

- Main processes and structures of procurement-, production- and distribution logistics

- Different forms of delivery processes (regular, JIT, JIS) and methods of material classification (ABC/XYZ)

- Main forms and means of external transports (road, rail, water, air) / their advantages and disadvantages

- Basics of transport regulations (incoterms) and transport cost calculation

- Main Key Performance Indicators (KPI) for logistic-cost, logistic-service and logistic-performance

- Basic functionalities of MRP / MRP II, main master data, material requirement planning, basics of capacity planning, example of the load oriented order release

- Vertical and horizontal distribution structures, different storage levels and forms of warehouses, example of a typical distribution warehouse

- Basic structures of logistics organizations within a company

Teaching methods Tuition in seminars, lectures and practical classes
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information

ML_1.03 Technical Fundamentals

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_1.03	150 h	5 CP	1st semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Open

Learning outcomes / Competences and qualifications profile

This module has introduced students to selected key principles of Physics. The successful student is able to apply the physical concepts, laws and equations he has learned in advanced modules and in his or her professional life. The student is able to describe simple motion mathematically, can decompose forces and has a sound understanding of the physical concepts work, energy and power.

The student has understood the principal of energy conservation and is able to solve given tasks concerning the topics mentioned above. The student is also able to describe simple harmonic oscillation/waves, calculate the natural frequency of simple oscillating systems, has a sound understanding of period and wave length and is able to solve basic tasks including superpositioning of waves. Furthermore the student has understood the principals of electromagnetic induction and current and can apply this knowledge in advanced modules (for example while talking about RFID).

Content

- Examples for today's use of technical systems in logistic processes.
- Physical quantities and units
- 1D and 3D motion
- Forces and Newton's laws
- Work, energy, power
- Osscillations, waves & superposition
- Electrical charges & electric fields
- Electrostatic potential & electric energy
- Current & Ohm's law
- Kirchhoff's rules
- Magnetic field
- Electromagnetic induction

Teaching methods Lectures and practical classes
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Christian Ressel
Additional information Literature: - Paul A. Tipler, Gene Mosca: "Physics for Scientists and Engineers", enlarged 6th edition; W.H. Freeman, 2007. - David Halliday, Robert Resnick, Jearl Walker: " Fundamentals of Physics", 9th Edition; Wiley , John & Sons, 2010

ML_1.04 Fundamentals of Computer Science and Networks

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_1.04	150 h	5 CP	1st semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 45 h / 3 semester hours per week (SWS) Excercise: 15 h / 1 SWS	60 h / 4 SWS	90 h	45 students

Learning outcomes / Competences and qualifications profile

This module has introduced students to the key principles of computers and networks. Successful students have gained the ability to identify the major hardware and software components of a computer system, to understand their relationship to one another and the importance of these components within the system. They are also able to convert numbers from different numeral systems, which are frequently used by computer systems, and can express conditions and causality using binary logic.

Furthermore students have gained an understanding of how computer networks work. They are able to explain the ISO/OSI reference model and IP traffic and can set up small networks independently.

Content

- Example for today's use of computers in different environments
- Basic principles: numeral systems, representation of text, combinational logic
- Hardware of a computer system, incl. CPU, motherboard, storage devices, RAID and backup systems
- Introduction to operating systems, incl. common operating systems
- Computer networks: network classifications, ISO/OSI reference model, layers of IP networks, network devices, basic security

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

None

Types of assessment

Graded examination

Requirements for the award of credit points

Passed examination

Use of module (in other study programs) Same module in "Environment and Energy" and "Industrial Engineering - Specialization Communication and Information Engineering" and "Mobility and Logistics"
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Christian Ressel
Additional information Literature: Mafield,C.: Bebop - to the boolean boogie,ISBN 1856175073, Newnes, 2008 (3rd. edition) Tannenbaum,A.: Computer Networks, ISBN 0130661023, Prentice Hall, 2002 (4th. edition) Muller, J.-M. et al.: Handbook of Floting Point Arithmetic, ISBN 081764704X, Springer, 2009 Brent, R. P.; Zimmermann, P.: Arithmetic (Cambridge Monograph on Applied and Computational Mathematics), ISBN 0521194695, Cambridge University Press, 2010

ML_1.05 Analysis and Discrete Mathematics

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_1.05	150 h	5 CP	1st semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

This lecture has introduced students to the basics of Discrete Mathematics and fundamental topics of Analysis and has therefore enabled them to solve technical and operational problems.

With the knowledge of these mathematical methods and formulas students can solve analytical problems based on discrete or continuous functions and are able to apply their knowledge to their professional context as analysts, planners or engineers.

Additionally students are able to develop advanced solutions to describe and optimize technological functionalities in a mathematical way by using basic trigonometric functions as well as main formulas and procedures of differential and integral calculus.

Content

- Fundamentals of logic, sets and numerative systems
- Fundamentals of relations and functions
- Elementary functions like rational-, potential-, exponential- and logarithm-functions
- Trigonometric functions like sinus, cosinus, tangens, cotangens
- Fundamentals of differential calculus: functional limits, continuity, derivations and rules of derivations
- Fundamentals of integral calculus: anti derivations, integration and rules of integration

Teaching methods

Tuition in lectures and practical classes

Entry requirements

None

Types of assessment

Graded examination

Requirements for the award of credit points Passed examination
Use of module (in other study programs) Same module in "Environment and Energy", "Industrial Engineering - Specialization Communication and Information Engineering", and "Mobility and Logistics"
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Rolf Becker
Additional information Literature: James Stewart: Calculus, Early Transcendentals, International Metric Edition, 6th Edition, BrooksCole, 2008; ISBN-13: 9780495382737

ML_1.06 Introduction to Scientific Working

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_1.06	150 h	5 CP	1st semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Seminaristic lecture: 60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	90 h	Seminaristic Lecture: 30 students

Learning outcomes / Competences and qualifications profile

This course enables students to explain the purposes and name the stakeholders of research and science. Students are able to define a topic, border it adequately and find literature on the topic. They have also acquired the skills to evaluate literature efficiently and critically and write a well-structured seminar paper applying either footnotes or Harvard citation style. Furthermore students know what criteria pieces of scientific writing have to meet and can give a convincing and to the point oral presentation about their research findings.

Content

- What is research and science? What purpose do they serve?

- Where is research produced? Different stakeholders in the field of research.

- Research methods in economics and business management.

- Finding a suitable topic and bordering the topic.

- Literature search: Sources and searching methods, relevance of literature, quality of literature.

- Reading techniques: Efficient reading, critical reading.

- Scientific writing: Different genres of scientific writing - summary, response paper, policy paper, seminar paper, bachelor thesis, master thesis, research proposal, research paper, literature review.

- Structuring the topic; the elements of a seminar paper, time management

- Citations: What purpose do citations serve? Citations with footnotes, citations in Harvard Style

- References vs. bibliography: Purposes and formats

- Graphs and tables

- Evaluation criteria for pieces of scientific writing

- Oral presentation of research results: Demands, preparation, methods, evaluation criteria.

Teaching methods

The course is mostly taught in seminaristic lectures in which students discuss different topics of scientific working. Small research and writing exercises will be part of the course to directly apply what has been learned. In the later part of the course students present their seminar papers. Their results, the scientific approach as well as the style of the oral presentation are discussed.

Entry requirements

None

Types of assessment

Certificate (Testat)

Requirements for the award of credit points

Written assignments, seminar papers and oral presentation delivered have to meet quality criteria to pass

Use of module (in other study programs)

Same module in "E-Government", "Industrial Engineering - Specialization Communication and Information Engineering", "International Business and Social Sciences", "Media Communication and Computer Sciences" and "Mobility and Logistics"

Weight towards final grade

None (ungraded)

Person in charge of module

Prof. Dr. Michael Schwind

Additional information

Reading:

Esselborn-Krummbiegel, H. (2008): Von der Idee zum Text. Eine Anleitung zum wissenschaftlichen Schreiben. 3rd edition. Stuttgart: UTB / Schöningh.

Franck, N. / Stary, J. (2009): Die Technik wissenschaftlichen Arbeitens. 16th edition. Stuttgart: UTB / Schöningh.

Hofmann, A. H. (2010): Scientific Writing and Communication: Papers, Proposals, and Presentations. Oxford: Oxford University Press.

Russey, W. E. / Ebel, H. F. / Bliefert, C. (2006): How to Write a Successful Science Thesis: The Concise Guide for Students. Chichester: Wiley.

ML_2.01 Technical logistic systems

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_2.01	150 h	5 CP	2nd semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

Students have developed a solid understanding of the material flow technologies which are needed to realize transport, handling and storing processes in intralogistics systems.

Students are able to classify various materialflow systems. They have acquired a broad knowledge of existing methods as well as latest trends and their applications and are able to discuss their differences and weaknesses. They are also able to calculate the maximal load capacity and capacity limitations and know how to define the necessary dimensions of the systems. The successful student can develop and advance solutions to problems and arguments in the subject area of technical logistic systems.

Content

- Different forms and materials of packagings and containerization, basics of securing the load on a truck
- Main techniques and systems for transportation and conveying, their classification, strength and weaknesses
- Basics of material flow calculation, calculation of system throughput and capacity limitation
- Main systems and techniques for storing goods (warehouses), their classification and fields of application
- Main forms of warehouse organizations, Key Performance Indicators for warehouses
- Different ways of picking and picking techniques (picking systems)
- Different forms of sorting and sorting techniques (sorters)

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

None

Types of assessment

Graded examination

Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module N.N.
Additional information

ML_2.02 Planning of logistic systems and processes

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_2.02	150 h	5 CP	2nd semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 60 h / 4 SWS	90 h / 6 SWS	60 h	35 students

Learning outcomes / Competences and qualifications profile

This module has introduced students to the analysis and optimization of logistic processes in general. Students have learned how to plan a factory or logistic site in detail, starting with site location planning and the general land-use plan, then working their way up from draft to detailed layout planning.

The succesful student is expected to be able to:

- apply his knowledge about logistic process analysis and layout planning to his professional context and needs.

- evaluate and compare different layouts

- find an optimal arrangement of layout areas

- read a general land-use plan and

- dimension the logistic areas in a planned building.

On completion of the course students are able to use a CAD software, a skill which is vital for their professional career.

Content

- Logistic process analysis and planning, logistic potential classes, basics of logistic process optimization

- Comparison and evaluation of materialflow and layout variants

- Draft layout planning: methods of optimized planning and arangements of layout areas

- Different forms of draft plant layouts (spine structures)

- General location planning, regional and local evaluation factors, methods of optimized location planning

- General "land-use" plan (master plan): elements of content, key figures, general procedure of master planning

- Detailed planning: general procedure, determination of amount of resources, calculation of area sizes

- Application of a CAD software to plan and dimension a detailed factory layout as a special exercise-course (2 SWS)
Teaching methods Tuition in seminars, lectures and practical classes
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information

ML_2.03 Electrical Circuits and Systems

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_2.03	150 h	5 CP	2nd semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	45 students

Learning outcomes / Competences and qualifications profile

This course has introduced students to the principles of designing electrical circuits including sensors and a microcontroller. Successful students have gained a good understanding of the construction and features of basic electronic components. They are able to build up small circuits, which combine sensor input and actuator output by using a simple (prepared) microcontroller board like the Arduino.

In addition to this students have a sound knowledge of the fundamental technical details to understand the industrial hardware components which will be introduced in the advanced module “Identification and Automation”.

Content

- Electrical conductance and resistance
- Capacitors
  - o Principles of capacitors and characteristics
  - o Charging / discharging of capacitors
- Coils
  - o Principles of coils and characteristics
  - o Principles of oscillation circuits
- Relays
  - o Function and classification of electromagnetic relays
  - o Circuits including relays and capacitors
- Semiconductors
  - o Principles of semiconductors
  - o Voltage depending resistor

o Light depending resistor

o Semiconductor diode

- Bipolar transistors

o Construction and features of a transistor

o The transistor as a switch

- Optoelectronics

o Phototransistors

o Light-sensitive barriers

- Implementing Logic using digital elements

o Using NAND and NOR Gates

o Flip-Flops

- Using a microcontroller to implement logic (e.g. Arduino)

o Platform and IDE

o Programming Logic

o Digital Input/output

o Analogue Input/output

o Using sensors

o Using actuators

Teaching methods

Lectures, practical classes, laboratory practicals

Entry requirements

It is strongly recommended to attend the following modules first:

“Fundamentals of Computer Science & Networks”

“Technical Fundamentals”

Types of assessment

Graded examination

Requirements for the award of credit points

Passed examination

Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Christian Ressel
Additional information Literature: Crow,J.; Hayes-Gill, B.: Introduction to Digital Electronics, ISBN 0340645709, A Butterworth-Heinemann Titler, 1998 (1st. edition) Morris, J.:Applied Electronics, ISBN 0340652845, A Butterworth-Heinemann Title, 1996 (2nd. rev. edition) Storey,N.: Electronics: a systems approach, ISBN 0273719181 Prentice Hall, 2009 Monk, S.: Programming Arduino Getting Started with Sketches, ISBN 0071784225, Tab Electronics, 2011 Banzi, M.: Getting started with Arduino, ISBN 0596155514, Make, 2009 (1st. edition

ML_2.04 Object Oriented Programming

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_2.04	150 h	5 CP	2nd semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Exercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: 45 students Exercise: 20 students

Learning outcomes / Competences and qualifications profile

The course has taught students to code fluently in an object-oriented paradigm using a programming language like Java. Students have learned to use standard library classes. Successful students have a sound understanding of the principles and practice of object oriented analyses and design in the construction of small robust, maintable programs. They are able to implement, compile, test and run programs, comprising more than one class, to address a particular software problem. They are able to use simple data structures like arrays and to make use of members of classes found in the standard API (such as the Math class).

Content

- Introduction: Compiler, Interpreter, IDE
- Principle elements (Variables, Statements, Operators, Flow)
- Primative Data Types, Reference Data Types, Strings and Arrays
- Principles of OOP
- Selected Classes
- Generic Classes
- Exception handling
- Concurrent Programming
- Structure charts, class diagram

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

None

Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information Literature: Liang, Y.D.:Introduction to Java programming. ISBN 978-0-13-247275-3, Pearson, Boston, 2010 Sierra, K.; Bates, B.:“Head first Java“. ISBN 0-596-00920-8, O’Reilly, Beijing, 2005 Lafore, R.:Data structures and algorithms in Java. ISBN 0-672-32453-9, Sams Ind., Indianapolis, 2010

ML_2.05 Linear Algebra and Graph Theory

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_2.05	150 h	5 CP	2nd semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 35 students

Learning outcomes / Competences and qualifications profile

This lecture has introduced students to mathematical methods of linear algebra and the basics of graph theory which are needed to solve technical and operational problems.

With these mathematical methods and procedures at hand, the students are able to solve linear problems and can therefore apply their knowledge to their professional context as analysts, planners or engineers.

Additionally the students are able to develop advanced solutions to describe and optimize networks by applying the basic rules and procedures of graph theory.

Content

- Introduction of vectors, matrices, vector- and matrix operations
- Vector-spaces and sub-spaces
- Linear transformations
- Linear equation systems
- Procedures to solve linear equation systems (Gauss algorithm, determinants)
- Basic definitions of graphs
- Euler rows, Hamilton circles
- Basic problems ("Bridges of Königsberg", "Travelling Salesman") and possible solutions

Teaching methods

Tuition in lectures and practical classes

Entry requirements

None

Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Same module in "Environment and Energy", "Industrial Engineering - Specialization Communication and Information Engineering" and "Mobility and Logistics"
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Rolf Becker
Additional information

ML_2.06 Project Management and Intercultural Competences

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_2.06	150 h	5 CP	2nd semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Exercise: 30 h / 2 SW	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Having passed this module students have developed the skills needed to plan and carry out projects. They are familiar with methodological tools used in project planning, realisation, monitoring and completion in fields like personnel, costs, deadlines and quality. They are able to present project results appropriately.

Students have experienced the dynamics and pitfalls of teamwork and are sensitised for different cultures and the cooperation with people from different cultural background

Content

Defining the goals, procedures and phases of a project and its scope

Developing the project plan (defining work packages, setting milestones, developing flow charts and network plans)

Scheduling the project

Creating, leading, and managing a project team (esp. teams with participants from different nations/cultures)

Managing resources and monitoring project performance

Controlling the project and managing risk

International projects, to work together with customers/project partners from foreign countries and different cultures (intercultural competences)

Project closure, documentation and presenting to an audience

Developing the presentation (developing the material, structuring the presentation, use of presentation software, preparation)

Presentation techniques and visual aid

Teaching methods Lectures, accompanied by exercises in which students conduct their own projects (case studies) and present their results
Entry requirements None
Types of assessment Certificate (Testat)
Requirements for the award of credit points Participation in a project (case study), final presentation and reports
Use of module (in other study programs) Same module in "Environment and Energy", "Industrial Engineering - Specialization Communication and Information Engineering", "Information and Communication Design", "International Business and Social Sciences" and "Mobility and Logistics"
Weight towards final grade None (ungraded)
Person in charge of module Prof. Dr. Daniel H. Scheible
Additional information Reading: Heerkens, G. R. (2002): Project Management. New York: McGraw-Hill. Hillson, D. (2009): Managing Risk in Projects. Farnham; Burlington: Gower. Larson, E. W. / Gray, C. F. (2011): Project Management. The Managerial Process. 5th edition. New York: McGraw-Hill. Raynolds, G. (2008): Presentation Zen. Simple Ideas on Presentation Design and Delivery. Berkeley: New Riders. Stanton, N. (2009): Mastering Communication. 5th edition. Basingstoke; New York: Palgrave Macmillian.

ML_3.01 Accounting

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_3.01	150 h	5 CP	3rd semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Exercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Having completed this course students are able to perform simple and adjustment bookings as well as closing entries in double-entry bookkeeping in journal format and in T-accounts. Students can set up a trial balance and an income statement. They are able to book under consideration of Value Added Tax and are able to perform year-end-bookings (accruals, deferrals, provisions).

Students can explain the purposes of the different elements of the financial statements and argue how accrual accounting differs from cash based accounting. They have insight into the concept of the International Financial Reporting Standards (IFRS) and can explain their basic valuation concept.

They are familiar with different cost types and can explain the aim of cost type accounting, cost center accounting and product costing. Students can perform an Internal Cost Allocation applying different methods. They are familiar with Full Cost Accounting and are able to set up a Cost Allocation Sheet and calculate the Production Costs as well as the Aggregate Costs of a product.

Content

I. **Bookkeeping**

- Basic terms in Accounting
- The Components of a Financial Statement
- Double-Entry System
- Accounts
- Closing of Accounts
- Selected Business Transactions

II. **Financial Statements**

- Elements of Financial Statement
- Major Differences between German Accounting Standard (HGB) and International Financial Reporting Standards (IFRS)
- Selected Aspects of Financial Statements
- Introduction to Financial Statement-Analysis

III. **Management Accounting (Cost Accounting)**

- Basic terms in Cost Accounting
- Full Cost Accounting
- - Cost Type Accounting
  - Cost Center Accounting
  - Product Costing
- Critical Evaluation of Full Cost Accounting – Perspectives of Direct Costing

Teaching methods Lectures, accompanied by exercises in which quantitative and qualitative problems as well as case studies are solved and discussed.
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Same module in "International Business and Social Sciences" and "Mobility and Logistics"
Weight towards final grade 3.45%
Person in charge of module Prof. Dr. Franca Ruhwedel
Additional information Reading: Bragg, S.M. (2011): Bookkeeping Essentials. Hoboken: Wiley & Sons. Drury, C. (2009): Management Accounting for Business. 4th edition. Andover: Cengage Learning EMEA. Kelly, J. / Barrow, P. / Epstein, L. (2011): Bookkeeping. 2nd edition. Chichester: Wiley & Sons. Powers, M. / Needles, B. E. / Crosson, S. V. (2010): Financial and Managerial Accounting Principles. 9th ed. Andover: Cengage Learning EMEA. Weber, J. / Weißenberger, B. E. (2010): Einführung in das Rechnungswesen. Bilanzierung und Kostenrechnung. 8th edition. Stuttgart: Schäffer-Poeschel.

ML_3.02 Production logistics

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_3.02	150 h	5 CP	3rd semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

This module has introduced the main functions and tasks of production logistics.

The students are able to apply their knowledge to their professional context as production logistics engineers. They can develop and advance solutions to problems in the field of production logistics like demand forecasting, materials requirement plannings and calculation and/or production planning and scheduling.

They are also able to develop advanced solutions to optimize the material flow within the production areas, to minimize stocks in the buffers and to optimize machine utilization.

Content

- General design and functionality of production planning and control systems (PPC)

- Necessary master data for PPC and their structural architectures

- Basic procedures of demand forecasting and material requirement planning

- Static and dynamic forms of lotsize calculation and optimization

- Basic procedures of order scheduling and capacity planning (forward and backward planning)

- Main procedures of order releasing and production control (Kanban=pull principle, OPT=optimal scheduling, LOR=load oriented order release, cumulative quantity procedure, MRP II procedure)

- Key Performance Indicators of production logistics and characteristic KPI curves

- Basic laws of production logistics

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

It is strongly recommended to attend the following modules first:

"Fundamentals of Logistics" (1st semester)

Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information Literature 1. Nyhuis, P.;Wiendahl, H.-P.: Fundamentals of Production Logistics: Theory, Tools and Applications; Springer Verlag Berlin 2008; ISBN: 978-3540342106 2. Chapman, St., N.: The Fundamentals of Production Planning and Control; Prentice Hall 2005; ISBN: 978-0130176158

ML_3.03 Technical Innovations in Logistics and Mobility

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_3.03	150 h	5 CP	3rd semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	90 h	25 students

Learning outcomes / Competences and qualifications profile

Students having attended this module are able to identify current worldwide mega-trends (like the demographic change or worldwide mobility) and their effect on logistics and society. They know about future challenges and opportunities for new possible logistic services.

In addition to this they know about selected new technologies, processes and concepts, which could be used forinstance to secure or to improve existing logistic processes and personnel mobility.

Successfull students have practice in:

- performing research on current topics of logistics and personnel mobility

- finding/understanding and summarizing main ideas of scientific articles

- preparing a scientific presentation about current topics and themes of logistics and mobility

- presenting topics in a broader context or own/foreign ideas to a larger audience.

- discussing and defending own/foreign ideas or concepts

Content

The professional subjects of the module depend on current topics of interest, which are related to logistics and mobility. Present examples are:

- The internet of things and their influences on production and logistics (e.g. production 4.0)

- Supply-Chain Operations reference model (SCOR-model)

- global mega trends like mobility, globality, new technologies, individuality and demographic changes etc. - What are their main challenges on logistics and mobility and how can advanced technologies solve them.

- Approaches of integrated traffic control centers and traffic depending management and control strategies

- concepts for personnel mobility in rural areas and villages

- load oriented, dynamic schedule plans e.g. for busses and trains

- the effects of integrated takt-schedule plans for public personnel transport systems

Teaching methods Tuition in seminars and presentations
Entry requirements It is strongly recommended to attend the lectures "Fundamentals of Computer Science and Networks" and "Project management and Intercultural Competence" before taking this course.
Types of assessment Certificate (Testat)
Requirements for the award of credit points presentation of an assigned topic
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information Literature differs between courses and depends on the selected topics.

ML_3.04 Data Management

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_3.04	150 h	5 CP	3rd semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	45 students

Learning outcomes / Competences and qualifications profile

Having passed this module, students are able to make use of abstraction, analyses and modelling methods to design data bases for various applications. Students are able to classify data bases based on the system architectures used. In addition to that students are familiar with normalization and data privacy principles. They can express SQL statements independently and use them to solve given tasks.

Content

- Introduction: file systems and data base systems, migration from file system, client-server-architecture, data base based web-applications
- Abstraction, analysis and modelling methods
- Data models, Entity Relationship Model (ER), Enhanced Entity Relationship Model (primary key, foreign key, integrity constraints ...)
- Theoretical fundamentals of relational data bases: relational algebra, functional dependencies, normalization,
- Structured Query Language
- Semantical modelling and data base design
- Information security and data privacy
- Trends and new technologies: Object oriented data bases, data warehouse, data mining, information retrieval, search engines
- Tuning, backup, distributed data bases

Teaching methods

Lectures and practical classes

Entry requirements

It is strongly recommended to attend the lecture "Fundamentals of Computer Science and Networks" before

taking this course.
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Same module in "Industrial Engineering - Specialization Communication and Information Engineering" and "Mobility and Logistics"
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Christian Ressel
Additional information Reading: Beaulieu,A.: Learning SQL, ISBN 0596520832, O'Reilly, 2009 Elmasri, R.: Database Systems, ISBN 0132144980, Pearson, 2011

ML_3.05 Linear Optimisation and Operations research

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_3.05	150 h	5 CP	3rd semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

The students are able to classify real world optimisation problems and can identify the appropriate method for solving. They can translate real world problems into the mathematical language of optimisation.

Starting from appropriate and comprehensive initial mathematical formulation for a subset of problem types they are able to solve these by using specific software products.

Students have learned to interpret the results and to perform sensitivity analyses to assess the optimal solution and its stability. This allows them to suggest future business decisions leading to most effective improvements.

The students know how to formulate optimisation problems and their solutions effectively in short reports and presentations.

Content

- Introduction and discussion of optimisation in business administration and logistics
- Optimized allocation of scarce resources
- Classification of optimisation problems
- Linear programming (LP) and classes of LP problems
- Graphical solution of 2D decision problems
- Simplex algorithm and its graphical interpretation
- Sensitivity analysis: shadow prices, reduced costs, stability of solution
- Examples of important LP classes: product mixing, transportation, distribution, blending, work allocation, scheduling, inventory management
- Goal Programming (multi-objective optimisation)
- Integer programming
- Network models (graph theory)

- Non-linear optimisation
Teaching methods Dialog oriented, seminaristic lectures with exercises Practical training with application specific software Students´ presentations
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Rolf Becker
Additional information Literature: Winston, Wayne L..: Operations research - applications and algorithms; 4. internat. student ed.; Thomson, Brooks/Cole 2008; ISBN: 978-0-534-42362-9 Software: LibreOffice Solver, LINGO, GNU Octave

ML_3.06 Statistics

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_3.06	150 h	5 CP	3rd semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Exercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Students who have completed this module successfully are able to make informed decisions based on business and social data. They can select appropriate statistical techniques for collecting, summarizing and displaying data. They are able to analyze and draw inferences from data using appropriate statistical methods and computer software. Students have developed the skills to interpret and communicate the results of a statistical analysis in the context of a business problem or an empirical investigation of a social phenomenon.

Content

Probability:

-Random phenomena (probability experiments and events)

-Probability rules

-Conditional probabilities (Bayes-Theorem)

-Combinatorics (counting techniques)

-Random variables (discrete and continuous)

-Expected value und variance

-Discrete and continuous probability distributions

Statistics:

Descriptive statistics and correlation analysis:

-Basic concepts (Levels of measurement, univariate data, bivariate data)

-Sampling and data collection

-Graphical and numerical summaries

-Frequency distributions

-Measures of central tendency, measures of position, measures of dispersion

-Grouped data

-Covariance, correlation, regression

Inferential statistics:

-Sampling distribution of a sample mean

-Sampling distribution of a sample proportion

-Point estimates, interval estimates, confidence intervals

-Hypothesentests

Statistical software skills:

-Using Excel, SPSS/R

Teaching methods

Lecture and Exercises. The course will be carried out in a seminar-like, interactive manner. The impartation of the statistical concepts will be supported by the integration of relevant applied examples and the deployment of statistical software (e.g. R, SPSS and/or Excel).

Entry requirements

Passed module "Mathematics"

Types of assessment

Graded examination

Requirements for the award of credit points

Passed examination

Use of module (in other study programs)

Same module in "E-Government", "International Business and Social Sciences" and "Mobility and Logistics"

Weight towards final grade

3.45%

Person in charge of module

Dipl.-Biol. Ralf Darius

Additional information

Reading:

Johnson, R. R. / Kuby, P. J. (2008): Elementary Statistics. 10th edition. Belmont: Thomson Brooks/Cole.

Sullivan, M. (2011). Fundamentals of Statistics. 3rd edition. Boston: Pearson Prentice-Hall.

ML_4.01 Controlling

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_4.01	150 h	5 CP	4th semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture 30 h / 2 semester hours per week (SWS) Exercises 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Students can name the different tasks of controlling and explain why controlling has an important function in the enterprise. They are able to differentiate between strategic and operational controlling and explain their different focus. Regarding strategic controlling students are able to derive strategies from a company's vision, goal and objectives and to explain the key tools of strategic controlling. They understand the company's planning process, can explain the different elements and are able to plan a financial budget. Students are able to perform direct costing and apply it to questions such as production planning or make or buy-decisions. They can apply standard costing as well as variance analysis. Students can calculate and interpret different ratios (asset, financial and profit position) in order to evaluate the company's performance. Students can derive transfer prices according to the cost-plus, market value and negotiated transfer price method. They are able to explain why the balanced scorecard has emerged as a tool to measure performance and can find key performance indicators for the different dimensions of the balanced score card.

Content

- Controlling basics
  - Basic principles and categories
  - Organizational structuring of the controlling function
- Strategic Controlling
  - Vision, goals and strategy
  - Planning process
  - Strategic controlling tools – overview
- Operative Controlling
  - Budgeting process
  - Cost accounting
    - Direct costing
    - Production planning and Make-or-Buy
    - Standard costing and variance analysis
  - Performance measurement – ratio analysis
  - Transfer prices
- Reporting – Balanced Scorecard

Teaching methods Lectures, accompanied by exercises in which quantitative and qualitative problems as well as case studies are solved and discussed.
Entry requirements It is recommended to attend the module "Accounting" before taking this course, but exceptions can be made.
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Same module in "International Business and Social Sciences" and "Mobility and Logistics"
Weight towards final grade 3.45%
Person in charge of module Prof. Dr. Franca Ruhwedel
Additional information Reading: Drury, C. (2009): Management Accounting for Business. 4th edition. Andover: Cengage Learning EMEA. Powers, M. / Needles, B. E. / Crosson, S. V. (2010): Financial and Managerial Accounting Principles, 9th ed., Andover: Cengage Learning EMEA. Weber, J. / Schäffer, U. (2008): Einführung in das Controlling. 12th edition. Stuttgart: Schäffer-Poeschel.

ML_4.02 Supply Chain Management

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_4.02	150 h	5 CP	4th semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

This module has introduced the main stuctures, functions and tasks of supply chain management (=SCM)

The students have gained a wide range of knowledge about the tasks and objectives of SCM. They have learned how to manage, describe (model) and plan (schedule) supply chains (=SC) and supply structures and are able to apply their knowledge to their professional context as a logistics and supply-chain managers.

They know how to design a SC network and are able to develop and advance solutions to problems in the fields of supply chains like demand forecasting in international SC networks, planning and managing inventories in SC or design transportation networks.

They are also able to develop advanced solutions for the optimization of material- and information flow within supply chains and to manage cross-functional drivers.

Content

- A strategic framework to analyze and describe supply chains including a process view (SCOR model),decision phases or optimization objectives

- Designing of a supply chain network like distribution networks, e-business applications or a global supply-chain network design

- Planning demand and supply in a supply chain including the demand forecasting, the aggregate planning or the sales and operations planning in a SC

- Managing inventories in a SC which includes forinstance the managing of uncertainty in a SC, the definition of safety inventory or determining the optimal level of product availability

- Designing and planning of transportation networks

- Managing cross-functional drivers in a SC, like sourcing decisions, pricing and revenue management or different information technologies

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements It ist strongly recommended to attend to the following lecture before: "Production logistics" (3rd semester)
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information Literature 1. Chopra, S.; Meindl, P.: Supply Chain Management: Strategy, planning and operation; 4th edition; Pearson 2010; ISBN: 978-0-13-609451-7 2. Stadtler, H.; Kilger, C.: Supply Chain Management and advanced planning; 4th edition; Springer 2008;ISBN 978-3-540-74511-2 3. Scott, C.; Lundgren, H.; Thompson, P.: Guide to Supply Chain Management; Springer 2011; ISBN 978-3-642-17675-3

ML_4.03 Identification & Automation

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_4.03	150 h	5 CP	4th semester	Summer semest.	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	45 students

Learning outcomes / Competences and qualifications profile

Students have gained fundamental knowledge of devices and methods, which are used to automate logistical processes. The module enables students to be part of a team which designs logistical systems using technology to identify items, measure physical quantities and perform automatic reactions. The taught fundamentals enable students to discuss with suppliers of material flow systems or with suppliers of automated warehouse systems. Furthermore successful students are able to solve easy automating tasks independently.

Content

- Sample applications
- Identification systems:
  - Identification charcteristics
  - Optical charcter recognition
  - 1D barcodes
  - 2D codes
  - coding sementics (ILN, EAN,NVE, UPC,EPC)
  - Error Correction
  - The technology of barcode reader
  - Printing processes
  - Radio Frequency Identification
- Automation
  - Control Theory and control systems (logic controls, state machines, workflow, control loop, feedback mechanism)
  - Hardware components
    - Sensors and actuators

- Automation devices, Controlling devices

- Programming systems used in the automation context

- Communication (bus systems)

- System diagnosis

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

It is strongly recommended to attend the following modules first:

“Fundamentals of Computer Science & Networks”

“Electrical Circuits & Systems”

It is expected that students have knowledge of the principle components of a programming language

Types of assessment

Graded examination

Requirements for the award of credit points

Passed examination

Use of module (in other study programs)

Weight towards final grade

3,45 %

Person in charge of module

Prof. Dr. Christian Ressel

Additional information

Literature:

Nof, S.Y.: Springer Handbook of Automation. ISBN 3540788301, Berlin, Springer, 2009.

Pearce,S.; Bushnell,R.D.: The Bar Code Implementation Guide: Using Bar Codes in Distribution. ISBN 0941668061,Tower Hill Pr, 2010.

Finkenzeller, K.: RFID Handbook. ISBN 0470695064, Chichester, Wiley, 2010

Fraden J.: Handbook of modern sensors. ISBN 1441964657, New York, Springer, 2010.

ML_4.04 Business Information Systems

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_4.04	150 h	5 CP	4th semester	Summer semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Seminar: 60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	90 h	40 students

Learning outcomes / Competences and qualifications profile

The students are familiar with business related information flows and communication processes as well as application specific technical solutions to support the different levels of information exchange. They can identify different communicators (e.g. business to customer, business to business, business internal) and the particular needs and intentions of different communication processes (e.g. customer relation, marketing, business analysis). They are able to assess which class of software is best to solve a particular problem. As a result of practical training they know how to use some of the relevant software products on an introductory level. They know about recent developments in information technology (IT) for business related applications. The graduates are able to formulate communication and information issues, propose IT solutions and present their findings.

Content

- Business related communication processes, their participants and intentions
- Business divisions, internal and external information exchange
- Different classes of software solutions to support business information and communication issues
- Business analysis with spreadsheets
- Corporate master data, database management systems and data warehouses
- Business processes and enterprise resources management (ERP) software
- E-commerce
- The role and technology of social networks

Teaching methods

Dialog oriented, seminaristic lectures with exercises

Practical training with application specific software

Students´ presentations

Entry requirements None
Types of assessment Certificate (Testat)
Requirements for the award of credit points Passing specific assignments
Use of module (in other study programs) Same module in "International Business and Social Sciences" and "Mobility and Logistics"
Weight towards final grade None (ungraded)
Person in charge of module Prof. Dr. Rolf Becker
Additional information Software: LibreOffice Calc, LibreOffice Base, Microsoft Dynamics NAV (ERP Software) Reading: Turban, E. / Volonino, L. (2010): Information Technology for Management. Transforming Organizations in the Digital Economy. 7th edition. Hoboken: Wiley.

ML_5.01 Traffic Logistics and Mobility

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_5.01	120 h	5 CP	5th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	60 h	35 students

Learning outcomes / Competences and qualifications profile

This module has introduced students to the basic systems and processses in Public Personnel Traffic systems (PPT) as a contribution to mobility and Freight Traffic Systems (FTS).

In the area of mobility and PPT the students have gained knowledge of the basics in public passenger transport systems, their plannings and their organizations. They are able to solve tasks and problems of public plannings and organizational plannings.

The successful student can develop and advance solutions to problems and arguments in the subject area of PPT or of FTS such as planning and setting up schedules for public transport systems, plannings for FTS networks or of goods-handling systems and freight networks.

Students can apply their knowledge to their professional context as personnel public traffic planners or as logistics planners in the field of freight traffic systems.

Content

- Organization forms of PPT- and transportation companies
- Different management forms and control strategies of PPT and FTS systems
- different mobility concepts in urban and rural areas
- Definition of schedules for public traffic systems and planning of transit plans to improve personnel mobility
- Basics and concepts of different freight traffic modes (land, water, rail, air) and of intermodal traffic systems
- Different organization and network forms of FTS like direct/indirect networks, hub-and-spoke networks
- Planning of FTS networks, FTS routing and shortest paths algorithms
- Different forms of goods-transshipment and goods-handling sites (transshipment, cross-docking etc.)

Teaching methods

Tuition in lectures and practical classes

Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module N.N.
Additional information

ML_5.02 Legal requirements and international regulations

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_5.02	150 h	5 CP	5th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS)	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

his module has given an overview of German and international legal requirements, laws, customs and international regulations.

The successful student has a sound knowledge of the main contents and requirements of legal requirements and international regulations, and is able to implement and perform international crossborder freights and transports. He has been introduced to the main legal parts of contracts with logistic providers, and has learned to setup and perform a secure supply chain. He has also gained a good knowledge of the tasks and responsibilities of an AEO (Authorized Economic Operator). Additionally, students should know basic consumer rights in international mobility.

The students can apply their knowledge to their professional context as internationally acting logistics managers.

Content

Economic background of legal regulations: globalization and free trade zones

- Different forms and main contents of national and international freight and logistic contracts

- Rights and obligations of a freight forwarder and logistic service provider

-Freight law regulations in accordance with the German Commercial Code (HGB) and the General Terms and Conditions of the German Forwarding Trade (ADSp)

- European and International Transportation Conventions

- Liability of logistics providers, regulations and limits of liability in terms of SDR (Special Drawing Rights)

- Different forms and main contents of forwarding documents like freight contracts, way bill, certificates of delivery

- Current customs regulations for a secure supply chain

- Tasks and responsibilities of an AEO (Authorized Economic Operator)

- Standards and international regulations like CTPAT (Customs Trade Partnerschip against Terrorism)

- Consumer rights in international mobility

Teaching methods Tuition in lectures and seminars
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs)
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Michael Schwind
Additional information

ML_5.03 Interdisciplinary Project

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_5.03	300 h	10 CP	5th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Project	90 h / 6 semester hours per week (SWS)	210 h	25 students

Learning outcomes / Competences and qualifications profile

In this module students have expanded and deepened the knowledge and skills they have acquired in previous project and modules. The interdisciplinary character of the project encourages students to discover new topics and gather practical experiences in different fields. Having completed this module, students are able to work on questions of theory or praxis in an international and interdisciplinary team. They are able to work scientifically and produce convincing results in their teams.

Content

The content differs between projects, depending on the study programs which are involved and the teaching staff's background. Depending on students' knowledge, lectures and workshops concerning different topics will be included so that students can attend different lectures of other study programms.

Teaching methods

Sessions for basic information about the project options; project coordination; project counseling provided by teaching staff or project partner from a company; accompanying lectures depending on projects' topics and demand; presentation of results to an interested audience consisting of university staff and students as well as external project partners.

Entry requirements

None

Types of assessment

Graded examination (depending on topic e.g. project report as well as presentation of results performed in team work.)

Requirements for the award of credit points

Project report and presentation of results delivered. Both have to meet quality criteria to pass the module.

Use of module (in other study programs)

Same module for all Bachelor study programs of the faculty

Weight towards final grade

6.9%
Person in charge of module All professors of the faculty
Additional information

ML_6.01 Internship / Semester Abroad

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_6.01	900 h	30 CP	6th semester	Summer or winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
		900 h	Open

Learning outcomes / Competences and qualifications profile

The internship module has enabled students to apply their knowledge in a practical setting. Students have gained insights into a company and into specific practical fields. During their stays as interns they have worked on different tasks in the companies and have taken on responsibility for certain topics.

Students having opted for a semester abroad have gained intercultural competencies. They have improved their foreign lanuage skills or have even studied a new foreign language, have learned how to get along in a foreign educational system and have worked with other students and teaching staff of different nationalities.

Content

Depending on internship company or university abroad. Topics will be discussed beforehand with teaching staff of Rhine-Waal University of Applied Sciences.

Teaching methods

Entry requirements

89 credit points achieved

Types of assessment

Certificate (Testat)

Requirements for the award of credit points

20 weeks of internship have to be completed. Splitting these 20 weeks into parts is not possible. An internship report and and a presentation which have to meet quality criteria have to be delivered.

In case of a semester abroad at least 10 ECTS have to be earned at the foreign university which is based in a non-German speaking country. Exceptions can be made in cases in which the success of the semester abroad is defined in a different way.

Use of module (in other study programs)

Same module in "International Business and Social Sciences", "Industrial Engineering - Specialization Communication and Information Engineering", "Information and Communication Design", "Environment and

Energy", and "Mobility and Logistics"
Weight towards final grade None (ungraded)
Person in charge of module All professors of the faculty
Additional information

ML_7.01 Bachelor Workshop I: Research Methods

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_7.01	150 h	5 CP	7th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Seminaristic lectures: 60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

This is a very applied course aiming to provide students with the skills and knowledge about research methods they need to write their bachelor thesis. Having completed this course, students are able to decide which research method is suited best to explore their chosen bachelor theses topics. The can research available data sets or collect their own data using questionnaires. They can evaluate the data either with SPSS or estimate simple econometric models with EViews.

With regard to qualitative research methods students are able to apply the case study methodology and write convincing case studies. They can also apply interviewing techniques when conducting expert interviews.

Students are aware of quality criteria for both quantitative and qualitative research. They have deepened this understanding through analyzing and criticizing examples of qualitative as well as quantitative research.

Content

Quantitative reasearch methods:

- Own data collection vs. working with available data sets

- Where to find available data sets

- Data quality, dealing with missing observations

- How to design a questionnaire

- How to evaluate a questionnaire

- Statistical analysis using SPSS

- Introduction to econometric methods

- Basic estimations using EViews

- Introduction to event study methodology

- Analysis of examples of quantitative research

Qualitative research methods:

- Quality of qualitative data

- Process of qualitative research

- Case study analysis

- Interview techniques

- Content analysis

- Discourse analysis

- Analysis of examples of qualitative research

Teaching methods

Seminaristic lectures which will include discussions as well as student tasks performed individually, in pairs or in groups. Some PC sessions to practice SPSS as well as EViews software.

Entry requirements

175 credits points achieved (including internship or semester abroad)

Types of assessment

Certificate (Testat)

Requirements for the award of credit points

Passed assessment

Use of module (in other study programs)

Same module in "International Business and Social Sciences", "Industrial Engineering - Specialization Communication and Information Engineering", "E-Government", "Environment and Energy", "Media Communication and Computer Sciences" and "Mobility and Logistics"

Weight towards final grade

None (ungraded)

Person in charge of module

All professors of the faculty

Additional information

Reading:

Pallant, J. (2010): SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS. 4th edition. New York: McGraw-Hill.

Saunders, M. / Lewis, P./ Thornhill, A. (2009): Research Methods for Business Students. 5th edition.

London: Financial Times.

Studenmund, A. H. (2010): Using Econometrics: A Practical Guide with Eviews.Upper Saddle River: Pearson Prentice Hall.

Yin, R. K. (2009): Case study research: Design and methods. 4th edition. Thousand Oaks: Sage.

ML_7.02 Bachelor Workshop II: Scientific Writing

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_7.02	150 h	5 CP	7th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Seminaristic lectures: 60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

Students are able to communicate their results of scientific working in an appropriate written form. They have learned how to write effectively, concisely, and clearly. By practicing the discussed writing techniques they have gained an understanding of and experience in creating a scientific manuscript.

Content

- Writing style
- Writing techniques
- Structure, outline, and first draft
- Organizing the writing process
- How to present methods and results effectively
- Discussing the results
- Putting the fragements together
- Abstract and Introduction
- Rewriting the manuscript
- Editing and publishing the text

Teaching methods

Workshop including seminaristic lectures and many writing exercises. Students discuss their results and support each other.

Entry requirements

175 credits points achieved (including internship or semester abroad)

Types of assessment

Certificate (Testat)

Requirements for the award of credit points Passed assessment
Use of module (in other study programs) Same module in "International Business and Social Sciences", "Industrial Engineering - Specialization Communication and Information Engineering", "E-Government", "Environment and Energy", "Media Communication and Computer Sciences" and "Mobility and Logistics"
Weight towards final grade None (ungraded)
Person in charge of module All professors of the faculty
Additional information Reading: Cargill, M. / O'Connor, P. (2009): Writing Scientific Research Articles. Strategy and Steps. Chichester: Wiley-Blackwell. Glasman-Deal, H. (2010): Science Research Writing for Non-Native Speakers of English. A Guide for Non-Native Speakers of English. London: Imperial College Press. Hofmann, A. H. (2010): Scientific Writing and Communication: Papers, Proposals, and Presentations. Oxford: Oxford University Press. Russey, W. E. / Ebel, H. F. / Bliefert, C. (2006): How to Write a Successful Science Thesis. The Concise Guide for Students. Weinheim: Wiley-VCH.

ML_7.03 Bachelor Workshop III: Colloquium

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_7.03	150 h	5 CP	7th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Seminaristic lectures: 60 h / 4 semester hours per week (SWS)	60 h / 4 (SWS)	90 h	35 students

Learning outcomes / Competences and qualifications profile

Students have received feedback, advice and guidance for their bachelor thesis. Each student has presented his or her own research findings in a short presentation (20-30 minutes). Together with two other students, who had received the respective presentation earlier, he/she has discussed the current state of research findings, methodology etc. In that way students have learned to present their research in a convincing way, to professionally defend their research and to accept feedback or criticism from their peers. At the same time students have learned to give feedback, provide ideas and advice for the work of others and formulate criticism in a fair way.

Content

- How to present research findings in a professional way

- How to comment and criticize the research of others

- How to moderate a group discussion

- Students´ presentations of their own findings followed by two discussant contributions and an open group discussion

Teaching methods

Students present their own research. Group discussions about the findings and methods applied.

Entry requirements

175 credits points achieved (including internship or semester abroad)

Types of assessment

Certificate (Testat)

Requirements for the award of credit points

Individual student´s presentation of his/her own research findings. Contribution to the discussion of two other students' researches.

Use of module (in other study programs) Same module in "International Business and Social Sciences", "Industrial Engineering - Specialization Communication and Information Engineering", "Environment and Energy", and "Mobility and Logistics"
Weight towards final grade None (ungraded)
Person in charge of module All professors of the faculty
Additional information

ML_7.04 Bachelor Thesis and Disputation

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_7.04	450 h	15 CP	7th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Bachelor Thesis: 12 CP Disputation: 3 CP	Depends on need and demand		

Learning outcomes / Competences and qualifications profile

Students have conducted their own studies examining a research question from their scientific discipline, developing an appropriate methodological approach, and reflecting their research design and findings critically.

During the disputation students have proven their competencies in evaluating the topic and reflecting on its impact on real-life problems.

Content

- Depends on the topic; inter alia:
- Researching and evaluating literature
- Developing a research question and deriving hypotheses
- Operationalizing constructs
- Analyzing methodological strengths and weaknesses of different research approaches
- Developing research designs
- Conducting the studies
- Evaluating the results / Implementation
- Writing the thesis
- Presenting and defending the findings

Teaching methods

Individual supervision and support

Entry requirements

175 credits points achieved (including internship or semester abroad)

Types of assessment Written Bachelor thesis and oral disputation
Requirements for the award of credit points Passed Bachelor thesis and disputation as well as successful completion of all other modules of the curriculum
Use of module (in other study programs)
Weight towards final grade 10.35%
Person in charge of module All professors of the faculty
Additional information

ML_W.01 Elective: Logistic Simulations

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.01	150 h	5 CP	4th or 5th semester	Once a year	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	20 students

Learning outcomes / Competences and qualifications profile

This module has introduced the analysis and optimization of material flow systems with discrete event simulation.

The students can apply their knowledge to their professional context as logistics engineers and logistics planners.

They can develop advanced solutions to problems in the field of simulation based analyzing of material flows and of material flow plannings.

They are also able to develop advanced solutions with the help of discrete event simulation systems for the optimization of material flows within the intralogistics of warehouses, conveyor networks and production logistics.

Content

- An elementary simulation-by-hand exercise
- General definitions and procedures of discrete simulations
- Basic architecture of discrete event simulation systems
- Rules and guidelines for simulation studies (basic procedure of a study)
- Basics of control levels for material flow systems
- Introduction of a the discrete event simulation tool DOSIMIS-3
- Elementary modelling and simulation tasks with DOSIMIS-3
- Simulation based analysis and optimization of a given material flow- or production-system plan
- Basic definitions and features of the digital factory approach

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements Successful completion of the following modules: - "Technical Material Flow Systems" (2nd semester) - "Production Logistics" (3rd semester)
Types of assessment Graded examination
Requirements for the award of credit points Passed assessment
Use of module (in other study programs) Open to students of other study programs
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information Literature 1. VDI Guideline 3633 Part 1-11:Simulation of systems in materials handling, logistics and production; Beuth Verlag Berlin 2010 2. VDI Guideline 4499: Part 1: Digital factory Fundamentals; Beuth Verlag Berlin 2008 3. DOSIMIS-3: Users manual; SimulationsDienstleistungsZentrum GmbH; Dortmund 2003

ML_W.02 Elective: Lean Management

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.02	150 h	5 CP	4th or 5th semester	Once a year	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	35 students

Learning outcomes / Competences and qualifications profile

This module has covered the main theory of lean management and lean logistics.

Students have acquired the skills to develop advanced solutions for the optimization of material flows within the production areas.

They are able to eliminate waste by minimizing stocks in the buffers or optimizing machine utilization.

They can also develop advanced solutions to optimize the value stream of goods and products by applying the methods of stream mapping and value stream design.

The successful student can apply his knowledge to the professional context of a logistics engineer or logistics planner especially in the fields of production logistics.

Content

- Overview of general focus, contents and history of lean management

- The 14 management principles of the Toyota production system

- The four basic lean principles and their implementation: flow principle, takt principle, pull principle and zero defect principle

- The 5S and the 6 Sigma approach

- Value stream mapping and desing

- Elements of lean logistics, like Kanban-loops, supermarkets, internal round-trips

- Methods for production and quality optimization, like SMED, Chaku-Chaku production, Poka-Yoke, Andon boards

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

It ist strongly recommended to attend to the following modules before taking this course:

- "Planning of logistic systems and processes" (2nd semester) - "Production logistics" (3rd semester)
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Open to students of other study programs
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Andreas Schürholz
Additional information Literature 1.Liker, Jeffrey: The Toyota way; McGraw Hill New York 2004; ISBN 0-07-139231-9 2. Womack, J.P; Jones D. T.: Lean Thinking: Banish waste and create wealth in your company; Free Press 2003; ISBN: 978-0743249270 3. Gygi, Craig, et al.: Six Sigma for Dummies; Wiley Publishing Inc.; Indianapolis 2005; ISBN 0-7645-6798-5 4.Gygi, Craig, et al.: Six Sigma Workbook; Wiley Publishing Inc.; Indianapolis 2006; ISBN 978-0470045190

ML_W.03 Elective: Harbour and Airport Logistics

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.03	150 h	5 CP	4th or 5th semester	Once a year	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	20 students

Learning outcomes / Competences and qualifications profile

This module has taught the basics of different structures, resources, processes and strategies of harbour and airport logistics.

The students have gained knowledge of the basics of different port (harbour, airport) structures, variants of processes and control strategies.

The students can apply their knowledge to their professional context as logistics engineers and logistics planners in the fields of traffic logistics and port logistics.

They can identify problems and know advanced solutions to problems in the fields of developing new and optimizing existing port structures and processes.

Content

The content is divided into two main parts: Harbour logistics and airport logistics

The main topics of harbour logistic are:

- Basics of maritime logistics: different types of ships, vessels, containers etc.

- Structures and processes of sea ports and domestic (inland) ports,

- Structures and processes of container terminals and of intermodal terminals

- Techniques, equipment and resources for charging and discharging of ships and vessels

- Basics of loading planning (storage plan)

The main topics of airport logistics are:

- Basics of air cargo logistics: different types of air-cargo planes, loading equipment, special containers (Unit Load Devices) and packagings for air cargo

- Baggage conveyor systems and processes in airports

- Passenger handling systems and processes - Air-cargo-handling systems and processes - Internal infrastructure of the buildings, air traffic infra structure, airstrips for departure and arrivals - External traffic connections to road and rail
Teaching methods Tuition in lectures, practical classes and visits of airports and harbours
Entry requirements It is strongly recommended to attend to the following module before taking this course: "Technical Logistic Systems" (2nd semester)
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Open to students of other study programs
Weight towards final grade 3,45 %
Person in charge of module N.N.
Additional information

ML_W.04 Elective: Procurement and Distribution Logistics

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.04	150 h	5 CP	4th or 5th semester	Once a year	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Excercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	20 students

Learning outcomes / Competences and qualifications profile

This module has taught the basics of different structures, resources, processes and strategies in the fields of procurement logistics and distribution logistics.

The students have learned basics about the different delivery structures, variants of processes and control strategies from the suppliers to the production (procurement) and from the production to the final customers (distribution)

The students can apply their knowledge to their professional context as logistics engineers and logistics planners. They can identify problems and know advanced solutions to problems in the fields of developing new and optimizing existing procurement and distribution processes and structures.

Content

The content is divided into two main parts: Procurement logistics and distribution logistics

The main topics of procurement logistics are:

- Different procurement structures and strategies, like global-, single- or multiple sourcing, modular sourcing

- Different concepts of the external material procurement: production-synchronous procurement (JIT/JIS deliveries), direct delivery callofs,

- Different techniques of supplier connections, pick-up- and supply processes, vendor managed inventory

- Topics of e-procurement: Web-portals, EDI connections, special EDI solutions like e-kanban, advanced shipping notes (ASN) etc.

The main topics of distribution logistics are:

- Different forms of distribution structures (vertical and horizontal distribution structures)

- Determination of the warehouse locations (optimal warehouse location)

- Customer-order to warehouse allocation strategies and optimization procedures

-Warehousing and distribution requirement planning

- Order treatment and distribution strategies in different companies and industies (industrial examples) - Special topics of trading companies like Quick Response (QR) or Efficient Consumer Response (ECR)
Teaching methods Tuition in lectures and practical classes
Entry requirements It is strongly recommended to attend to the following module before taking this course: "Production Logistics (3rd semester)
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Open to students of other study programs
Weight towards final grade 3,45 %
Person in charge of module N.N.
Additional information

ML_W.05 Elective: Strategic Management and Business Planning

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.05	150 h	5 CP	5th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture: 30 h / 2 semester hours per week (SWS) Exercise: 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Students are acquainted with fundamental concepts and common tools of strategic management. They are able to analyse the positioning of an organization, to develop strategic options, and they know how to transfer these options to stratigic programs.

Furthermore, students know how to apply this knowledge to the development of a new business. They have acquired skills of business planning and have first experience in writing a sound business plan.

Content

- The strategic management process
- Vision and mission
- Setting objectives
- Analyzing the external environment (macroenvironment and competitive environment)
- Analyzing the internal environment (competitive advantage, value chain analyzis, balanced scorecard)
- Corporate strategies
- Business strategies
- Strategies for multibusiness corporations
- Competing in international markets
- Strategy implementation and control
- Business planning: Defining and modeling the business
- Structure of the business plan
- Addressing the target audience (style and layout of the business plan, presentation)

Teaching methods Lectures, accompanied by exercises in which students develop their own business plan
Entry requirements None
Types of assessment Graded examination
Requirements for the award of credit points Passed examination
Use of module (in other study programs) Compulsory module in "International Business and Social Sciences", elective in "Mobility and Logistics" and "Industrial Engineering - Specialization Communication and Information Engineering"
Weight towards final grade 3.45%
Person in charge of module Prof. Dr. Daniel H. Scheible
Additional information Reading: Capezino, P. J. (2010): Manager's Guide to Business Planning. New York: McGraw-Hill. Dess, G. G. / Lumpkin, G. T. / Eisner, A. B. (2010): Strategic Management. Creating Competitive Advantage. 5th edition. New York: McGraw-Hill. Friend, G. / Zehle, S. (2009): Guide to Business Planning. London: Economist Profile Books. Gamble, J. E. / Thompson, A. A. (2011): Essentials of Strategic Management. The Quest for Competitive Advantage. 2nd edition. New York: McGraw-Hill. Pearce, J. A. / Robinson, R. B. (2011): Strategic Management. Formulation, Implementation, and Control. 12th edition. New York: McGraw-Hill.

ML_W.06 Elective: Quality and Risk

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.06	150 h	5 CP	5th semester	Winter semester	1 semester

Courses	Teaching time	Self-study	Planned group size
Lecture 30 h / 2 semester hours per week (SWS) Exercises 30 h / 2 SWS	60 h / 4 SWS	90 h	Lecture: open Exercise: 40 students

Learning outcomes / Competences and qualifications profile

Students are familiar with functionalities of quality management and risk management systems. They have acquired knowledge about tools of both, quality management and risk management, and have a general understanding of an adequate implementation of these tools and techniques. Furthermore, they are aware of the limitations of the various approaches of managing quality and risk.

Content

- Characteristics and definitions of quality

- Quality management principles and approaches (quality planning, quality control, quality improvement, quality assurance)

- Total quality management (integrated management, PDCA cycle, key elements of total quality, process design and evaluation, etc.)

- Managing quality using ISO 9000 and 14001

- Methods and tools of quality management (flowcharts, Ishikawa diagram, Failure Mode and Effects Analysis (FMEA), Poka Yoke, the Six Sigma toolbox)

- Environmental aspects of managing quality

- Communication in difficult situations (role of communication, information systems, etc.)

- Basics of risk management (difference between risk and uncertainty, approaches to risk management, benefit/risk function)

- Exposures in corporate risk management

- Measuring risk

- Value at risk (definition, methods, and criticism)

- Hedging and derivatives

Teaching methods

Lectures, accompanied by exercises in which case studies and problems in practice are presented

Entry requirements

None

Types of assessment

Graded examination

Requirements for the award of credit points

Passed examination

Use of module (in other study programs)

Compulsory module in "International Business and Social Sciences", elective in "Mobility and Logistics" and "Industrial Engineering - Specialization Communication and Information Engineering"

Weight towards final grade

3.45%

Person in charge of module

N.N.

Additional information

Reading:

Andersen, T. J. / Schrøder, P. W. (2010): Strategic Risk Management Practice. How to Deal Effectively with Major Corporate Exposures. Cambridge: Cambridge University Press.

Brealey, R. A. / Myers, S. C. / Allen, F. (2007): Principles of Corporate Finance. 9th edition. New York: McGraw-Hill.

Crouhy, M. / Galai, D. / Mark, R. (2006): The Essentials of Risk Management. The Definitive Guide for the Non-Risk Professional. New York: McGraw-Hill.

Goetsch, D. L. / Stanley, D. B. (2010): Quality Management for Organizational Excellence. Introduction to Total Quality. 6th edition. Upper Saddle River: Pearson Prentice Hall.

Hoyle, D. (2007): Quality Management Essentials. Oxford; Burlington: Butterworth-Heinemann Elsevier.

Jorion, P. (2011): Financial Risk Manager Handbook. FRM Part I / Part II. 6th edition. Hoboken: Wiley.

Noble, M. T. (2000): Organizational Mastery with Integrated Management Systems. Controlling the Dragon. New York: Wiley.

ML_W.07 Elective: Ambient Intelligent Systems

Code	Workload	Credits	Level of module	Frequency of offer	Duration
ML_W.07	150 h	5 CP	4th or 5th semester	Once a year	1 semester

Courses	Teaching time	Self-study	Planned group size
60 h / 4 semester hours per week (SWS)	60 h / 4 SWS	90 h	20 students

Learning outcomes / Competences and qualifications profile

Ambient Intelligence envisions a world where people are surrounded by sensors and intelligent, intuitive interfaces embedded in the everyday objects around them. This enables the environment to identify individuals or objects and to response to their presence and behaviour in an appropriate and perhaps personalized way.

In this module the students have been introduced to the vision of ambient intelligent systems. They have gained a sound understanding of enabling technologies and they got an overview of applications and experiments. The application field Ambient Assisted Living (AAL) has been discussed in detail. The students have learned how new technology can be used to improve care processes and to increase the personal mobility and comfort of elderly people. They also got a brief idea of other socio-cultural impacts. At the end of this course students are able to come up with new ideas and to start innovative projects in this area.

Content

- Vision, history and predecessor technologies/visions
- Knowledge-based systems
- Machine learning
- Adaptive multimodal interfaces
- Context: modelling, automatic detection and recognition
- Ideas and current research in the area of AAL

Teaching methods

Tuition in seminars, lectures and practical classes

Entry requirements

It is strongly recommended to attend the lectures

CI_04, ML_1.04 "Fundamentals of Computer Science and Networks"

CI_07, ML_2.06 "Project Management and Intercultural Competences"

CI_18 "Embedded Systems" or ML_2.03"Electrical Circuits and Systems"

before taking this course.

Types of assessment Graded examination
Requirements for the award of credit points Passed assessment
Use of module (in other study programs) Open to students of other study programs
Weight towards final grade 3,45 %
Person in charge of module Prof. Dr. Christian Ressel
Additional information Reading: Corchado,J.M. et al: 3rd Symposium of Ubiquitous Computing and Ambient Intelligence 2008. ISBN 978-3-540-85866-9, Berlin, Springer, 2008 Corchado,J.M. et al: Ambient Intelligence and Future Trends -: International Symposium on Ambient Intelligence 2010. ISBN 3642132677, Berlin, Springer 2010 Omatu, S. et al: Distributed Computing, Artificial Intelligence, Bioinformatics, Soft Computing, and Ambient Assisted Living: 10th International Work-Conference. ISBN 3642024807, Berlin, Springer, 2009 Verhaegh, W.; Aarts,E.; Korst,J.: Algorithms in ambient intelligence. ISBN 978-1402017575,Springer Netherlands, 2004. Bravo, J. et al: Ambient Assisted Living: Third International Workshop, IWAAL 2011. ISBN 3642213022, Berlin, Springer, 2011. Vasilakos,A.; Pedrycz, W.: Ambient intelligence, wireless networking, and ubiquitous computing. ISBN 1-580-53963-7,Boston, Artech House Inc, 2006