

---

Last updated: 25.05.2020

# Module Catalog

Bachelor's degree (B. Sc.)

Logistics and Information Management in Practice Cooperation  
(LIP)

---

# Content

---

<b>List of Abbreviations</b>	<b>I</b>
<b>1. Term 1</b>	<b>1</b>
LIP 1 Introduction to Computer Science	1
LIP 2 Introduction to Mathematics	3
LIP 3 Introduction to Business Administration	4
LIP 4 Bookkeeping and Accounting	5
LIP 5 Soft Skills and Conflict Management	6
<b>2. Term 2</b>	<b>8</b>
LIP 6 Applied Computer Science	8
LIP 7 Applied Mathematics	10
LIP 8 Cost Accounting and Cost Management	11
LIP 9 Transport Industry and Mobility	12
LIP 10 Fundamentals and Applications of Private Business Law	14
<b>3. Term 3</b>	<b>16</b>
LIP 11 Operations Research	16
LIP 12 Web Business	18
LIP 13 Digitization in Supply Chains	20
LIP 14 Information Management in Logistics	22
LIP 15 Logistics Service Management	24
<b>4. Term 4</b>	<b>25</b>
LIP 16 Database Systems	25
LIP 17 Internal Logistics and Process Management	27
LIP 18 External and Green Logistics	29
LIP 19 Automatable Methods for Logistics	30
LIP 20 Investment and Financing	32
<b>5. Term 5</b>	<b>33</b>
On-the-Job Training at the Company	33
<b>6. Term 6</b>	<b>34</b>
LIP 21 Optimization in Logistics	34
LIP 22 IT Project Management	36
LIP 23 Strategic Management in Logistics	38
LIP 24 Specialization Module I	39
LIP 25 Thesis	40
<b>7. Term 7</b>	<b>41</b>
LIP 26 Networks and Web Applications	41
LIP 27 Inventory Management	43
LIP 28 Specialization Module II	44

LIP 29 Electives I and II	45
<b>8. Term 8</b>	<b>46</b>
LIP 30 Supervised Internship	46
LIP 31 Bachelor's Thesis and Defense	47
<b>Specialization Modules Catalog (SPM)</b>	<b>48</b>
SPM 1 Cooperation Management	48
SPM 2 Special Topics of the Transport Industry	50
SPM 3 Airline and Airport Management	52
SPM 4 Human Resources	54
SPM 5 Business Application Systems	56
SPM 6 Process Management in Logistics and Supply Chain	58
SPM 7 Optimization of Transport and Traffic	60
SPM 8 Applied Market Research	62
SPM 9 Electromobility	63
SPM 10 Specialization in Overland Transport Technology	65
SPM 11 Integrated Network Planning	67
<b>Catalog of Mandatory Elective Subjects (WPF)</b>	<b>69</b>
WPF 1 Practical Philosophy - erroneous paths you'd better leave to others	69
WPF 2 International Summer School Traffic and Infrastructure	70
WPF 3 Cost and Activity Accounting Goods Transport Land/Sea	71
WPF 4 Current Issues in the Maritime and Seaport Industries	72
WPF 5 Introduction to SAP	73
WPF 6 Practical Modeling and Robot Programming	74
WPF 7 Management of Working Time	75
WPF 8 Management of Non-Profit Organizations	76
WPF 9 Rail Transport in Practice	77

## List of Abbreviations

### General abbreviations:

SWS	Contact hours (45 min. each) per week
CP	Credit points according to the European Credit Transfer System (ECTS)

### Course type:

V	Lecture
Ü	Exercise course
L	Laboratory course
P	Project assignment
S	Seminar
B	Supervision

### Forms of examination:

KL	Written exam with duration: KL60 = 60 min., KL90 = 90 min., KL120 = 120 min.
MP	Oral examination
RE	Paper and presentation
HA	Term paper
EA	Experimental work
ED	Creation and documentation of computer programs
PA	Project work
PR	Presentation
SA	Thesis
LE	Learning success check
BA	Bachelor's Thesis
MA	Master's Thesis
KO	Defense

\* A plus sign (+) indicates that all of the specified types of examinations are part of the module examination, and a slash (/) indicates that alternatively one of the specified types of examinations constitutes the module examination.

# 1. Term 1

## LIP 1 Introduction to Computer Science

<b>No:</b> LIP 1	<b>Mandatory module:</b> Introduction to Computer Science	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 1	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL90 + ED	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 60 hrs.	<b>Self-study hours:</b> 120 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Introduction to Computer Science		Prof. Dr. Hansmann		V	2
Introduction to Computer Science - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<p><u>Introduction to Computer Science:</u></p> <ul style="list-style-type: none"> <li>- History of computer science</li> <li>- Basic structure</li> <li>- Functionality and fields of application of computer systems</li> <li>- Number systems</li> <li>- Information representation (numbers, characters, audio, video, colors, files)</li> <li>- Operating systems</li> <li>- Classification of programming languages and methods for syntax description</li> <li>- Algorithms</li> <li>- Information systems</li> <li>- Internet</li> </ul> <p>Current topics in the field of computer science</p>					
<p><u>Introduction to Computer Science - Lab:</u></p> <ul style="list-style-type: none"> <li>- Introduction to structured programming with C: Basic syntax, simple data types, loops, conditions, functions, fields, realization of simple programs and implementation of simple algorithms, such as searching or sorting</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>Introduction to Computer Science:</u></p> <p>Students are familiar with basic number systems and arithmetic. They know different fields of usage of computer systems and typical applications. Basic terms and processes in the context of the Internet are familiar to them. They can implement simple algorithms related to non-complex problems. The main operating systems and typical application programs can be classified. Students will also be able to determine key aspects, such as the storage requirements of a video file or its download duration, in the context of information presentation.</p>					
<p><u>Introduction to Computer Science - Lab:</u></p> <p>After completion, the students know different data types, basic concepts of procedural programming and their implementation in C. They not only know how simple problems can be solved using algorithms, but can also implement them independently in the form of simple C programs.</p>					
<b>Literature and teaching aids</b>					
Materials and exercises by the lecturer					

Introduction to Computer Science:

Ernst, H.; Schmidt J.; Beneken G. (2015): Grundkurs Informatik. Grundlagen und Konzepte für die erfolgreiche IT-Praxis. 5th ed. Springer Vieweg Wiesbaden

Schmidt J. (2019): Grundkurs Informatik – Das Übungsbuch. 1st ed. Springer Fachmedien, Wiesbaden.

Hower, W. (2019): Informatik Bausteine. Eine komprimierte Einführung. 1st ed. Springer Fachmedien Wiesbaden.

Lemke C.; Brenner, W. (2015): Einführung in die Wirtschaftsinformatik. Volume 1: Verstehen des digitalen Zeitalters. 1st ed. Springer Gabler Berlin-Heidelberg

Introduction to Computer Science - Lab:

Die Programmiersprache C. Ein Nachschlagewerk. RRZN Regionales Rechenzentrum für Niedersachsen/Universität Hannover

Logofätu, D. (2016): Einführung in C, 2nd ed., Springer

Theis, Th. (2017): Einstieg in C, Rheinwerk

**LIP 2 Introduction to Mathematics**

<b>No:</b> LIP 2	<b>Mandatory module:</b> Introduction to Mathematics	<b>Language:</b> German		<b>Credit points:</b> 7	
		<b>Frequency:</b> each fall term		<b>Term:</b> 1	
		<b>Workload:</b> 210 hrs.		<b>Form of examination:</b> KL90 + LE	
	<b>Prerequisites for participation:</b> School mathematics	<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 120 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Introduction to Mathematics		Prof. Dr. Hansmann		V+Ü	4 + 2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
- Sets, numbers, sequences, series, real and integer functions, limits, differential and integral calculus, determination of extreme values, geometry, linear algebra, vector and matrix calculus, systems of equations					
<b>Learning objectives and competencies to be imparted</b>					
Students are introduced to basic mathematical concepts and methods. They are able to use or understand mathematical language and notation. For different problems, possibilities of an analytical as well as a numerical approach are considered. That is, in addition to finding exact solutions, approximate approaches are discussed.					
After successful participation, students possess sound basic mathematical knowledge. This will provide them with the prerequisite to apply quantitative methods for applications in the field of business administration and logistics as well as to understand the content of the following advanced courses.					
<b>Literature and teaching aids</b>					
Materials and exercises by the lecturer Dietz, H. M. (2012): Mathematik für Wirtschaftswissenschaftler - Das ECOMath-Handbuch, 2nd edition, Springer Walz, G.; Zeifelder, F.; Rießinger, Th. (2015): Brückenkurs Mathematik: für Studieneinsteiger aller Disziplinen, 4th edition, Springer Precht, M.; Voit, K.; Kraft, R. (2010): Mathematik I für Nichtmathematiker, 8th edition, Oldenbourg Helm, W.; Pfeifer, A.; Ohser, J. (2015): Mathematik für Wirtschaftswissenschaftler, 2nd edition, Hanser, Munich Struckmann, W.; Wätjen, D. (2007): Mathematik für Informatiker, Elsevier, Heidelberg Heuser, H. (2009): Lehrbuch der Analysis - Teil 1, 17th edition, Teubner-Vieweg Fischer, G. (2009): Lineare Algebra, Eine Einführung für Studienanfänger, 17th edition, Vieweg Teubner Teschl, G.; Teschl, S. (2008): Mathematik für Informatiker: Volume 1 and Volume 2, 3rd edition, Springer					

**LIP 3 Introduction to Business Administration**

<b>No:</b> LIP 3	<b>Mandatory module:</b> Introduction to Business Administration	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 1	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
<b>Contact hours:</b> 60 hrs.		<b>Self-study hours:</b> 120 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Introduction to Business Administration		Prof. Dr. Saleh		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Subject and classification of business administration in the system of sciences</li> <li>- Constitutive decisions of business administration</li> <li>- Goal setting and decision making</li> <li>- Introduction to the main processes of operational service production</li> <li>- Introduction to financing and investment accounting</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
This module teaches students the basic interrelationships of business administration. Successful completion of the module will result in a confident use of business-specific terminology as well as an understanding of key business issues. The course forms the foundation for later, more advanced and in-depth courses in business administration.					
<b>Literature and teaching aids</b>					
<p>Schierenbeck, H. (2016): Grundzüge der Betriebswirtschaftslehre, 19th edition., De Gruyter Oldenbourg, Berlin.</p> <p>Thommen, J.-P.; Achleitner, A.-C. (2017): Allgemeine Betriebswirtschaftslehre. Umfassende Einführung aus managementorientierter Sicht, 8th edition, Springer Gabler Verlag, Wiesbaden.</p> <p>Thommen, J.-P.; Achleitner, A.-C. (2018): Allgemeine Betriebswirtschaftslehre Arbeitsbuch: Repetitionsfragen Aufgaben – Lösungen, 8th edition, Springer Gabler Verlag, Wiesbaden.</p> <p>Wöhe, G. (2016): Einführung in die Allgemeine Betriebswirtschaftslehre, 26th edition, Vahlen Verlag, München.</p> <p>Wöhe, G. (2016): Übungsbuch zur Einführung in die Allgemeine Betriebswirtschaftslehre, 15th edition, Vahlen Verlag, München.</p>					
Extensive lecture notes (will be provided as PDF files)					



**LIP 4 Bookkeeping and Accounting**

<b>No:</b> LIP 4	<b>Mandatory module:</b> Bookkeeping and Accounting	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 1	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 60 hrs.	<b>Self-study hours:</b> 120 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Bookkeeping and Accounting		Prof. Dr. Czenskowsky		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Fundamentals and principles of external (and internal) accounting</li> <li>- History and legal framework</li> <li>- Inventory and stocktaking</li> <li>- Balance sheet structures</li> <li>- Management of balance sheet, profit and loss and mixed accounts</li> <li>- Profit and loss account and statement</li> <li>- Accounting policies</li> <li>- Accounting for selected assets and liabilities</li> <li>- Balance sheet and performance indicators</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
The module teaches students basic interrelations in business administration. Completion of the module will result in proficiency with external accounting terminology for companies in the transportation industry. Students will be able to stocktake and create an inventory, record business transactions and derive a balance sheet and profit and loss account. Furthermore, a balance sheet can be designed taking into account the company's policy and analyzed using key figures.					
<b>Literature and teaching aids</b>					
Lecture notes					
Buchner, R. (2005): Buchführung und Jahresabschluss, 7th edition, Vahlen, München					
Buchholz, R. (2013): Grundzüge des Jahresabschlusses nach HGB und IFRS, 8th edition Vahlen, München					
Coenenberg, A. (2014): Jahresabschluss und Jahresabschlussanalyse, 23rd edition, Schäffer Poeschel, Landsberg/Lech					
Eberhardt, M.; Egger, N.; Weckbach, M. (2014): Rechnungswesen Spedition und Logistikdienstleistung, 15th edition, Winklers Verlag, Braunschweig					
Eisele, w.; Knobloch, A. P. (2018): Technik des Betrieblichen Rechnungswesens, 9th edition, Vahlen, München					
Heinhold, M. (2012): Buchführung in Fallbeispielen, 12th edition, Schäffer-Poeschel, Stuttgart.					
Meyer, C.; Teile, C. (2018): Bilanzierung nach Handels- und Steuerrecht, 29th edition, NWB-Verlag, Herne.					

**LIP 5 Soft Skills and Conflict Management**

<b>No:</b> LIP 5	<b>Mandatory module:</b> Soft Skills and Conflict Management	<b>Language:</b> German		<b>Credit points:</b> 5	
		<b>Frequency:</b> each fall term		<b>Term:</b> 1	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 150 hrs.		<b>Form of examination:</b> PR / HA	
<b>Contact hours:</b> 60 hrs.		<b>Self-study hours:</b> 90 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Communicating, Presenting, Facilitating Meetings		Dipl.-Ök. A. Borchers		S	3
Conflict Management				S	1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<u>Presenting:</u>					
<ul style="list-style-type: none"> <li>- Definition of the term "presentation"</li> <li>- Clarification of the presentation objective</li> <li>- Analysis as well as consideration of the target group</li> <li>- Selection and structuring of content</li> <li>- Principles as well as possibilities of visualizations</li> <li>- Selection and use of different media</li> <li>- Dealing with difficult situations (stage fright, questions, objections, breakdowns)</li> <li>- Presentation organization</li> <li>- Presentation followed by discussion/reflection</li> </ul>					
<u>Communicating and Facilitating Meetings:</u>					
<ul style="list-style-type: none"> <li>- Definition, goals, tasks and areas of application of facilitation</li> <li>- The role of the facilitator / dual role of executive/facilitator</li> <li>- Procedure/phases of facilitating a meeting</li> <li>- Dealing with difficult types of participants</li> <li>- Detailed description of the instruments or the tools of facilitating</li> <li>- Planning the facilitation of a meeting</li> <li>- Communication theory and models and their application</li> <li>- Conversation techniques (I-messages, listening, questions), body language, feedback techniques, basic rules of constructive communication</li> </ul>					
<u>Conflict Management:</u>					
<ul style="list-style-type: none"> <li>- Definition, emergence and course (escalation stages) of conflicts</li> <li>- Causes of conflict (especially communication and perception) with deepening through corresponding exercises</li> <li>- Criteria for appropriate recognition and criticism</li> <li>- Types of conflict in the company (background and characteristics)</li> <li>- Conflict resolution strategies</li> <li>- Technique and procedure of a conflict resolution meeting between employees or employees and supervisors (theory and role play)</li> <li>- Strategies to prevent the emergence or escalation of conflicts</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
Students acquire important methodological and social skills for later specialist and management tasks.					

Communicating, Presenting, Facilitating Meetings:

With the help of the acquired basic knowledge on the topic of "presentating" as well as due to the various practical exercises within the course, the students are able to prepare and give an effective presentation. Furthermore, the students master the facilitation methodology with its goals and possible applications. Students are also familiar with the role of the facilitator and his or her responsibilities. They can lead conversations and ensure balanced participation of all participants. They will get to know and use different facilitation methods. In addition, students will be able to plan and present facilitation procedures for a variety of settings. Furthermore, they have strategies on how facilitators can deal with difficult participants. A great deal of emphasis is placed on students implementing the tools/methods of facilitating in practical exercises. Exercises in plenary and in small groups alternate. Active participation of students is required in the seminar. Communication is the foundation of any relationship. Not communicating is not possible. It is not only a matter of formulating messages clearly and concisely, but also of interpreting the messages of others correctly. In the area of "Communication", students learn the most important aspects of communication and conversation management and practice these by means of exercises and role plays.

Conflict Management:

Participants in this module will acquire basic skills in conflict management. They can recognize conflicts and their causes at an early stage and select an appropriate conflict resolution strategy according to the escalation level. In addition, they learn to lead conflict discussions.

**Literature and teaching aids**

Presenting:

Lecture notes

Hartmann, M./ Funk, R./ Nietmann, H. (2018): Präsentieren: Präsentationen: zielgerichtet, adressatenorientiert, nachhaltig, 10th revised edition, Weinheim, Basel: Beltz Verlag

Holzheu, H. (2010): Natürliche Rhetorik ohne Lampenfieber, München: Goldmann Verlag (TB)

Schilling, G. (2012): Angewandte Rhetorik und Präsentationstechnik: Der Praxisleitfaden für Vortrag und Präsentation, revised edition, Berlin: Gert Schilling Verlag

Schulz von Thun, F. (2016): Miteinander Reden 1 - Störungen und Klärungen, 53th edition (original edition), Reinbek bei Hamburg: Rowohlt Taschenbuch Verlag

Schulz von Thun, F./ Ruppel, J./ Stratmann, R. (2017): Miteinander Reden: Kommunikationspsychologie für Führungskräfte, 17th edition (original edition), Reinbek bei Hamburg: Rowohlt Taschenbuch Verlag

Seifert, J. W. (2015): Visualisieren - Präsentieren – Moderieren, 35th edition, Offenbach: Gabal Verlag

Communicating and Facilitating Meetings:

Lecture notes

Funcke, A., Havenith, E. (2017): Moderationstools, 5th edition, Bonn: managerSeminare Verlags GmbH

Graeßner, G.(2013): Moderation- das Lehrbuch: Gruppensteuerung und Prozessbegleitung, 2nd edition, Augsburg: ZIEL Verlag

Groß, S. (2018): Moderationskompetenzen: Kommunikationsprozesse in Gruppen zielführend begleiten, Wiesbaden: Springer Gabler Verlag

Hartmann, M. u.a. (2012): Zielgerichtet moderieren, 6th edition, Weinheim, Basel: Beltz Verlag

Sperling, J. B., Stapelfeldt, U., Wasseveld-Reinhold, J. (2011): Moderation, Freiburg: Haufe Lexware Verlag

Conflict Management:

Freitag, S., Richter, J. (Hrsg.) (2019): Mediation – das Praxisbuch: Denkmodelle, Methoden und Beispiele, 2nd revised edition, Weinheim, Basel: Beltz Verlag

Glasl, F. (2013): Konfliktmanagement, Ein Handbuch für Führungskräfte, Beraterinnen und Berater, 11th updated edition, Bern: Haupt Verlag

Rosenberg, M. B. (2016): Gewaltfreie Kommunikation, 12th revised and expanded edition, Paderborn: Junfermann Verlag

Schwarz, G. (2014): Conflict Management: Konflikt erkennen, analysieren, lösen, 9th edition, Wiesbaden: Springer Gabler

## 2. Term 2

### LIP 6 Applied Computer Science

<b>No:</b> LIP 6	<b>Mandatory module:</b> Applied Computer Science	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 2	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60 + ED / MP + ED	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Applied Computer Science		Prof. Dr. Hansmann		V	2
Applied Computer Science - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<u>Applied Computer Science:</u>					
<ul style="list-style-type: none"> <li>- Advanced syntax of the C programming language (structures, pointer arithmetic, dynamic memory management, use of program parameters and file handling)</li> <li>- Composite data structures (fields, linked lists, trees)</li> <li>- Basic algorithms (e.g. sorting algorithms, generation of permutations and subsets),</li> <li>- Recursive methods</li> <li>- Storage and visualization of graphs and networks</li> <li>- Library integration</li> </ul>					
<u>Applied Computer Science - Lab:</u>					
<ul style="list-style-type: none"> <li>- Practical implementation of selected contents taught in the lecture with the help of the programming language C and additional software tools (visualization/modeling of networks)</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<u>Applied Computer Science:</u>					
Students know basic concepts and data structures as well as basic algorithms of computer science. They are familiar with properties and types of algorithms as well as the differences between object-oriented and procedural programming. They are aware of the impact that the choice of data structures used (e.g., for storing graphs and networks) has on memory requirements and computation time. Students will know how computers and algorithms can be used to contribute to decision support for planning in the field of logistics.					
<u>Applied Computer Science - Lab:</u>					
Students are now familiar with all the essential building blocks for using the C programming language. They will thus be able to independently implement a wide range of tasks and associated algorithms. Students are proficient in the use of compilers, debuggers, and error analysis tools. In particular, after successful participation, students possess the prerequisite for the implementation of tasks in the laboratory part of the following courses.					
<b>Literature and teaching aids</b>					
Lecture notes and C-templates Die Programmiersprache C. Ein Nachschlagewerk. RRZN Regionales Rechenzentrum für Niedersachsen/Universität Hannover Logofätu, D. (2016): Einführung in C, 2nd edition, Springer					

Theis, Th. (2017): Einstieg in C, Rheinwerk  
Cormen, Th. H. et al (2007): Algorithmen - Eine Einführung, 2nd edition, Oldenbourg  
Krumke, S. O.; Noltemeier, H. (2009): Graphentheoretische Konzepte und Algorithmen, 2nd Edition, Vieweg+Teubner

**LIP 7 Applied Mathematics**

<b>No:</b> LIP 7	<b>Mandatory module:</b> Applied Mathematics	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 2	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL90	
	<b>Prerequisites for participation:</b> School mathematics	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Applied Mathematics		Prof. Dr. Hansmann		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Combinatorics (calculation rules for the calculation of numbers)</li> <li>- Descriptive statistics (empirical key figures)</li> <li>- Closing statistics (distributions, expected values, confidence intervals, hypothesis tests)</li> <li>- Stochastics/Probability (classical and conditional probabilities, Bernoulli chains)</li> <li>- Selected topics in geometry/(distances, arc lengths of graphs/curves, geocoordinates, distances on the earth's surface)</li> <li>- Approaches of decision and game theory and insights derived from them with regard to business management (dominance of strategies, Nash equilibria)</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Students master a wide range of quantitative methods to support planning tasks in the fields of business administration and logistics. They are able to derive forecasts for future processes on a number basis and to quantitatively assess risks and opportunities.</p> <p>Students know what geocoordinates are and how distance calculations, such as those used in tracking and tracing systems, work. Finally, they are able to understand and, in some circumstances, control social and managerial behavior through decision and game theory approaches.</p>					
<b>Literature and teaching aids</b>					
<p>Materials and exercises by the lecturer</p> <p>Bourier, G. (2011): <i>Wahrscheinlichkeitsrechnung und Schließende Statistik</i>. 7th edition, Gabler</p> <p>Henze, N. (2010) <i>Stochastik für Einsteiger</i>, SpringerVieweg</p> <p>Borat, M.; Hromkovič, J. (2017): <i>Stochastik</i>. 1st edition, Birch houses</p> <p>Meeus, J. (2000): <i>Astronomical Algorithms</i>. 2nd edition. Willmann-Bell, Richmond</p> <p>Bartholomae, F.; Wiens, M. (2016): <i>Spieltheorie – Ein anwendungsorientiertes Lehrbuch</i>, Springer Gabler</p> <p>Winter, St. (2019): <i>Grundzüge der Spieltheorie</i>. 2nd edition, SpringerGabler</p>					

**LIP 8 Cost Accounting and Cost Management**

<b>No:</b> LIP 8	<b>Mandatory module:</b> Cost Accounting and Cost Management	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 2	
	<b>Prerequisites for participation:</b> Introduction to Business Administration, Bookkeeping and Accounting	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
<b>Contact hours:</b> 56 hrs.		<b>Self-study hours:</b> 124 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Cost Accounting and Cost Management		Prof. Dr. Czenskowsky		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Relationship between external and internal accounting</li> <li>- Overview of internal accounting</li> <li>- Basics of cost accounting and cost accounting systems</li> <li>- Full and partial cost accounting</li> <li>- Cost element accounting</li> <li>- Cost center accounting and internal activity allocation</li> <li>- Unit costing/calculation</li> <li>- "Classic" and "modern" cost unit time accounting</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Based on the previous course Bookkeeping and Accounting, this module teaches students further basics of business thinking. Completion of the Cost and Activity Accounting module will result in proficiency with internal accounting terminology. Students understand the importance of structured and meaningful cost accounting to manage a transportation company and create internal transparency. They will learn the structures of internal accounting, be able to identify and calculate main cost types, create cost centers and correctly assign costs to cost objects. In the <b>cost management</b> part of the course, students learn to independently apply procedures of internal activity allocation, costing and short-term profit and loss accounting and to assess their practical significance. The relevant business vocabulary is learned and applied in practical cases.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes</p> <p>Czenskowsky, T.; Schünemann, G.; Zdwomyslaw, N. (2010): Grundzüge des Controlling, 3rd edition, Deutscher Betriebswirte Verlag, Gernsbach</p> <p>Däumler, K.; Grabe, J.(2013): Kostenrechnung 1 Grundlagen, 11th edition, NWB-Verlag, Herne.</p> <p>Däumler, K.; Grabe, J. (2013): Kostenrechnung 2 Deckungsbeitragsrechnung, 10th edition, NWB-Verlag, Herne.</p> <p>Friedl, G.; Hofmann, C. (2013); Pedell, B.: Kostenrechnung, 2nd edition, Vahlen, Munich 2013</p> <p>Heinhold, M. (2010): Kosten- und Erfolgsrechnung in Fallbeispielen, 5th edition, Schäffer-Poeschel, Stuttgart.</p> <p>Jórasz, W. (2009): Kosten- und Leistungsrechnung, 5th edition, Stuttgart</p> <p>Kilger, W.; Pampel, J.; Vikas, K. (2012): Flexible Plankostenrechnung und Deckungsbeitragsrechnung, 13th edition, Gabler, Wiesbaden</p>					

**LIP 9 Transport Industry and Mobility**

<b>No:</b> LIP 9	<b>Mandatory module:</b> Transport Industry and Mobility	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 2	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Transport Industry and Mobility		Prof. Dr. Trost		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Basics, technical terms and basic interrelationships of the transport industry, in general and with regard to the mode of transport</li> <li>- Structure, importance and development of the transport sector (statistical coverage of mobility and transport, longitudinal and cross-sectional comparisons, forecast)</li> <li>- Internal and external developments in the transport sector, background on mobility</li> <li>- Transportation policy regulatory framework, service and cost structures</li> <li>- Lines of development of national and EU transport policy</li> <li>- Markets, organizational structures and competitive conditions in the transport sector, including new mobility services</li> <li>- Basic approaches to pricing and infrastructure policy</li> <li>- Mobility recording, causes of mobility</li> <li>- Possibilities and strategies for influencing mobility and traffic</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>After the course, students will know the basic facts of the transportation industry and they will be able to confidently use the terminology and apply it to similar contexts and in other subjects. Students will have a broad basic knowledge of the entire transportation and traffic sector in an inter-company perspective. Current developments can be described, causes and backgrounds identified and analyzed and applied to developments that are forecast. The framework conditions in passenger and freight transport are mastered and the current market and competitive conditions of transport companies in the various submarkets are known, both in a national and in an EU-wide/international context. After having acquired the basics of mobility recording and causes of mobility, students are able to assess and critically question possibilities for influencing mobility and traffic and to formulate independent proposals.</p>					
<b>Literature and teaching aids</b>					
<p>Extensive lecture notes (will be provided as PDF files)</p> <p>Aberle, G. (2009): Transportwirtschaft, 5th edition, Munich</p> <p>Bichler, K. et. al. (2017): Kompakt-Lexikon Logistik, 3rd edition, Wiesbaden</p> <p>Grandjot, H.-H/ Bernecker, T. (2014): Verkehrspolitik – Grundlagen, Funktionen und Perspektiven für Wissenschaft und Praxis, Hamburg</p> <p>Hölser, Th. (Eds.; 2016): Lorenz 1. Leitfaden für Spediteure und Logistiker in Ausbildung und Beruf: Grundlagen der Verkehrswirtschaft, Spedition &amp; Logistik, Speditions- und ... Kombiniertes Verkehr, Lagerei &amp; Distribution, 25th edition, Hamburg</p> <p>Krampe, H; Lucke, H.-J., Schenk, M. (2012): Grundlagen der Logistik – Einführung in die Theorie und Praxis logistischer Systeme, 4th edition, Munich</p> <p>Kummer, S. (2018): Einführung in die Verkehrswirtschaft, 3rd edition, Stuttgart</p>					



Nobis, Claudia and Kuhnimhof, Tobias (2018): Mobilität in Deutschland – MiD Ergebnisbericht. Studie von infas, DLR, IVT und infas 360 im Auftrag des Bundesministers für Verkehr und digitale Infrastruktur, Bonn, Berlin. [www.mobilitaet-in-deutschland.de](http://www.mobilitaet-in-deutschland.de)

**LIP 10 Fundamentals and Applications of Private Business Law**

<b>No:</b> LIP 10	<b>Mandatory module:</b> Fundamentals and Applications of Private Business Law	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 2	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
<b>Contact hours:</b> 56 hrs.		<b>Self-study hours:</b> 124 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Fundamentals of Private Business Law		Dipl.-Jur. Schmidt		V+Ü	1 + 1
Application Scenarios in Private Business Law				V+Ü	1 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<u>Fundamentals of Private Business Law:</u>					
<ul style="list-style-type: none"> <li>- Fundamentals and concepts of law; separation of powers</li> <li>- Structure of the BGB, case handling and subsumption, principle of abstraction, subjects and objects of law</li> <li>- Declaration of intent; contract; defects of the legal transaction; representation (including procuration and power of attorney), condition; time limits and statute of limitations</li> <li>- Concept and origin of the obligation; performance obligations, time and place; involvement of third parties; compensation for damages (types, scope and calculation); liability for vicarious agents; termination of the obligation; default in the obligation, liability for breach of contract, contract with protective effect in favor of third parties</li> <li>- Property law</li> <li>- General terms and conditions</li> <li>- Fundamentals of the law of commercial enterprises (concept of merchant and types of merchants, commercial company and register)</li> </ul>					
<u>Application Scenarios in Private Business Law:</u>					
<ul style="list-style-type: none"> <li>- Broadening of knowledge on topics from the introductory course, e.g. regulations on the transfer of companies</li> <li>- Special features of commercial law, in particular special regulations for commercial transactions e.g. § 377 HGB, commercial customs</li> <li>- Significance of silence in law and for merchants</li> <li>- as well as special types of contracts under commercial law: storage contract, freight contract, forwarding contract and commission business</li> <li>- Legal appearance liability in the case solution e.g. §§ 3666 HGB and § 15 HGB.</li> <li>- Tortious liability and product liability under the German Civil Code (BGB) and product liability under the German Product Liability Act (Produkthaftungsgesetz)</li> <li>- Complex legal relationships, especially in case solutions</li> <li>- Basic principles of corporate law</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<u>Fundamentals of Private Business Law:</u>					
Knowledge of the basics of law, BGB general part, general law of obligations and commercial law as well as teaching the concepts, knowledge, contexts and skills (especially subsumption technique/expert opinion style) to solve practical (simple) cases					
<u>Application Scenarios in Private Business Law:</u>					

Students are familiar with important regulations of private commercial law. They are able to integrate these prerequisites into the basic structures of the basic course and thus recognize the significance of these regulations as well as the differences relevant to commercial law or business. They are able to discuss the regulations in relation to their application. This also results in a higher level of complexity in expert case resolution, which students become familiar with and are able to apply to suitable cases.

#### **Literature and teaching aids**

Bitter, Gorg; Schuhmacher, Florian: Handelsrecht, current edition, Franz Vahlen, München.  
Führich, Ernst R.: Wirtschaftsprivatrecht, current edition, Franz Vahlen, Munich; also available via Campuslizenz.  
Klunzinger, Eugen: Einführung in das Bürgerliche Recht, current edition, Vahlen, Munich (subject to change of publisher); also available via campus license.  
Kookemoor, Axel; Lohrer, Stefan: Handelsrecht mit Gesellschaftsrecht. Current edition, Franz Vahlen, Munich.  
Müssig, Peter: Wirtschaftsprivatrecht, current edition, C.F. Müller, Heidelberg.  
Oetker, Hartmut: Handelsrecht, current edition, Springer, Berlin, Heidelberg, campus license only.  
Wörten, Rainer; Metzler-Müller, Karin: BGB AT: mit Einführung in das Recht, current edition, Franz Vahlen, Munich.  
Wörten, Rainer; Metzler-Müller, Karin: Schuldrecht AT, current edition, Franz Vahlen, Munich.  
Wörten, Rainer; Metzler-Müller, Karin: Schuldrecht BT, current edition, Franz Vahlen, Munich.  
Slide sets and assignment sheets.

### 3. Term 3

#### LIP 11 Operations Research

<b>No:</b> LIP 11	<b>Mandatory module:</b> Operations Research	<b>Language:</b> German		<b>Credit points:</b> 6
		<b>Frequency:</b> each fall term		<b>Term:</b> 3
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL90 + ED
	<b>Prerequisites for participation:</b> Basic knowledge of mathematics and its implementation from previous terms	<b>Contact hours:</b> 60 hrs.	<b>Self-study hours:</b> 120 hrs.	
<b>Courses:</b>		<b>Module commissioner:</b>	<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Operations Research		Prof. Dr. Hansmann	V+Ü	2 + 1
Operations Research – Lab			L	1
This module is used for the following degree programs: LIM, LIP				
<b>Contents</b>				
<p><u>Operations Research:</u></p> <ul style="list-style-type: none"> <li>- Process of OR-supported planning in practice</li> <li>- Mathematical modeling of practical optimization problems</li> <li>- Solution of linear optimization tasks using the simplex method (two-phase method)</li> <li>- Mixed-integer optimization: exact methods (branch&amp;bound, complete enumeration) and heuristics (rounding heuristics, greedy methods, natural analog methods)</li> <li>- Methods for selected application areas of OR: e.g. for transport and route optimization or for resource planning</li> </ul> <p><u>Operations Research – Lab:</u></p> <ul style="list-style-type: none"> <li>- Implementation (in C) and application of a selected optimization method (e.g. simplex method) to an optimization problem discussed in the lecture</li> </ul>				
<b>Learning objectives and competencies to be imparted</b>				
<p><u>Operations Research:</u></p> <p>Students know the typical process of an OR-based project in practice. They know how to mathematically model business and logistic optimization problems, e.g., using linear models without discrete decisions or mixed-integer models with discrete decisions. Students know different types of solution methods (exact, heuristic, or approximate) and have an understanding of the relationships between logistic instance size, computation time, and solution quality in this regard. The students are able to decide for logistic problems whether and if so which methods of OR can be used.</p> <p><u>Operations Research – Lab:</u></p> <p>For logistic planning tasks (leading, for example, to linear optimization models), students can generate proposals by implementing and applying algorithms (e.g., simplex algorithm). For more complex problems, they are able to accompany the model creation and propose adequate solution procedures.</p>				
<b>Literature and teaching aids</b>				
<p>Manuals of the RRZN Hannover for C programming                  Lecture notes and C-templates                  Cormen, Th. H. et al (2007): Algorithmen - Eine Einführung, 2nd edition, Oldenbourg</p>				

Krumke, S. O.; Noltemeier, H. (2009): Graphentheoretische Konzepte und Algorithmen, 2nd Edition, Vieweg+Teubner  
Domschke, W.; Drexl, A. (2010): Einführung in Operations Research, 8th edition, Springer  
Dempe, St.; Schreier, H. (2006): Operations Research, 1st edition, Teubner  
Dempe, St.; Unger, Th. (2010): Linear optimization, 1st Edition, Vieweg+Teubner  
Burkhard, R.E.; Zimmermann U.T. (2012): Einführung in die mathematische Optimierung, 1st edition, Springer  
Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Grundlagen (Band I), Shaker Verlag, Aachen  
Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Wege und Touren (Band II), Shaker Verlag, Aachen  
Domschke, W. (2010): Logistik - Transport, 5th edition, Oldenbourg Verlag, München  
Domschke, W. (2007): Logistik - Rundreisen und Touren, 5th edition, Oldenbourg Verlag, München  
Kallrath, J. (2012): Gemischt-ganzzahlige Optimierung in der Praxis, 2nd edition, Vieweg

**LIP 12 Web Business**

<b>No:</b> LIP 12	<b>Mandatory module:</b> Web Business	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 3	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60 + PR / PA + PR	
	<b>Prerequisites for participation:</b> Basics of computer science and programming	<b>Contact hours:</b> 60 hrs.	<b>Self-study hours:</b> 120 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Web Business		Prof. Dr. Franke		V	2
Web Business – Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<u>Web Business:</u>					
<ul style="list-style-type: none"> <li>- Definition of web business</li> <li>- E-business models</li> <li>- E-marketplaces</li> <li>- Develop e-commerce / e-business</li> <li>- E-marketing:</li> </ul>					
<u>Web Business Lab:</u>					
<ul style="list-style-type: none"> <li>- Overall implementation of a web business project</li> <li>- Cost-effectiveness considerations</li> <li>- Prototype implementation</li> <li>- Risk assessments</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<u>Web Business:</u>					
After successful participation in this course, participants will know the requirements of a web business, as well as how to trade electronically using modern technologies. Furthermore, the students learn the methods to plan and carry out the actions. The course will focus on e-commerce and e-business.					
<u>Web Business Lab:</u>					
In the Web Business Lab, exemplary e-commerce and e-business projects are prototypically designed and partially implemented. Students will work on and recognize the relevance and differences between web projects and purely market-based projects.					
<b>Literature and teaching aids</b>					
<u>Web Business:</u>					
Lecture notes					
Clement, R. (2016): Internet-Ökonomie: Grundlagen und Fallbeispiele der vernetzten Wirtschaft, Springer Gabler; edition: 3, fully revised and expanded edition					
Peters, R. (2010): Internet-Ökonomie, Springer; 1st edition.					
<u>Web Business Lab:</u>					
Lecture notes					

Clement, R. (2016): Internet-Ökonomie: Grundlagen und Fallbeispiele der vernetzten Wirtschaft, Springer Gabler; edition: 3, fully revised and expanded edition  
Peters, R. (2010): Internet-Ökonomie, Springer; 1st edition.

**LIP 13 Digitization in Supply Chains**

<b>No:</b> LIP 13	<b>Mandatory module:</b> Digitization in Supply Chains	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 3	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60 + PR / PA + PR	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 60 hrs.	<b>Self-study hours:</b> 120 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Digitization in Supply Chains		Prof. Dr. Franke		V	2
Digitization in Supply Chains - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<u>Digitization in Supply Chains:</u> <ul style="list-style-type: none"> <li>- Basics of digitization in supply chains</li> <li>- Lean Logistics in Supply Chains</li> <li>- The Supply Chain Value Stream Model</li> <li>- Industry 4.0</li> <li>- Logistics 4.0</li> </ul>					
<u>Digitization in Supply Chains - Lab:</u> <ul style="list-style-type: none"> <li>- Implementation of an IT realization example in supply chains</li> <li>- Implementation of the supply chain value stream model</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<u>Digitization in Supply Chains:</u> Digital processes are increasingly taking place in supply chain management. In view of Logistics 4.0 and Industry 4.0, students should be able to both theoretically understand and practically implement the close interlinking of digitization and supply chains. In this course, students will understand the transitions from lean logistics processes to modern cyberphysical and cyberlogistic systems.					
<u>Digitization in Supply Chains - Lab:</u> Based on a realistic scenario of a supply chain, students identify optimization potential in the area of digitization and value creation and implement it in the form of an improvement concept.					
<b>Literature and teaching aids</b>					
<u>Digitization in Supply Chains</u> Lecture notes Erlach, K. (2010): Wertstromdesign: Der Weg zur schlanken Fabrik (VDI-Buch), Springer; edition: 2, revised and expanded ed. Lindner, A. (2007) : Wertstromdesign, Hanser Verlag, 2010 Arndt, H. (2017) Supply Chain Management: Optimierung logistischer Prozesse, Springer Kuhn, A.; Hellgrath, B.(2013): Supply Chain Management, 6th edition, Springer					
<u>Digitization in Supply Chains - Lab:</u> Lecture notes					



Erlach, K. (2010): Wertstromdesign: Der Weg zur schlanken Fabrik (VDI-Buch), Springer; edition: 2, revised and expanded ed.  
Lindner, A. (2007) : Wertstromdesign, Hanser Verlag, 2010  
Arndt, H. (2017): Supply Chain Management: Optimierung logistischer Prozesse, Springer  
Kuhn, A.; Hellingrath, B.(2013): Supply Chain Management, 6th edition, Springer

**LIP 14 Information Management in Logistics**

<b>No:</b> LIP 14	<b>Mandatory module:</b> Information Management in Logistics	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 3	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60 + PR / PA + PR	
<b>Contact hours:</b> 60 hrs.		<b>Self-study hours:</b> 120 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Information Management in Logistics		Prof. Dr. Franke		V	2
Information Management in Logistics - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<p><u>Information Management in Logistics:</u></p> <ul style="list-style-type: none"> <li>- Data, information and systems</li> <li>- Agents and logistics software systems</li> <li>- Process control and decision making in information logistics</li> <li>- Information and communication systems in logistics</li> </ul> <p><u>Information Management in Logistics - Lab:</u></p> <ul style="list-style-type: none"> <li>- Project planning of information systems in logistics</li> <li>- Conceptual design based on modeling methods</li> <li>- Implementation using modeling methods</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>Information Management in Logistics:</u> Information plays a crucial role in logistics in particular. In this course, students learn the scientific and practical handling of data and information required for logistics processes and applications. Data and information serve as an important basis for decision-making in logistics. Students are taught basic logistical procedures, which are urgently needed to understand logistical systems and software. After successful completion of the course, students will be able to process information in logistics in a targeted manner in order to solve even complex logistical problems and thus achieve goals in practice.</p> <p><u>Information Management in Logistics - Lab:</u> Using systems for modeling logistical information systems, realistic scenarios are designed, modeled, and partially implemented prototypically.</p>					
<b>Literature and teaching aids</b>					
<p><u>Information Management in Logistics:</u> Lecture notes Hausladen, I (2016): IT-gestützte Logistik: Systems - Processes - Applications, Springer Gabler; edition: 3, updated &amp; expanded ed. Krcmar, H. (2015): Informationsmanagement in der Logistik, Springer Gabler; edition: 2, rev. edition Wehberg, G.: Logistik 4.0 (2015): Komplexität managen in Theorie und Praxis, Springer Gabler; edition: 1 Wager, R.: Industrie 4.0 für die Praxis (2018): Mit realen Fallbeispielen aus mittelständischen Unternehmen und vielen umsetzbaren Tipps, Springer Gabler; edition: 1</p>					

Information Management in Logistics - Lab:

Lecture notes

Hausladen, I (2016): IT-gestützte Logistik: Systems - Processes - Applications, Springer Gabler; Edition: 3, updated & expanded ed.

Krcmar, H. (2015): Informationsmanagement in der Logistik, Springer Gabler; edition: 2, rev. edition

Wehberg, G.: Logistik 4.0 (2015): Komplexität managen in Theorie und Praxis, Springer Gabler; edition: 1

Wager, R.: Industrie 4.0 für die Praxis (2018): Mit realen Fallbeispielen aus mittelständischen Unternehmen und vielen umsetzbaren Tipps, Springer Gabler; edition: 1

**LIP 15 Logistics Service Management**

<b>No:</b> LIP 15	<b>Mandatory module:</b> Logistics Service Management	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each fall term		<b>Term:</b> 3	
	<b>Prerequisites for participation:</b> General business administration knowledge, knowledge in the field of business accounting and cost and performance accounting	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
<b>Contact hours:</b> 60 hrs.		<b>Self-study hours:</b> 120 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Logistics Service Management		Prof. Dr. Ordemann		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Requirements of demand/shippers for logistics services</li> <li>- Basic interrelationships in the transport industry and logistics</li> <li>- Functions/production Systems</li> <li>- Forms of organization</li> <li>- Tariff and price structures for freight forwarders</li> <li>- Carriage company</li> <li>- Inland shipping companies and in the maritime transport industry</li> <li>- Trends and developments towards digitalization in the logistics service provider sector</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
With regard to the mode of transport (see contents), students know the essential activities/services/service provision processes of logistics service providers and a number of actors (examples) in this field.					
<b>Literature and teaching aids</b>					
<p>Lecture notes (will be provided as PDF file)</p> <p>Hölser, T (Hrsg.), Grundwissen Spedition und Logistik, Lorenz 1, 25th edition, DVV, Hamburg 2016</p> <p>Kummer, S., Einführung in die Verkehrswirtschaft, 3rd edition, UTB Verlag, Stuttgart 2018</p> <p>Kille, C., Schwemmer, M., Die Top 100 der Logistik, current edition, DVV Hamburg</p> <p>Krampe, H., Lucke, H.-J. (eds), Grundlagen der Logistik, 4th edition, Huss-Verlag, Munich 2012</p> <p>Bohlmann, B., Krupp, T. (ed.), Strategisches Management für Logistikdienstleister, DVV, Hamburg 2007</p>					

## 4. Term 4

### LIP 16 Database Systems

<b>No:</b> LIP 16	<b>Mandatory module:</b> Database Systems	<b>Language:</b> German		<b>Credit points:</b> 6
		<b>Frequency:</b> each spring term		<b>Term:</b> 4
	<b>Prerequisites for participation:</b> Basics of computer science and programming	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60+PR / PA+PR
		<b>Contact hours:</b> -- --	<b>Self-study hours:</b> -- --	
<b>Courses:</b>		<b>Module commissioner:</b>	<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Database Systems		Prof. Dr. Franke	V	2
Database Systems - Lab			L	2
This module is used for the following degree programs: LIM, LIP				
<b>Contents</b>				
<p><u>Database systems:</u></p> <ul style="list-style-type: none"> <li>- Introduction to DBS, data models</li> <li>- Modeling</li> <li>- Normalization</li> <li>- The physical model</li> <li>- SQL and database programming</li> </ul> <p><u>Database Systems - Lab:</u></p> <ul style="list-style-type: none"> <li>- Data modeling exercises</li> <li>- SQL and database application development</li> <li>- SQL and database programming</li> <li>- Handling of different database systems</li> </ul>				
<b>Learning objectives and competencies to be imparted</b>				
<p><u>Database systems:</u> Upon completion of this module, students will have a comprehensive overview of the complex field of relational database systems. In addition to the basic technologies, they additionally have an insight into future developments. Furthermore, they can subsequently handle database systems. In addition to data modeling and SQL, students are familiar with database administration and application development. After successful participation in this course, the participants will know the requirements for trading with modern SQL-based database technologies and the possibilities they offer and methods to plan and execute trading with them.</p> <p><u>Database Systems - Lab:</u> After successful participation in the course, students are able to implement a practical database project with relational databases.</p>				
<b>Literature and teaching aids</b>				
<p><u>Database Systems</u> Lecture materials and manuals, e.g. language reference in SQL Kemper, A.; Eickler (2015), A.: Database systems: Eine Einführung, 10th edition, De Gruyter Elmasri, Navathe, Fundamentals of DATABASES SYSTEM (2010), Sixth Edition, Pearson</p>				

Database Systems - Lab:

Lecture materials and manuals, e.g. language reference in SQL

Kemper, A.; Eickler (2015), A.: Database systems: Eine Einführung, 10th edition, De Gruyter

Elmasri, Navathe, Fundamentals of DATABASES SYSTEM (2010), Sixth Edition, Pearson

**LIP 17 Internal Logistics and Process Management**

<b>No:</b> LIP 17	<b>Mandatory module:</b> Internal Logistics and Process Management	<b>Language:</b> German		<b>Credit points:</b> 7	
		<b>Frequency:</b> each spring term		<b>Term:</b> 4	
	<b>Prerequisites for participation:</b> fundamentals of mathematics and business administration	<b>Workload:</b> 210 hrs.		<b>Form of examination:</b> KL60 + RE	
<b>Contact hours:</b> 70 hrs.		<b>Self-study hours:</b> 140 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
In-house Logistics and Process Management		Prof. Dr. Felsch		V+Ü	3 + 1
Logistics Laboratory				L	1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<u>In-house Logistics and Process Management:</u>					
<ul style="list-style-type: none"> <li>- Principles of internal logistics</li> <li>- Organizational structures</li> <li>- Material flow</li> <li>- Process management</li> <li>- Storage systems</li> <li>- Conveyor systems</li> <li>- Production logistics</li> <li>- Tools</li> <li>- Warehouse planning</li> <li>- Logistics controlling</li> <li>- Management of business processes and their graphical representation</li> </ul>					
<u>Logistics Laboratory:</u>					
Interdisciplinary business simulation:					
<ul style="list-style-type: none"> <li>- Optimization of logistical targets</li> <li>- Application of concrete logistics strategies</li> <li>- Strategic project planning</li> <li>- Supplier selection</li> <li>- Action-oriented reading of balance sheets</li> <li>- Cost-optimized warehouse management</li> <li>- Customer orientation, personnel management</li> <li>- Marketing mix taking into account cost aspects</li> </ul>					
optionally in English					
<b>Learning objectives and competencies to be imparted</b>					
<p>After participating in the module, students will be familiar with the central aspects of the wide-ranging field of internal logistics, i.e. from goods receipt to goods issue, taking into account the interfaces with suppliers and customers. Students will have knowledge of the major logistics components that make up material handling systems. Building on this, students master strategies for combining these components in a meaningful way to create efficient logistics systems and for how logistics systems can be optimally designed. In the context of process management, students know the organizational aspects of business processes and how to model them. This knowledge is deepened in the accompanying strongly interdisciplinary laboratory and applied in a practice-oriented manner by means of the independent development of logistics strategies. This lab is conducted in groups to additionally develop students' soft skills such as communication as well as teamwork skills. This</p>					

knowledge of internal processes provides students with a solid foundation for further modules that develop special topics in this area.

### **Literature and teaching aids**

#### In-house Logistics and Process Management:

Lecture notes

Arnold, D.: "Intralogistik: Potentiale, Perspektiven, Prognosen", Springer Verlag, Berlin (2006)

Günthner, W.; Ten Hompel, M.: "Internet der Dinge in der Intralogistik", Springer Verlag, Berlin (2010)

Jahns, C.; Schüffler, C.: "Logistik", Gabler Verlag, Wiesbaden (2009)

Jünemann, R.; Wölker, M.: "Materialfluss und Logistik", Springer Verlag, Berlin (2001)

Klaus, P.; Krieger, W.: "Gabler Lexikon Logistik", Gabler Verlag, Wiesbaden (2012), 5th, completely revised and updated edition

Martin, H.: "Transport- und Lagerlogistik", Springer Vieweg, Wiesbaden (2013), 9th edition

Ten Hompel, M.; Schmidt, T.; Nagel, L.: "Materialflusssysteme: Förder- und Lagertechnik", Springer Verlag, Berlin (2007), 3rd, completely revised edition

Becker, J.; Kugeler, M.; Rosemann, M.: "Prozessmanagement – Ein Leitfaden zur prozessorientierten Organisationsgestaltung.", 6th, updated and expanded edition, Springer Verlag, Berlin (2008)

Relevant trade journals, e.g. "Logistik für Unternehmen", Fachmagazin der internen und externen Logistik, VDI Fachmedien, Düsseldorf

#### Logistics Laboratory:

Manuals for the laboratory

Bichler, K.; Schröter, N.: "Praxisorientierte Logistik", Verlag W. Kohlhammer, Stuttgart (1995)

Holland, H.: "Mathematik im Betrieb: Praxisbezogene Einführung mit Beispielen", Springer Fachmedien, Wiesbaden (2014)

Pfohl, H.: "Logistiksysteme", Springer Verlag, Berlin (2004)



**LIP 18 External and Green Logistics**

<b>No:</b> LIP 18	<b>Mandatory module:</b> External and Green Logistics	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 4	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
	<b>Prerequisites for participation:</b> Knowledge of business administration with relation to transport	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
External and Green Logistics		Prof. Dr. Ordemann		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<p>In general, the contents of this module are related to those logistics processes from the point of view of industrial and commercial companies which interface with the suppliers and with the customers of such companies. Trends in logistics are taught, especially from the perspective of industrial and retail companies, logistics strategies/concepts in the areas of procurement and distribution logistics and contract logistics/logistics outsourcing. In addition, procedures and selected methods for analyzing processes in logistics are covered, for example, in order to improve them or to prepare competitive analyses and tenders in the area of logistics services which have to be purchased. Another focus in this module is the so-called "green logistics", where the basic physical relationships around the topic of "greenhouse effect/climate change", "carbon footprint" and the calculation of CO2 emissions in logistics are dealt with on the basis of DIN EN 16258.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>After completing the module, the students will be familiar with different variants of the logistics conception of industrial and commercial enterprises. The focus is on the logistical phases of procurement and distribution of such companies. Among them are procurement strategies, make-or-buy concepts, ECR concepts, delivery service strategies, etc. The focus is on the organization of the external logistic "channels" between suppliers, customers and industrial and trading companies. Another main topic is contract logistics or logistics outsourcing, which to a certain extent provides a common bracket or a special interface between the logistics activities of industrial and retail companies on the one hand and the (future) activities of logistics service providers on the other. Furthermore, the topics "Sustainability/Green Logistics" and calculation methods relating to the logistics phases to determine the shares of the product carbon footprint are known. In addition, students will know analysis and conceptual design methods that will be part of the tools of the trade for later logistics projects in companies.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes (will be provided as PDF file)                      Ehrmann, H., Logistik, 9th edition, Kiehl Verlag, Ludwigshafen 2017                      Pfohl, H.-Ch., Logistiksysteme, 9th edition, Springer Verlag, Berlin, Heidelberg, New York 2018                      Boutellier, R.; Locker, A., Beschaffungslogistik, Hanser-Fachbuch, Munich, Vienna 1998                      Ihde, G.B., Transport, Verkehr, Logistik, 3rd edition, Vahlen, Munich.                      Arndt, H., Supply Chain Management, 7th edition, Springer Gabler Verlag, Wiesbaden 2017                      Appelfeller, W.; Buchholz, W., Supplier Relationship Management, Springer Verlag, Wiesbaden 2011</p>					

**LIP 19 Automatable Methods for Logistics**

<b>No:</b> LIP 19	<b>Mandatory module:</b> Automatable Methods for Logistics	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 4	
	<b>Prerequisites for participation:</b> Basic knowledge of mathematics	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL90	
<b>Contact hours:</b> 56 hrs.		<b>Self-study hours:</b> 124 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Automatable Methods for Logistics		Prof. Dr. Hansmann		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Actors, goals, trade-offs and framework conditions in logistics systems</li> <li>- Classification of methods (quantitative, qualitative,...)</li> <li>- Shortest paths in networks: Dijkstra procedure, turn restrictions, earliest arrival, latest departure</li> <li>- Optimal interconnections of all/selected sites: exact and approximate methods</li> <li>- Route optimization of one or more vehicles: heuristic solution methods, consideration of time windows, preprocessing techniques</li> <li>- Site optimization: Add and drop method, method from Hakimi</li> <li>- Optimal delivery quantities and sequences</li> <li>- Loading optimization</li> <li>- Methods for stock management: optimal storage space allocations</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>This course provides students with an overview of classical and modern methods for solving logistical problems, such as those arising in route optimization, location planning, loading optimization, or warehousing. The perspectives of different actors as well as approaches for the appropriate definition and prioritization of goals in different temporal views will be addressed. Furthermore, advantages and disadvantages of qualitative and quantitative methods are discussed.</p> <p>Upon completion of this module, students will be able to model, quantitatively describe, and evaluate basic logistics tasks. They are further able to assess the possible applications of optimization tools for concrete practical examples in planning and operation. In particular, they learn to assess when problems can be solved exactly and when they can be solved approximately.</p> <p>For numerous logistical planning problems with a manageable scale, students learn to generate solutions independently by using quantitative methods, which can be used in the sense of decision support. In case a manual implementation of the methods is impossible due to the magnitude of the problem, the students are able to communicate with an IT expert regarding the logic of the method.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes, results of projects and studies carried out by lecturer</p> <p>Krumke, S. O.; Noltemeier, H. (2009): Graphentheoretische Konzepte und Algorithmen, 2nd edition, Vieweg+Teubner, Wiesbaden</p> <p>Cormen, Th. H. et al (2007): Algorithmen - Eine Einführung, 2nd edition, Oldenbourg Verlag, München</p> <p>Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Grundlagen (Band I), Shaker Verlag, Aachen</p> <p>Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Wege und Touren (Band II), Shaker Verlag, Aachen</p> <p>Domschke, W. (1996): Logistik - Standorte, 4th edition, Oldenbourg Verlag, München</p> <p>Domschke, W. (2010): Logistik - Transport, 5th edition, Oldenbourg Verlag, München</p> <p>Domschke, W. (2007): Logistik - Rundreisen und Touren, 5th edition, Oldenbourg Verlag, München</p>					



**LIP 20 Investment and Financing**

<b>No:</b> LIP 20	<b>Mandatory module:</b> Investment and Financing	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 4	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
	<b>Prerequisites for participation:</b> Introduction to Business Administration	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Investment and Financing		N. N.		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Introduction</li> <li>- Rating and Basel I, II and III</li> <li>- Overview of the business models of banks and task of the ECB with monetary international scenarios</li> <li>- Basics of financial mathematics, types of financing, finance plan, financing rules, cash flow, leverage effects</li> <li>- Investment calculation methods, leasing, ABS structures, optimal useful life and replacement time, overview of derivatives</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Students will know how companies finance their investments after taking this module. They can take into account key economic goals, such as profitability. Alternative financing, such as leasing, can be examined from a profitability perspective and analyzed internationally. Students will be able to identify financial instruments and interrelationships and explain them using practical examples. In addition, students are able to decide when investments are worthwhile. They will be able to demonstrate and assess the impact of investments on companies. All major corporate taxes are known.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes</p> <p>Wöhe, G. (2016): Allgemeine BWL, 26th edition, Vahlen, Munich.</p> <p>Perridon, L.; Steiner, M.; Rathgeber, A. (2017): Finanzwirtschaft der Unternehmung, 17th edition, Vahlen, Munich.</p> <p>Kruschwitz, L.; Husmann, S. (2012): Finanzierung und Investition, 7th edition, Oldenbourg, Munich Vienna.</p> <p>Olfert, K. (2017): Kompakt-Training Finanzierung, 9th edition, Kiehl-Verlag, Herne.</p> <p>Olfert, K. (2015): Kompakt-Training Investition, 7th edition, Kiehl-Verlag, Herne.</p> <p>Röhrich, M. (2007): Grundlagen der Investitionsrechnung, Oldenbourg, Munich Vienna.</p> <p>Bender, H. J. (2000): Kompakt-Training Leasing, Kiehl-Verlag, Herne.</p>					

## 5. Term 5

### On-the-Job Training at the Company

<b>No:</b> -	<b>Mandatory module:</b> On-the-Job Training at the Company	<b>Language:</b> German		<b>Credit points:</b> 30	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 900 hrs.		<b>Form of examination:</b> Performance is reviewed/confirmed by the company.	
<b>Contact hours:</b> 0 hrs.		<b>Self-study hours:</b> 900 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (CP)</b>
On-the-Job Training at the Company		<u>Supervisor in the company</u>		B	30
This module is used for the following degree programs: LIP, LOP					
<p><b>Contents</b></p> <p>During this practical phase, students are usually assigned to work in two or more areas/departments of their company. Often, these are departments where students could have their first professional job after graduation. These assignments serve to dovetail theory at the university with practice in the company. Students become familiar with practical business and logistics processes in the company and apply the knowledge and skills acquired in the previous course of study, including those from the business administration and logistics modules.</p> <p>In the company, in addition to day-to-day activities, students are often given smaller project tasks for which they are expected to develop concepts during the practical phase. These concepts can also be scientifically supplemented and written up as part of their thesis.</p>					
<p><b>Learning objectives and competencies to be imparted</b></p> <p>During the internship, students learn to integrate themselves into the usual work processes in a company. They apply the knowledge they have acquired in their previous studies to practice-oriented tasks.</p>					
<p><b>Literature and teaching aids</b></p> <p>None</p>					

## 6. Term 6

### LIP 21 Optimization in Logistics

<b>No:</b> LIP 21	<b>Mandatory module:</b> Optimization in Logistics	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60 + ED	
	<b>Prerequisites for participation:</b> Successful participation in previous terms	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Optimization in Logistics		Prof. Dr. Hansmann		V	2
Optimization in Logistics - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<p><u>Optimization in Logistics:</u></p> <ul style="list-style-type: none"> <li>- Offline and online optimization</li> <li>- Robust optimization</li> <li>- Resource planning in logistics: exact and heuristic methods</li> <li>- Transportation optimization: MODI methods, classical, open, single and multilevel transport problems</li> <li>- Tour optimization: Euler tours, letter carrier problems</li> <li>- Minimum cost flows in logistics networks</li> </ul> <p><u>Optimization in Logistics - Lab:</u></p> <ul style="list-style-type: none"> <li>- Implementation (in C) and application of selected optimization methods to a topic covered in the lecture</li> <li>- Use of commercial optimization tools</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>Optimization in Logistics:</u></p> <p>The students know advantages and disadvantages of different optimization approaches for planning tasks in logistics: Offline Optimization for strategic planning, Online Optimization for operations, and Robust Optimization to maintain effectiveness in the event of minor deviations from forecasted developments. After successful participation, students will be able to model logistic problems in a way that allows the use of exact or heuristic methods. They are able to select and implement adapted procedures and adequate solution methods according to the respective quality and time requirements and the available computer resources.</p> <p><u>Optimization in Logistics - Lab:</u></p> <p>Students will have the ability to implement known or self-designed solution methods in the form of console applications. They know how to use commercial optimization software to determine efficient or optimal solutions. They are thus able to contribute decisively to decision-making in logistical planning tasks.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes, results of projects and studies carried out by lecturer</p> <p>Krumke, S. O.; Noltemeier, H. (2009): Graphentheoretische Konzepte und Algorithmen, 2nd edition, Vieweg+Teubner, Wiesbaden</p> <p>Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Grundlagen (Band I), Shaker Verlag, Aachen</p> <p>Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Wege und Touren (Band II), Shaker Verlag, Aachen</p>					

Domschke, W. (2010): Logistik - Transport, 5th edition, Oldenbourg Verlag, München  
Domschke, W. (2007): Logistik - Rundreisen und Touren, 5th edition, Oldenbourg Verlag, München  
Domschke, W; Drexl, A. (2010): Einführung in Operations Research, 8th edition, Springer  
Dempe, St.; Schreier, H. (2006): Operations Research, 1st edition, Teubner  
Kallrath, J. (2012): Gemischt-ganzzahlige Optimierung in der Praxis, 2nd edition, Vieweg  
Scholl, A. (2001): Robuste Planung und Optimierung, 1st edition, Physica-Verlag

**LIP 22 IT Project Management**

<b>No:</b> LIP 22	<b>Mandatory module:</b> IT Project Management	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
		<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60 + PR / PA + PR	
	<b>Prerequisites for participation:</b> Successful participation in previous terms	<b>Contact hours:</b> 56 hrs.	<b>Self-study hours:</b> 124 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
IT Project Management		Prof. Dr. Franke		V	2
IT Project Management - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<p><u>IT Project Management:</u> Basics of planning, management, control in IT projects</p> <ul style="list-style-type: none"> <li>- Analysis of requirements and tasks</li> <li>- Effort estimation and economic efficiency</li> <li>- Process models</li> <li>- Risk management</li> <li>- Project plan creation</li> </ul> <p><u>IT Project Management - Lab:</u> Analysis of a practice-relevant task in IT projects</p> <ul style="list-style-type: none"> <li>- Implementation of procedure models</li> <li>- Proposed solutions</li> <li>- Realization approaches</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>IT Project Management:</u> Students learn to formulate the specific requirements of IT systems in such a way that technicians and IT specialists can implement them in terms of systems engineering. Furthermore, the course familiarizes students with the peculiarities of IT projects. They will learn the special techniques for implementing IT projects such as project plan creation, risk analysis, stakeholder analysis.</p> <p><u>IT Project Management Lab:</u> Students learn how to realistically implement practice-relevant IT projects based on a given scenario.</p>					
<b>Literature and teaching aids</b>					
<p><u>IT Project Management:</u> Geierhos, M (2011). IT Project Management, Galileo Computing Tiemeyer, E. (2018): Handbuch IT-Projektmanagement: Vorgehensmodelle, Managementinstrumente, Good Practices, Carl Hanser Verlag GmbH &amp; Co. KG; edition: 3, revised</p> <p><u>IT Project Management - Lab:</u> Geierhos, M. (2011): IT Project Management, Galileo Computing Tiemeyer, E. (2018): Handbuch IT-Projektmanagement: Vorgehensmodelle, Managementinstrumente, Good Practices, Carl Hanser Verlag GmbH &amp; Co. KG; edition: 3, revised</p>					





**LIP 23 Strategic Management in Logistics**

<b>No:</b> LIP 23	<b>Mandatory module:</b> Strategic Management in Logistics	<b>Language:</b> German		<b>Credit points:</b> 6	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 180 hrs.		<b>Form of examination:</b> KL60	
<b>Contact hours:</b> 56 hrs.		<b>Self-study hours:</b> 124 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Strategic Management in Logistics		Prof. Dr. Saleh		V+Ü	3 + 1
This module is used for the following degree programs: LIM, LIP, LOM, LOP					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Basic planning in the company (normative management)</li> <li>- Strategic goal setting</li> <li>- Selected techniques of environmental analysis (PEST, indicator analysis, stakeholder approach, etc.)</li> <li>- Selected techniques of company analysis (strengths/weaknesses analysis, experience curve analysis, portfolio analysis, zip code analysis, etc.)</li> <li>- Combinations of environmental and business analysis</li> <li>- Digitalization and agility</li> <li>- Strategy development and implementation</li> <li>- Case studies</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Upon completion of the module, students will be able to assess the importance of fundamental planning for a company in the logistics industry and to define and set goals. Students should be able to apply and evaluate the methods of environmental and business analysis for business management tasks. This includes incorporating the influence of digitization and the associated need for agility in the company into strategy development. The goal is to enable students to develop specific strategies based on these analyses that can be used to generate value-added potential and competitive advantages. In order to establish a practical connection to the logistics industry, case studies are used.</p>					
<b>Literature and teaching aids</b>					
<p>Bea, F.X, Haas, J. (2017): Strategisches Management, 9th ed., UVK/Lucius Verlag, Munich.  Hungenberg, H.(2014): Strategisches Management im Unternehmen, 8. Aufl. Springer Gabler Verlag, Wiesbaden.  Macharzina, K., Wolf, J.(2018): Unternehmensführung: das internationale Managementwissen: Aufl. Springer Gabler Verlag, Wiesbaden.  Welge, M.K, Al-Laham, A., Eulerich, M. (2017): Strategisches Management: Grundlagen, Prozesse, Implementierung, 7th edition, Springer Gabler Verlag, Wiesbaden.</p>					
Extensive lecture notes (will be provided as PDF files)					

**LIP 24 Specialization Module I**

<b>No:</b> LIP 24	<b>Mandatory module:</b> Specialization Module I	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> See catalog SPM	
	<b>Prerequisites for participation:</b> See catalog SPM	<b>Contact hours:</b> 84 hrs.	<b>Self-study hours:</b> 156 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Specialization Module II		See catalog SPM			6
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<b>Contents</b>					
See catalog SPM					
<b>Learning objectives and competencies to be imparted</b>					
See catalog SPM					
<b>Literature and teaching aids</b>					
See catalog SPM					

**LIP 25 Thesis**

<b>No:</b> LIP 25	<b>Mandatory module:</b> Thesis	<b>Language:</b> German		<b>Credit points:</b> 5	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
		<b>Workload:</b> 150 hrs.		<b>Form of examination:</b> SA	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 0 hrs.	<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (CP)</b>
Thesis		Supervising lecturer		B	5
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<b>Contents</b>					
<p>The specific question/task.</p> <p>The thesis can be linked to the course of study in a number of ways. The experiences or areas of responsibility during a voluntary internship can be documented and analyzed. The thesis can also be based on the contents of a course or on the evaluation of specialist literature.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Students independently work on a problem/task from their field of study within a given period of time. The topic is determined by a supervisor/examiner in consultation with the student. The previously learned principles of scientific work are thus brought to a first practical application, which also serves as preparation for the writing of the bachelor's thesis.</p>					
<b>Literature and teaching aids</b>					
<p>The supervising lecturer communicates the relevant literature and working materials in each case.</p>					

## 7. Term 7

### LIP 26 Networks and Web Applications

<b>No:</b> LIP 26	<b>Mandatory module:</b> Networks and Web Applications	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 7	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL60 + PA / KL90	
	<b>Prerequisites for participation:</b> Basic knowledge of computer science, programming and databases	<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Networks and Web Applications		Dipl.-Ing. (FH) Apel M.Sc.Eng. (LfbA)		V+Ü	3 + 1
Networks and Web Applications - Lab				L	2
This module is used for the following degree programs: LIM, LIP					
<b>Contents</b>					
<u>Networks and Web Applications:</u>					
<ul style="list-style-type: none"> <li>- Basics of data communication</li> <li>- Important protocols</li> <li>- Coding</li> <li>- Application development on the WWW</li> <li>- Theoretical presentation of the most common languages on the web</li> <li>- Creating dynamic websites with database connection</li> </ul>					
<u>Networks and Web Applications - Lab:</u>					
<ul style="list-style-type: none"> <li>- Practical application development in the WWW with client-side and server-side technologies</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<u>Networks and Web Applications:</u>					
With the content taught, students are able to grasp the fundamentals of data communication as well as its physical and logical basis. Starting with the basics of data communication, students learn how to build and develop websites using common development languages.					
<u>Networks and Web Applications - Lab:</u>					
Students will be able to create their own website according to defined specifications and will be able to analyze websites.					
<b>Literature and teaching aids</b>					
Materials and exercises by the lecturer					
<u>Networks and Web Applications:</u>					
Harald Zisler (2018): Computer-Netzwerke, 5th edition, Rheinwerk, Bonn					
Jürgen Wolf (2015): HTML 5 und CSS 3, 1st edition, Rheinwerk Verlag, Bonn					
Kai Laborenz (2015): CSS Das umfassende Handbuch, 3rd edition, Rheinwerk Verlag, Bonn					
Andreas Ertel, Kai Laborenz (2017): Responsive Webdesign, 3rd edition, Rheinwerk Verlag, Bonn					
Eric Freeman, Elisabeth Robson (2012): HTML 5 Programmierung von Kopf bis Fuß, 1st edition, O'Reilly					
Philip Ackermann (2018): Javascript: Das umfassende Handbuch. 2nd edition, Rheinwerk, Bonn					

Tobias Hauser (2019): PHP 7 und MySQL Das umfassende Handbuch, 3rd edition, Rheinwerk, Bonn

Networks and Web Applications - Lab:

Literature see above

Assignment

**LIP 27 Inventory Management**

<b>No:</b> LIP 27	<b>Mandatory module:</b> Inventory Management	<b>Language:</b> German		<b>Credit points:</b> 8		
		<b>Frequency:</b> each fall term		<b>Term:</b> 7		
	<b>Prerequisites for participation:</b> Knowledge of internal logistics	<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> PA / KL90		
		<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 150 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>	
Inventory Management and Optimization		Prof. Dr. Felsch		P	4	
Technical Systems of Inventory Management				P	2	
This module is used for the following degree programs: LIM, LIP, LOM, LOP						
<b>Contents</b>						
<u>Inventory Management and Optimization:</u>						
<ul style="list-style-type: none"> <li>- Classification in logistics, objectives of inventory management, key figures, logistic target figures, inventory management, article structuring, disposition strategies, determination of demand, lot size optimization, inventory controlling, methods for inventory optimization, picking, stocktaking</li> </ul>						
<u>Technical Systems of Inventory Management:</u>						
<ul style="list-style-type: none"> <li>- Setup of inventory management systems, graphical support of inventory management, warehouse management, kanban, simulation of inventory procedures, use of data warehousing for inventory management</li> </ul>						
<b>Learning objectives and competencies to be imparted</b>						
<p>After attentive participation in this module, students will know the importance of inventory management, which plays an essential role in the context of logistics. They know the basics of inventory management so that they can master essential components such as scheduling strategies or lot size optimization. Furthermore, they have knowledge about the procedures of picking. This knowledge forms the foundation for subsequently being able to better assess and apply common technical systems of inventory management from practice. This combination of basic knowledge and application orientation, taking into account business and technical components, enables students to independently implement essential inventory management procedures in practice.</p>						
<b>Literature and teaching aids</b>						
<u>Inventory Management and Optimization:</u>						
Lecture notes						
Arnolds, H.; Heege, F.; Tussing, W.; Röh, C.: "Materialwirtschaft und Einkauf", Gabler Verlag, Wiesbaden (2012), 12th edition						
Günther, H.; Tempelmeier, H.: "Produktion und Logistik", Springer Verlag, Berlin (2005), 6th edition						
Wannenwetsch, H.: "Integrierte Materialwirtschaft und Logistik", Springer Verlag, Berlin (2009), 4th edition						
<u>Technical Systems of Inventory Management:</u>						
Lecture notes						
Hoppe, M.: "Bestandsoptimierung mit SAP", Galileo Press, Bonn (2008), 2nd edition						
Nyhuis, P.; Wiendahl, H.: "Logistische Kennlinien", Springer Verlag, Berlin (2012), 3rd edition						
Schütte, R.; Rotthowe, T.; Holten, R.: "Data Warehouse Managementhandbuch", Springer Verlag, Berlin (2012)						
Ten Hompel, M.; Schmidt, T.: "Warehouse Management", Springer Verlag, Berlin (2010), 4th edition						

**LIP 28 Specialization Module II**

<b>No:</b> LIP 28	<b>Mandatory module:</b> Specialization Module II	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 7	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> See catalog SPM	
	<b>Prerequisites for participation:</b> See catalog SPM	<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Specialization Module I		See catalog SPM			6
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<b>Contents</b>					
See catalog SPM					
<b>Learning objectives and competencies to be imparted</b>					
See catalog SPM					
<b>Literature and teaching aids</b>					
See catalog SPM					



**LIP 29 Electives I and II**

<b>No:</b> LIP 29	<b>Mandatory module:</b> Electives I and II	<b>Language:</b> German		<b>Credit points:</b> 4	
		<b>Frequency:</b> each fall term (spring term is also possible)		<b>Term:</b> 7 (6 is also possible)	
		<b>Workload:</b> 120 hrs.		<b>Form of examination:</b> See catalog WPF	
	<b>Prerequisites for participation:</b> See catalog WPF	<b>Contact hours:</b> 60 hrs.	<b>Self-study hours:</b> 60 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Elective I		See catalog SPM			2
Elective II		See catalog SPM			2
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<b>Contents</b>					
See catalog WPF					
<b>Learning objectives and competencies to be imparted</b>					
See catalog WPF					
<b>Literature and teaching aids</b>					
See catalog WPF					

## 8. Term 8

### LIP 30 Supervised Internship

<b>No:</b> LIP 30	<b>Mandatory module:</b> Supervised Internship	<b>Language:</b> German		<b>Credit points:</b> 15	
		<b>Frequency:</b> each fall term		<b>Term:</b> 8	
		<b>Workload:</b> 450 hrs.		<b>Form of examination:</b> -	
	<b>Requirements for participation:</b> determined by examination regulations and supplementary resolutions of the examination board	<b>Contact hours:</b> 0 hrs.	<b>Self-study hours:</b> 450 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (CP)</b>
Supervised Internship		Supervising lecturer		B	15
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<p><b>Contents</b></p> <p>As a rule, the supervised internships are designed in such a way that the students work on a project at the hosting institution or receive a self-contained sub-project within this framework. In addition to a general orientation in the company / the hosting institution or the establishment of a working environment, the students spend the first weeks of their internship familiarizing themselves with their work. Normally, the actual topic for the Bachelor's thesis is derived from the problem/task posed by the hosting institution in consultation with the university supervisor.</p>					
<p><b>Learning objectives and competencies to be imparted</b></p> <p>During the internship, students learn to integrate themselves into the usual work processes in a company. In doing so, they apply the knowledge they have acquired in their previous studies in practice-oriented methods.</p>					
<p><b>Literature and teaching aids</b></p> <p>None</p>					

**LIP 31 Bachelor's Thesis and Defense**

<b>No:</b> LIP 31	<b>Mandatory module:</b> Bachelor's Thesis and Defense	<b>Language:</b> German		<b>Credit points:</b> 15	
		<b>Frequency:</b> each fall term		<b>Term:</b> 8	
		<b>Workload:</b> 450 hrs.		<b>Form of examination:</b> BA + KO	
	<b>Requirements for participation:</b> determined by examination regulations and supplementary resolutions of the examination board	<b>Contact hours:</b> 0 hrs.	<b>Self-study hours:</b> 450 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (CP)</b>
Bachelor's Thesis		Supervising lecturer		B	15
Defense				B	
This module is used for the following degree programs: LIM, LIP, LOM, LOP, MPM, WMV					
<b>Contents</b>					
<p>After the official issue of the topic by the examination board, the actual preparation of the Bachelor's thesis is a continuous process, which is usually started during the internship term (in the last third) and intensified after completion. The supervision of the internship term and the supervision of the bachelor's thesis are carried out by the same supervisor.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>With their Bachelor's thesis, students demonstrate that they are able to independently work on a problem/task from their field of study, which is formulated by a supervisor/first examiner after consultation with the student, using scientific methods and within a specified period of time. The exact procedure for this is regulated by the "Prüfungsordnung".</p>					
<b>Literature and teaching aids</b>					
The relevant literature and working materials.					

## Specialization Modules Catalog (SPM)

### SPM 1 Cooperation Management

No: SPM 1	Specialization Module: Cooperation Management	Language: German		Credit points: 8	
		Frequency: each spring term		Term: 6	
	Prerequisites for participation: General business knowledge, business administration and logistics knowledge. Knowledge of how to facilitate meetings is helpful.	Workload: 240 hrs.		Form of examination: PA+KO	
Contact hours: 84 hrs.		Self-study hours: 156 hrs.			
Courses:		Module commissioner:		Teaching and learning types:	Scope (SWS):
Cooperation Management in the Field of Logistics		Prof. Dr. Ordemann		V	2
Cooperation Management Projects				P	4
This module is used for the following degree programs: LOM, LOP, LIM, WMV, MPM					
<b>Contents</b>					
<p><u>Cooperation Management in the Field of Logistics Service Providers:</u> For many medium-sized logistics service providers, collaborations are the key to success in maintaining or increasing their competitiveness.</p> <p><u>Methods of Managing Cooperations:</u> The supply side of the logistics market in Germany is characterized on the one hand by large logistics groups and on the other by more medium-sized industry and specialists. Innovations that originated from medium-sized logistics service providers, e.g. the development of parcel service and general cargo networks in Germany, show that these companies have held their own very well against the logistics groups. The key to success here is often cooperation, i.e. well-organized collaboration between these companies. The performance of such medium-sized companies is all the more remarkable because the same companies are competitors in some of the same and, as a rule, in other logistical service areas. Since cooperative ventures are based on contractual agreements that can be terminated at any time, these contexts make it clear that designing a cooperative venture is much more difficult than, for example, the prescribed cooperation between branches of a logistics group. The aim should always be to achieve a balance of interests that results in a higher cooperation benefit for each cooperating party in the medium term than its cooperation costs (monetary and non-monetary). Due to advancing globalization and the increasing complexity of logistical services, it is not particularly surprising that even logistics groups, especially at an international level, also (have to) provide part of their range of services on the basis of such cooperation.</p> <p>However, collaborations do not arise "just by the way", e.g. merely on the basis of a few meetings by managing directors of potential cooperators who would like to cooperate. Rather, knowledge and methods are required which make it possible to identify and remove potential barriers to the formation and development of cooperation. In the lecture part of this module, therefore, the typically required functions of a cooperation, such as the development, production, distribution, etc. are examined in more detail from a cooperation point of view. Apart from the alternative of organizing such functions in cooperative systems or by oneself, possible obstacles to cooperation as well as measures to overcome them are identified.</p> <p><u>Cooperation Management Projects:</u></p>					

In this part of the module, practice-oriented business management projects are carried out by the students under the direction and participation of the instructor.

### **Learning objectives and competencies to be imparted**

After successful participation, students will be able to independently establish new collaborations, further develop existing collaborations or participate in them.

### **Literature and teaching aids**

#### Collaboration Management in the Transport Industry:

Eckstein, W. E./ Szafera, S. (1998): Prozesse und Hemmnisse der Kooperation in der Transportwirtschaft, Bremen.

Deutscher Speditions- und Logistikverband DSLV (ed.), Speditionskooperationen in Deutschland, n.p., current edition.

Wiendahl, H.-P./ Dreher, C./ Engelbrecht, A. (eds.; 2005): Erfolgreich kooperieren, Springer Verlag, Heidelberg.

Zentes, J./ Swoboda, B./ Morschett, D. (2005): Kooperationen, Allianzen und Netzwerke, 2nd revised edition, Springer Verlag, Wiesbaden

Bretzke, W.-R./ Barkawi, K., Nachhaltige Logistik, Berlin, Heidelberg 2010

Lecture notes (will be provided as PDF file)

#### Cooperation Management Projects:

Lecture notes (will be provided as PDF file)

Documents by industry partners

**SPM 2 Special Topics of the Transport Industry**

<b>No:</b> SPM 2	<b>Specialization Module:</b> Special Topics of the Transport Industry	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL90 / KL60+RE / RE	
	<b>Prerequisites for participation:</b>	<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Transport, Infrastructure and Pricing Policy		Prof. Dr. Trost		V	3+1
Current Problems of Freight Transport				S	2
This module is used for the following degree programs: LOM, LOP, LIM, MPM und WMV					
<b>Contents</b>					
<p><u>Transport, Infrastructure and Pricing Policy:</u> Current status of national and international transport policy; deregulation of transport markets and deregulation experiences; pricing policy in the transport industry for different modes of transport; transport infrastructure calculations; economic transport infrastructure planning; (private and public) financing of transport infrastructure investments and transport modes; transport externalities and internalization.</p> <p><u>Current Problems of Freight Transport:</u> Independent work on current topics from selected areas of freight transport, preferably with reference to transport, infrastructure and pricing policy. Preparation of a short, written topic paper, presentation and discussion of the results in plenary sessions. Instructor-led guidance in the selection and in the various stages of elaboration is obligatory.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>The module allows students to view the transportation sector from both a macroeconomic and business perspective. Following this module, students will be familiar with current developments in the national and international competitive framework. Deregulation experiences abroad can be critically examined and discussed by students. Students will be familiar with the problem areas of tolls/infrastructure charges, infrastructure accounting, economic transportation planning issues, and infrastructure and transportation financing issues after taking this module.</p> <p>Based on selected topics of freight transport, the students are be enabled to scientifically illuminate a given topic and to communicate the results of the analyses both in writing and in the context of a presentation. The current topics are critically discussed in plenary sessions, partial aspects are deepened, and the presented topics are evaluated. Overall, this succeeds in advancing to taxonomy level six, as this module does not only require knowledge and understanding, but also focuses on the use and application of what has been learned, as well as communication. Ultimately, even solutions can be developed.</p>					
<b>Literature and teaching aids</b>					
<p><u>Transport, Infrastructure and Pricing Policy:</u> Lecture notes (will be provided as PDF files) Aberle, G. (2009): Transportwirtschaft, 5th edition, Munich Bundesminister für Verkehr und digitale Infrastruktur (2016): Bundesverkehrswegeplan 2030, Berlin</p>					

Bundesminister für Verkehr und digitale Infrastruktur (2018): Berechnung der Wegekosten für das Bundesfernstraßennetz sowie der externen Kosten nach Maßgabe der Richtlinie 1999/62/EG für die Jahre 2018 bis 2022, Berlin

DB Netze (ed.) (2019): Das Trassenpreissystem 2020 der DB Netz AG, Frankfurt am Main

Eisenkopf, A. (2002): Effiziente Straßenbenutzungsabgaben, Theoretische Grundlagen und konzeptionelle Vorschläge für ein Infrastrukturabgabensystem, Giessener Studien zur Transportwirtschaft und Kommunikation, vol. 17, Hamburg

Grandjot, H.-H/ Bernecker, T. (2014): Verkehrspolitik – Grundlagen, Funktionen und Perspektiven für Wissenschaft und Praxis, Hamburg

Hennecke, R. (2003), Wegeausgabenorientierte Straßenbenutzungsgebühren – Wegerechnungen für das deutsche Straßennetz, Sensitivitätsanalyse und konzeptionelle Weiterentwicklungen, vol. 19, Giessener Studien zur Transportwirtschaft und Kommunikation, Hamburg

Link, H. / Dodgson, J. S. / Maibach, M. / Herry, M. (1999): The Costs of Road Infrastructure and Competition in Europe, Heidelberg – New York

Link, H./ Kalinowska, D./ Kunert, U./ Radke, S. (2009): Wegekosten und Wegekostendeckung des Straßen- und Schienenverkehrs in Deutschland im Jahre 2007, Berlin

Schade, J. (2005): Akzeptanz von Straßenbenutzungsgebühren: Entwicklung und Überprüfung eines Modells, Lengerich, Dresden

Stock, W./ Bernecker, T. (2014): Verkehrsökonomie, 2nd edition, Wiesbaden

Current Problems of Freight Transport:

Current specialist literature on the chosen topics.

**SPM 3 Airline and Airport Management**

<b>No:</b> SPM 3	<b>Specialization Module:</b> Airline and Airport Management	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
	<b>Prerequisites for participation:</b> Fundamentals of business administration	<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL90	
<b>Contact hours:</b> 90 hrs.		<b>Self-study hours:</b> 150 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Airline Management with Seminar		Prof. Dr. Cerbe		V+S	2+2
Airport Management				V+Ü	1+1
This module is used for the following degree programs: LOM, LOP, LIM, MPM und WMV					
<b>Contents</b>					
<p><u>Airline Management with Seminar:</u> The lecture covers the following topics: Market structure, strategies and business models, corporate connections, network management, route and profit accounting, marketing management, information technologies. The seminar includes a business simulation (General Airline Management Simulation by Lufthansa Consulting): Three airlines are simulated over eight scheduling periods. Participants will gain insight into airline management, route planning, aircraft deployment, marketing, yield management, fleet planning, and crew and personnel planning.</p> <p><u>Airport Management:</u> Integration of airports into the air transport system, responsibilities and services of an airport, airport as a business enterprise, planning and financing of airports, growth management, airport cooperation, intermodal transport port management.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>This module provides basic aviation knowledge. After completing the module, students have sound business knowledge using the example of airlines, airports and their interaction with other companies and organizations in the aviation industry. In a business simulation, students apply the knowledge imparted in the lectures to the task of leading an airline to entrepreneurial success and deepen their knowledge and skills. With the knowledge gained about the interdependencies and functionalities of air traffic, students will later be able to process and solve a wide variety of operational and strategic tasks in aviation companies.</p>					
<b>Literature and teaching aids</b>					
<p><u>Airline Management with Seminar:</u> Conrady, R.; Fichert, F.; Sterzenbach, R. (2019): „Luftverkehr: betriebswirtschaftliches Lehr- und Handbuch“, 6th edition, De Gruyter Oldenbourg, Munich Literature and working materials as well as competent contact persons will be presented and named during the course.</p> <p><u>Airport Management:</u> Schulz, A.; Baumann, S.; Wiedenmann S. (2010): „Flughafen Management“, Oldenbourg Verlag, München Mensen, H. (2013): Planung, Anlage und Betrieb von Flugplätzen, 2nd edition, Springer Gabler, Berlin/Heidelberg. Literature and working materials as well as competent contact persons will be presented and named during the course.</p>					





**SPM 4 Human Resources**

<b>No:</b> SPM	<b>Specialization Module:</b> Human Resources	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL90 / RE	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Human Resources		Prof. Dr. Saleh		V+Ü	3+1
Labor Law				V+Ü	1+1
This module is used for the following degree programs: LOM, LOP, LIM, WMV, MPM					
<b>Contents</b>					
<u>Human Resources</u>					
<ul style="list-style-type: none"> <li>- Foundations of human resource management</li> <li>- Organization of the personnel department</li> <li>- Personnel planning and recruitment</li> <li>- Personnel deployment and development</li> <li>- Personnel assessment and remuneration</li> <li>- Personnel management and release</li> <li>- Current developments in human resource management</li> </ul>					
<u>Labor Law</u>					
<ul style="list-style-type: none"> <li>- Labor law in the legal system</li> <li>- Establishment and termination of employment relationships</li> <li>- Rights and focal points arising from the employment relationship</li> <li>- Legal protection in labor law</li> <li>- The main features of collective labor law</li> <li>- The recruitment process</li> <li>- The employment contract</li> <li>- Special forms of the employment contract</li> <li>- Termination of the employment relationship</li> <li>- Industrial action law; the labor court procedure</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>This module teaches students the creative, planning and controlling tasks of human resources management. They will learn to distinguish between the framework functions and the core functions of HR. Students are taught the many external as well as internal influences on human resources management as well as the resulting necessary operational measures.</p> <p>Students should be able to assess and apply human resources management tasks in the overall context of the company.</p>					
<b>Literature and teaching aids</b>					
<u>Human Resources</u>					
Hentze, J. (2005): Personalwirtschaftslehre, 7th edition, UTB, Stuttgart.					
Jung, H. (2017): Personalwirtschaft, 10th edition, De Gruyter Oldenbourg, Munich					
Olfert, K. (2015): Personalwirtschaft, 16th edition, Kiehl, Herne.					
Schmeisser, W./Clermont, A., Krimohove, D.(Hrsg.) (2015): Personalführung und Organisation, Vahlen Verlag,					

Munich.

Labor Law

Richardi, R. (2019): Arbeitsgesetze ArbG, 94th edition, Beck-Texte im dtv, Munich.

Junker, A. (2019): Grundkurs Arbeitsrecht, 18th edition, C.H. Beck, Munich.

Wörlen, R. (2011): Arbeitsrecht, 10th edition, Vahlen, Munich.

Mues, W.M., Eisenbeis, E., Laber, J. (2010): Handbuch zum Kündigungsrecht, Dr. Otto Schmidt Verlag, Cologne.

Greiner, S.; Preis, U.; Rolfs, C.; Stoffels, M.; Wagner, K.J. (2015): Der Arbeitsvertrag, Dr. Otto Schmidt Verlag, Köln.

Gaul, B. (2018): Aktuelles Arbeitsrecht, Dr. Otto Schmidt Verlag, Köln.

Neue Zeitschrift Arbeitsrecht (NZA), Beck, Munich, Frankfurt a. Main.

Sowie

Extensive lecture notes (will be provided as PDF files)

**SPM 5 Business Application Systems**

<b>No:</b> SPM 5	<b>Specialization Module:</b> Business Application Systems	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> ED +PR / KL90	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 84 hrs.	<b>Self-study hours:</b> 156 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Building Blocks of Business Application Systems in Logistics		Prof. Dr. Franke		V	2
Implementation of Logistics Application Systems				L	4
This module is used for the following degree programs: LOM, LOP, LIM, WMV, MPM					
<b>Contents</b>					
<p><u>Building Blocks of Business Application Systems in Logistics:</u></p> <ul style="list-style-type: none"> <li>- Theory and implementation of different topics of logistic information and application systems</li> <li>- IT in logistics, processes in the area of transport and warehouse</li> <li>- Basics of special programming languages</li> </ul> <p><u>Implementation of Logistics Application Systems:</u></p> <ul style="list-style-type: none"> <li>- Project planning of a logistic application example</li> <li>- Implementation of the example</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>Building Blocks of Business Application Systems in Logistics:</u> After participation, students will master basic, selected business tasks of logistical information and application systems and will be able to implement them prototypically.</p> <p><u>Implementation of Logistics Application Systems:</u> Building blocks of logistical application systems are examined in more detail in order to implement them directly in software. As a result, a prototypically developed logistics application system from the areas of transportation and warehousing is created.</p>					
<b>Literature and teaching aids</b>					
<p><u>Building Blocks of Business Application Systems in Logistics:</u> Lecture notes A. Stern (2016): Keine Angst vor Microsoft Access! Datenbanken verstehen, entwerfen und entwickeln - Für Access 2007 bis 2016, O'Reilly; edition: 5 Held, B. (2016): VBA mit Access: Das umfassende Handbuch mit VBA-Lösungen für Access 2007 bis Access 2016. Inkl. Makro-Lösungen und Praxisbeispielen, Rheinwerk Computing; edition: 2 Langer, W. (2016): Access 2016: Das umfassende Handbuch. Tabellen, Formulare, Berichte, Datenbankdesign, Abfragen, Import und Export, SQL, VBA, DAO u. v. m., Rheinwerk Computing; edition: 1</p> <p><u>Implementation of Logistics Application Systems:</u> Lecture notes</p>					

A. Stern (2016): Keine Angst vor Microsoft Access! Datenbanken verstehen, entwerfen und entwickeln - Für Access 2007 bis 2016, O'Reilly; edition: 5  
Held, B. (2016): VBA mit Access: Das umfassende Handbuch mit VBA-Lösungen für Access 2007 bis Access 2016. Inkl. Makro-Lösungen und Praxisbeispielen, Rheinwerk Computing; edition 2  
Langer, W.( 2016): Access 2016: Das umfassende Handbuch. Tabellen, Formulare, Berichte, Datenbankdesign, Abfragen, Import und Export, SQL, VBA, DAO u. v. m. ,Rheinwerk Computing; edition: 1...

**SPM 6 Process Management in Logistics and Supply Chain**

<b>No:</b> SPM 6	<b>Specialization Module:</b> Process Management in Logistics and Supply Chain	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
	<b>Prerequisites for participation:</b> Fundamentals of business administration, bookkeeping and accounting, cost accounting and cost management, investment and financing	<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> RE / PA / KL60	
<b>Contact hours:</b> 90 hrs.		<b>Self-study hours:</b> 150 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Process Management in Logistics and Supply Chain		Prof. Dr. Czenskowsky		V	2
Exercises / Projects				Ü / P	4
This module is used for the following degree programs: LOM, LOP, WMV, LIM, MPM					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Introduction</li> <li>- Processes and sub-processes</li> <li>- Process management</li> <li>- Instruments for process mapping or process recording and documentation</li> <li>- Instruments for time recording in processes</li> <li>- Instruments for overhead cost control as the basis of activity-based costing</li> <li>- Activity-based costing</li> <li>- Supply chain controlling and performance measurement</li> <li>- Organizational aspects in process management</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>After participating in this module, students will be familiar with the various internal and external processes in the supply chain and logistics. They can record and document these independently and systematically using appropriate instruments. Using controlling and cost accounting methods, students are also able to independently assess processes and sub-processes from a commercial perspective and plan and control them in terms of capacities, costs and times. The challenges that arise in the organizational anchoring of process management in companies and the requirements for the use of "process owners" can be assessed and overcome.</p>					
<b>Literature and teaching aids</b>					
Lecture notes Czenskowsky, T.; Poussa, J.; Segelken, U. (2/2002): Prozessorientierte Kostenrechnung in der Logistik, in: Kostenrechnungspraxis krp 2/2002, pp. 75-86 Czenskowsky, T.; Piontek, J. (2012): Logistikcontrolling, 2nd edition, Deutscher Betriebswirte Verlag, Gernsbach Delfmann, W.; Reihlen, M. (Eds.; 2003): Controlling von Logistikprozessen, Schäffer Poeschel, Stuttgart Erlach, K. (2010): Wertstromdesign, 2nd edition, Springer, Heidelberg Gadatsch, A. (2012): Grundkurs Geschäftsprozess-Management, 7th edition, Gabler, Wiesbaden Klaus, P.; Staberhofer, F.; Rothböck, M. (Eds.; 2007): Steuerung von Supply Chains, Gabler, Wiesbaden					

Remer, D. (2005): Einführen der Prozesskostenrechnung, 2nd edition, Schäffer-Poeschel, Stuttgart.  
Richert, J. (2006): Performance Measurement in Supply Chains, Gabler, Wiesbaden  
Schick, U.; Haupt, H.; Mallon, P. u. a. (2009): Spedition und Logistikdienstleistung Leistungsprozesse, 3rd edition, Winkler's Verlag, Brunswick, Germany  
Weber, J.; Wallenburg, C. (2010): Logistik- und Supply Chain Controlling, 6th edition, Schäffer-Poeschel, Stuttgart.

**SPM 7 Optimization of Transport and Traffic**

<b>No:</b> SPM 7	<b>Specialization Module:</b> Optimization of Transport and Traffic	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each fall term		<b>Term:</b> 6	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL60+ED	
	<b>Prerequisites for participation:</b> Basics in mathematics, computer science and operations research, knowledge of the programming language C	<b>Contact hours:</b> 90 hrs.	<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Modeling and Quantitative Solutions		Prof. Dr. Hansmann		V	2
Computer-Aided Optimization				L	4
This module is used for the following degree programs: LIM (,LOM, LOP, MPM, WMV)					
<b>Contents</b>					
<p><u>Modeling and Quantitative Solutions:</u></p> <ul style="list-style-type: none"> <li>- Graph theoretical concepts</li> <li>- Paths and flows in time-expanded networks</li> <li>- Mathematical Modeling, Mixed-Integer Models</li> <li>- Preprocessing techniques for model reduction</li> <li>- Generation of models (independently or via modeling languages) for optimization by commercial solvers</li> <li>- Decomposition approaches, rolling horizon methods, greedy heuristics</li> </ul> <p><u>Computer-Aided Optimization:</u></p> <p>In the laboratory, various optimization methods are developed and tested for specific practical problems. In the process, an almost complete project cycle is simulated:          verbal problem description → model building → design of a solution procedure → implementation → program run → admissibility test of the particular solution → back transformation of the solution into user language</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>Modeling and Quantitative Solutions:</u></p> <p>Students will be familiar with concepts for modeling and solving optimization problems for transportation and traffic. They are aware of advantages and disadvantages of different solutions such as heuristic or exact approaches.</p> <p><u>Computer-Aided Optimization:</u></p> <p>After successful participation, students are able to independently implement solutions for practical problems in logistics (in the programming language C). They are capable of using modeling environments and commercial solvers for optimization, and they have gained experience in the relationships between instance size, computation time, and solution quality. With the solutions generated by their own programs, students can contribute to decision support in logistics and transportation.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes, results of projects and studies carried out by lecturer          Krumke, S. O.; Noltemeier, H. (2009): Graphentheoretische Konzepte und Algorithmen, 2nd edition,</p>					



Vieweg+Teubner, Wiesbaden

Cormen, Th. H. et al (2007): Algorithmen - Eine Einführung, 2nd edition, Oldenbourg Verlag, München

Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Grundlagen (vol. I), Shaker Verlag, Aachen

Grünert, T.; Irnich, St. (2005): Optimierung im Transport - Wege und Touren (vol. II), Shaker Verlag, Aachen

Domschke, W. (2010): Logistik - Transport, 5th edition, Oldenbourg Verlag, München

Domschke, W. (2007): Logistik - Rundreisen und Touren, 5th edition, Oldenbourg Verlag, München

**SPM 8 Applied Market Research**

<b>No:</b> SPM 8	<b>Specialization Module:</b> Applied Market Research	<b>Language:</b> German		<b>Credit points:</b> 8
		<b>Frequency:</b> each fall term		<b>Term:</b> 5
	<b>Prerequisites for participation:</b> Knowledge from the field of passenger and/or freight transport or logistics	<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> PA / RE / KL90
<b>Contact hours:</b> 90 hrs.		<b>Self-study hours:</b> 150 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>	<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Introduction to Applied Market Research		Prof. Dr. Ernst	V	2
Project			P	4
This module is used for the following degree programs: LOM, LOP, WMV, LIM, MPM				
<b>Contents</b>				
<p><u>Introduction to Applied Market Research:</u></p> <ul style="list-style-type: none"> <li>- Epistemological foundations, theory and empiricism</li> <li>- Structure and process of empirical research (concept specification, operationalization and measurement, research design and forms of investigation, sampling, data collection techniques, data preparation and analysis)</li> </ul> <p><u>Project:</u></p> <ul style="list-style-type: none"> <li>- Conversion of an entrepreneurial decision problem into market research</li> <li>- Implementation of the market research</li> <li>- Derivation of recommendations for the solution of the entrepreneurial decision problem from the results of the market research</li> </ul>				
<b>Learning objectives and competencies to be imparted</b>				
<p>After participation, students will have mastered the basics of applied market research and will be able to independently design and manage market research projects and carry them out or outsource the implementation to a service provider.</p> <p>To this end, students first learn the basics of quantitative and qualitative empirical research, which they then apply in the context of a market research project.</p>				
<b>Literature and teaching aids</b>				
<p>Schnell, R., Hill, P.B., Esser, E. (2018): Methoden der empirischen Sozialforschung, München  Meffert, H., Bruhn, M. (2018): Dienstleistungsmarketing: Grundlagen – Konzepte – Methoden, Wiesbaden  Kuß, A. (2018): Marktforschung – Datenerhebung und Datenanalyse, Wiesbaden  Bleymüller J. (2015): Statistik für Wirtschaftswissenschaftler, München  Backhaus, K., et.al. (2018): Multivariate Analysemethoden – Eine anwendungsorientierte Einführung, Heidelberg</p>				

### SPM 9 Electromobility

<b>No:</b> SPM 9	<b>Specialization Module:</b> Electromobility	<b>Language:</b> German		<b>Credit points:</b> 8
		<b>Frequency:</b> each spring term		<b>Term:</b> 6
	<b>Prerequisites for participation:</b> Basic knowledge in the field of transportation. Solidified basic knowledge of physics.	<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL60+PA
<b>Contact hours:</b> 84 hrs.		<b>Self-study hours:</b> 156 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>	<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Introduction to Electromobility		Hon. Prof. Strube	V	2
Electric Drives			V	2
Current Topics Electromobility			V+P	2
This module is used for the following degree programs: LOM, LOP, WMV, LIM, MPM				
<b>Contents</b> <ul style="list-style-type: none"> <li>- Basics</li> <li>- Drivers/motivation</li> <li>- Electric vehicle structure</li> <li>- Drive components (motors, inverters, control)</li> <li>- Vehicle types</li> <li>- Power generation/distribution/storage</li> <li>- Secondary consumers</li> <li>- Charging infrastructure and grid integration</li> <li>- Environmental impact</li> <li>- Business models</li> <li>- Outlook/challenges</li> </ul>				
<b>Learning objectives and competencies to be imparted</b> <p>The aim is to provide students with knowledge in the field of electromobility and to introduce them step by step to the necessary basics and terminology. All major components of electrically powered vehicles, as well as the most common designs, are covered. Students gain a holistic understanding of electromobility. After participation, students will have developed a sound understanding of the concepts of electromobility. The modes of operation of the drive, storage, generation and distribution components with all essential boundary conditions are part of the acquired knowledge. They understand the connections between the power grid and the charging infrastructure and are familiar with possible business models and mobility concepts. Students are put in a position to decide on possible applications in companies and to help shape business models. They also know the essential components of electrically powered vehicles.</p>				
<b>Literature and teaching aids</b> <p>Lecture notes  Öko-Institut, Optum, Ergebnisbroschüre: Umweltentlastungspotenziale von Elektrofahrzeugen -Integrierte Betrachtung von Fahrzeugnutzung und Energiewirtschaft, Berlin, 09/2011  UBA, Umweltverträglicher Verkehr 2050: Argumente für eine Mobilitätsstrategie für Deutschland, Berlin, 02/2014  BEE/InnoZ, Die neue Verkehrswelt - Mobilität im Zeichen des Überflusses: schlau organisiert, effizient, bequem und nachhaltig unterwegs, Berlin, 01/2015  Böhm, W.: Elektrische Antriebe, Würzburg, 2009</p>				

Schröder, D.: Elektrische Antriebe, Regelung von Antriebssystemen, Berlin, 2015  
Fischer, R.: Elektrische Maschinen, München, 2017

**SPM 10 Specialization in Overland Transport Technology**

No: SPM 10	Specialization Module: Specialization in Overland Transport Technology	Language: German		Credit points: 8	
		Frequency: each spring term		Term: 6	
	Prerequisites for participation: Basic knowledge of transport systems	Workload: 240 hrs.		Form of examination: KL90 / KL60+PA	
Contact hours: 84 hrs.		Self-study hours: 156 hrs.			
Courses:		Module commissioner:		Teaching and learning types:	Scope (SWS):
Specialization in Rail Transport		Prof. Dr. sc. ETH Santel		V+Ü	1+1
Specialization in Road Transport				V+Ü	3+1
This module is used for the following degree programs: LIM, LOM, LOP, MPM, WMV					
<b>Contents</b>					
<u>Specialization in Rail Transport:</u>					
<ul style="list-style-type: none"> <li>- Essential elements of the railroad system including various track technologies, alignment parameters, etc.</li> <li>- The most important securing techniques</li> <li>- Function and variants of interlockings, level crossings, the dispatching and control technology for wheel/rail systems</li> <li>- Special track guided systems</li> </ul>					
<u>Specialization in Road Transport:</u>					
<ul style="list-style-type: none"> <li>- Overview of structure, design and dimensioning of road traffic facilities</li> <li>- Relevant guidelines issued by the German Road and Transportation Research Association (FGSV)</li> </ul> <p>Topics from the following list can be studied in greater depth:</p> <ul style="list-style-type: none"> <li>- Structure of the system of interurban roads or structure and design of transport networks outside towns and within towns (cf. RIN)</li> <li>- Design of roads in site plan, elevation plan and cross section (cf. RASt, RAL and RAA)</li> <li>- Intersection shapes, basics of design methodology (cf. HBS 2015)</li> <li>- Dimensioning of junction-free sections, facilities for pedestrian traffic, bicycle traffic as well as stationary traffic.</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
After successful participation, the students master contexts, procedures and methods that enable them to technically design or/and operate components or elements in the areas of road traffic engineering or rail traffic engineering.					
<b>Literature and teaching aids</b>					
<u>Specialization in Rail Transport:</u>					
Extensive lecture notes (will be provided as PDF files)					
Documents from rail transport companies, e.g. DB AG and supply industry e.g. Siemens, Vossloh					
EU documents, e.g. „Technische Spezifikationen für die Interoperabilität (TSI)“					
Maschek, U., „Sicherung des Schienenverkehrs“, Wiesbaden 2012					
Hausmann, A./ Enders, D.; Grundlagen des Bahnbetriebs, DB-Fachbuch 2007					
Janicki, J.; Systemwissen Eisenbahn, DB-Fachbuch 2008					
Pachl, J.; Systemtechnik des Schienenverkehrs, Wiesbaden 2011					
H. Freystein, „Handbuch Entwerfen von Bahnanlagen“, Hamburg 2008					
P. Neumann, „Leit- und Sicherungstechnik im Bahnbetrieb“, Hamburg 2004					

Specialization in Road Transport:

Natzschka, H.: Straßenbau – Entwurf und Bautechnik; 3rd edition 2011; Teubner Verlag, Wiesbaden

Velske S., H. Mentlein und P. Eymann: Straßenbautechnik; 7th edition 2013; Werner Verlag, Düsseldorf

Schnabel W. and D. Lohse: Grundlagen der Straßenverkehrstechnik und der Straßenverkehrsplanung, vol. 1

Straßenverkehrstechnik; 3rd edition 2011; Beuth Verlag, Berlin/Kirschbaum Verlag, Bonn

Forschungsgesellschaft für Straßen- und Verkehrswesen (FGSV):

Handbuch für die Bemessung von Straßenverkehrsanlagen (HBS)

Richtlinien für die Standardisierung des Oberbaus von Verkehrsflächen (RStO)

Richtlinien für die Anlage von Autobahnen (RAA)

Richtlinien für die Anlage von Landstraßen (RAL)

Richtlinien für die Anlage von Stadtstraßen (RASt)

**SPM 11 Integrated Network Planning**

<b>No:</b> SPM 11	<b>Specialization Module:</b> Integrated Network Planning	<b>Language:</b> German		<b>Credit points:</b> 8	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
		<b>Workload:</b> 240 hrs.		<b>Form of examination:</b> KL60+PA	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 84 hrs.	<b>Self-study hours:</b> 156 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Integrated Network Planning		Prof. Dr. Menzel		V	2
Case Studies of Integrated Network Planning				V+Ü	1+1
Integrated Interface Planning				V+Ü	1+1
This module is used for the following degree programs: LIM, LOM, LOP, MPM, WMV					
<b>Contents</b>					
<p><u>Integrated Network Planning/Case Studies of Integrated Network Planning:</u></p> <ul style="list-style-type: none"> <li>- Theoretical background of integrated planning in the transport sector</li> <li>- Aspects of transdisciplinary planning, planning and project processes</li> <li>- Theories of individual modes of transport in the overall context</li> <li>- Complementary case studies, some of whose backgrounds are explored in depth in short field trips and exercises</li> </ul> <p><u>Integrated Interface Planning:</u></p> <ul style="list-style-type: none"> <li>- Relevance of transport links as a basis for multi- and intermodal mobility, determinants of mobility, current planning strategies, approaches and measures as well as planning tools</li> <li>- Entire range of intra- and intermodal interfaces of transport systems</li> <li>- Practical examples as a basis for discussion with regard to their respective system-technical characteristics as well as with regard to organizational aspects</li> <li>- Discussion of the mobile station concept</li> <li>- Discussion of business models and economic constraints of complex travel chains across multiple intra- and intermodal interfaces</li> <li>- Demand- or behavior-oriented interventions to promote multimodal mobility under the umbrella term of mobility management</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p><u>Integrated Network Planning/Case Studies of Integrated Network Planning:</u></p> <p>Upon successful completion of the course, students will have methodological and conceptual competencies in integrated urban, transportation, and environmental planning, as well as meta-level systems theory and its areas of application. In the lecture part, the taxonomy levels "analysis" and "synthesis" have to be achieved for the most part in order to pass with at least the grade "good". To achieve the grade 1.0 (very good), additional knowledge must be developed through independent study. To pass with a "sufficient" 4.0, the "analysis" taxonomy level must be achieved in at least core aspects of traffic. Accordingly, the exam is divided into three equal parts: "collection questions", "comprehension questions" and "transfer questions". Correct answers to the "collection questions" and at least half of the "comprehension questions" correspond to reaching the taxonomy level "analysis" in core aspects. Content transfer performances with aspects of traffic object planning and mobility management correspond to taxonomy level "assessment" and can lead to an improvement of the performance in the exam (also to a pass).</p> <p><u>Integrated Interface Planning:</u></p>					

Based on the task given, students demonstrate skills in analyzing, adapting, and reflecting on issues in integrated interface planning.

**Literature and teaching aids**

Literature and working materials as well as competent contact persons will be presented and named during the course.



## Catalog of Mandatory Elective Subjects (WPF)

### WPF 1 Practical Philosophy - erroneous paths you'd better leave to others

<b>No:</b> WPF 1	<b>Mandatory elective module:</b> Practical Philosophy - erroneous paths you'd better leave to others	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> PR	
<b>Contact hours:</b> 30 hrs.		<b>Self-study hours:</b> 30 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Practical Philosophy - erroneous paths you'd better leave to others		Prof. Dr. Ernst		S	2
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
Older structures in the human brain can lead to thinking errors when dealing with contemporary problems, which remain undetected because their perception requires special attention. The brain just does not think by itself that it sometimes does not think correctly.					
Independent work on short case studies that highlight errors in one's logic.					
<b>Learning objectives and competencies to be imparted</b>					
Students know flaws in their reasoning that lead to behavior that is not useful to them. They understand basic structures of the human brain and their influence on cognitive thinking. They analyze short case studies and reenact the unfavorable thinking patterns presented in them. They transfer these thinking patterns to their own thinking and evaluate the influence of their own thinking on their behavior.					
<b>Literature and teaching aids</b>					
Dobelli, R. (2015): Die Kunst des Klaren Denkens, 52 Denkfehler, die Sie lieber anderen überlassen, München.					
Dobelli, R. (2015): Die Kunst des klugen Handelns, 52 Irrwege, die Sie besser anderen überlassen, München.					
Kahnemann, D. (2012): Schnelles denken, langsames denken, München.					
Hessen, J. (1964): Lehrbuch der Philosophie, München					

**WPF 2 International Summer School Traffic and Infrastructure**

<b>No:</b> WPF 2	<b>Mandatory elective module:</b> International Summer School Traffic and Infrastructure	<b>Language:</b> English		<b>Credit points:</b> 2	
		<b>Frequency:</b> each summer term at changing locations		<b>Term:</b> 4 / 6	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> PA	
<b>Contact hours:</b> 28 hrs.		<b>Self-study hours:</b> 32 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Summer School with Széchenyi István University (Hungary)		Prof. sc. ETH Santel		S	2
The module is used for the following courses of study: cross-curricular					
<b>Contents</b>					
<p>In addition to input sessions to impart necessary knowledge, the focus is on working on a practical example. Field trips to the study site as well as to best-practice applications are part of the content, as is work with traffic models and simulations.</p> <p>Within one week, groups work on, document and present a traffic-related issue based on a practical example in the region.</p> <p>The summer school alternately takes place at Ostfalia University in Salzgitter and at Széchenyi István University in Győr.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Upon successful participation, students possess methodological and conceptual competencies in all areas of traffic planning starting from the superordinate level of traffic development planning up to concrete traffic object planning.</p> <p>During the summer school, students consolidate and expand their theoretical knowledge based on a practical example as well as their social skills.</p>					
<b>Literature and teaching aids</b>					
Literature and working materials as well as competent contact persons will be presented during the course.					

**WPF 3 Cost and Activity Accounting Goods Transport Land/Sea**

<b>No:</b> WPF 3	<b>Mandatory elective module:</b> Cost and Activity Accounting Goods Transport Land/Sea	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each spring term		<b>Term:</b> 6	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> KL60 / PR / RE / HA	
<b>Contact hours:</b> 28 hrs.		<b>Self-study hours:</b> 32 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Cost and Activity Accounting Goods Transport Land/Sea		Prof. Dr. Ordemann		V+Ü	1+1
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
<p>In addition to the content taught in various transport and logistics courses and the course "Cost Accounting and Cost Management", this elective deals with a more in-depth and specialized study of cost and activity accounting, including price calculation. The focus of this course will be the establishment of cost and activity accounting in the area of truck transports as well as container maritime transports.</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>The students are able to develop a cost and activity accounting in the mentioned area (see contents) in corresponding companies.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes (will be provided as PDF file)                  Kerler, S. W., Fit für den Preiskampf, 2nd edition, Munich.                  Wittenbrink, P, Transportmanagement, 2nd edition, Wiesbaden.                  Eberhardt, M., Egger, N., Weckbach, N., Rechnungswesen – Spedition und Logistikleistung, 17th edition Braunschweig 2017                  Drewry Maritime Research (ed.), Ship Operating Costs Annual Review and Forecast, Annual Report, op. cit, latest ed.                  Schönknecht, A.: Maritime Containerlogistik, Heidelberg 2009                  Ordemann, F., Szenario für eine Seehafenkooperation im Bereich des Containerverkehrs, ed. by WWF-Deutschland, Berlin 2013                  Ordemann, F., Kooperation der deutschen Containerseehäfen -hat eine größere Wirkung als Flussvertiefungen, Salzgitter 2015</p>					

**WPF 4 Current Issues in the Maritime and Seaport Industries**

<b>No:</b> WPF 4	<b>Mandatory elective module:</b> Current Issues in the Maritime and Seaport Industries	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each fall term		<b>Term:</b> 5	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> KL60 / PR / RE / HA	
<b>Contact hours:</b> 30 hrs.		<b>Self-study hours:</b> 30 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Current Issues in the Maritime and Seaport Industries		Prof. Dr. Ordemann		V+Ü	1+1
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
<p>The maritime industry is a dynamically developing transport market segment. Changes range from parts of the market regime, such as the softening and eventual abolition of shipping conferences in 2008, to procedural changes, such as the introduction of blockchain technology, for which well-known shipping companies are pioneering logistics. Accordingly, special topics are permanently offered, which are treated here and which represent a supplement to a part of the compulsory module "Logistics Service Management". Similarly, the seaport industry must adapt to the changes taking place in the maritime sector. The importance of the German seaports in the context of their competitors and their position worldwide, the factors influencing seaport competition, and the diversity of the typical logistics service providers operating at the seaport location are taught.</p>					
<b>Learning objectives and competencies to be imparted</b>					
Students have structural knowledge and current knowledge of the maritime and seaport industries.					
<b>Literature and teaching aids</b>					
<p>Lecture notes (will be provided as PDF file)  Hölser, T (Hrsg.), Grundwissen Spedition und Logistik, Lorenz 1, 25th edition, DVV, Hamburg 2016  Schönknecht, A.: Maritime Containerlogistik, Heidelberg 2009  Ordemann, F., Szenario für eine Seehafenkooperation im Bereich des Containerverkehrs, ed. by WWF-Deutschland, Berlin 2013  Ordemann, F., Kooperation der deutschen Containerseehäfen -hat eine größere Wirkung als Flussvertiefungen, Salzgitter 2015</p>					

**WPF 5 Introduction to SAP**

<b>No:</b> WPF 5	<b>Mandatory elective module:</b> Introduction to SAP	<b>Language:</b> German		<b>Credit points:</b> 2
		<b>Frequency:</b> each fall and spring term		<b>Term:</b> 5 / 6 / 7
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> KL60
<b>Contact hours:</b> 00/001		<b>Self-study hours:</b> 00/001		
<b>Courses:</b>		<b>Module commissioner:</b>	<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Introduction to SAP		Prof. Dr. Brey	V+L	1+1
The module is used for the following courses of study: cross-curricular				
<b>Learning objectives and competencies to be imparted</b>				
<p>After participation, students master the principle transaction-oriented business process modeling and processing within the SAP ERP system. To this end, students are taught how ERP systems work and how they are structured, using the SAP Business Suite as an example. Business processes specified in case studies are implemented and analyzed in SAP.</p> <p>In this way, the students will gain the knowledge they need to understand how SAP works and to work with the system in a company later on.</p>				
<b>Contents</b>				
<ul style="list-style-type: none"> <li>- Theoretical basics of the SAP ERP architecture</li> <li>- General operation of the SAP GUI</li> <li>- Mapping of business structures in SAP</li> <li>- Interactive representation of business processes and their integration using the example of the SAP model companies IDES and/or GBI</li> </ul>				
<b>Literature and teaching aids</b>				
<p>Lecture notes and manuals                  Fallstudien im Rahmen des University Alliances Program der SAP AG                  Frick et. al : Grundkurs SAP ERP, vieweg, 1st edition 2008                  Benz/ Höflinger : Logistikprozesse mit SAP, vieweg + Teubner, 2nd edition 2008</p>				

**WPF 6 Practical Modeling and Robot Programming**

<b>No:</b> WPF 6	<b>Mandatory elective module:</b> Practical Modeling and Robot Programming	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each fall and spring term		<b>Term:</b> from the 3rd term onwards	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> KL30 / PR / RE / PA	
<b>Contact hours:</b> 30/28 hrs.		<b>Self-study hours:</b> 30/32 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Practical Modeling and Robot Programming		Prof. Dr. Brey		V+Ü	1+1
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
<p>Theory:</p> <ul style="list-style-type: none"> <li>- Object-oriented programming</li> <li>- General information about object orientation</li> <li>- Basic structures of OOP</li> <li>- Variables and methods</li> <li>- Expressions, statements and blocks</li> <li>- Control structures</li> <li>- Interfaces</li> </ul> <p>Laboratory:</p> <ul style="list-style-type: none"> <li>- Modeling</li> <li>- Programming in general</li> <li>- Robotics programming</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>The goal is to impart competencies in the field of model building by practically translating real-world issues into adequate computer models in standard environments (operating system: Linux, programming language: JAVA, Python, etc.).</p> <p>Students deepen their knowledge acquired in "Introduction to Computer Science" using practical examples (including the LEGO MINDSTORMS EV3 system) and learn how to program sensors and actuators.</p> <p>After successful participation, students can understand mathematical methods of digital signal processing, create their own programs and design basic algorithms for controlling robot systems.</p>					
<b>Literature and teaching aids</b>					
<p>Lecture notes</p> <p>Maximilian Schöbel, Thorsten Leimbach, Beate Jost: Roberta - EV3 Programmieren mit Java - Lernen mit Robotern. Fraunhofer Verlag 2015</p> <p>Various JAVA textbooks</p>					

**WPF 7 Management of Working Time**

<b>No:</b> WPF 7	<b>Mandatory elective module:</b> Management of Working Time	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each fall and spring term		<b>Term:</b> 4 / 5 / 6 / 7	
		<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> RE / HA	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 30/28 hrs.	<b>Self-study hours:</b> 30/32 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Management of Working Time		Prof. Dr. Ernst		S	1+1
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
<u>Work Time Management:</u>					
<ul style="list-style-type: none"> <li>- Legal system (Working Hours Act, collective agreements, company agreements)</li> <li>- Basic pattern of work time organization</li> <li>- Trends towards flexibility</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
The students recognize the strategies and flexible processes of personnel responsibility as a target for real innovation and learn to implement them especially in companies of the transportation sector.					
Knowledge of the relevant economic and legal framework.					
Knowledge of current work schedule models including basic patterns.					
Competence to develop models that are appropriate to the subject matter and interests.					
<b>Literature and teaching aids</b>					
Hellert, U. (2018): Arbeitszeitmodelle der Zukunft. Arbeitszeiten flexibel und attraktiv gestalten, 2nd edition, Freiburg/Munich/Stuttgart					
Hoff, A. (2015): Gestaltung betrieblicher Arbeitszeitsysteme. Ein Überblick für die Praxis, Wiesbaden					
Pletke, M./Schrader, P./Siebert, J. et al (2017): Rechtshandbuch Flexible Arbeit. Flexible Beschäftigungsverhältnisse, Personalanpassung, Vergütungssysteme, Arbeitszeitmodelle, Aufgabenänderung, München					
Reh, D. A./Kilz, G. (1996): Die Neugestaltung der Arbeitszeit als Gegenstand des betrieblichen Innovationsmanagements, 1st edition, Baden-Baden.					
Reh, D. A./Kilz, G. (1996): Innovative Arbeitszeitsysteme nach dem neuen Arbeitszeitrecht, Berlin					
Schaub, G. (2017): Arbeitsrechts-Handbuch. Systematische Darstellung und Nachschlagewerk für die Praxis, 17th edition, Munich					

**WPF 8 Management of Non-Profit Organizations**

<b>No:</b> WPF 8	<b>Mandatory elective module:</b> Management of Non-Profit Organizations	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each spring term		<b>Term:</b> 4 / 6	
	<b>Prerequisites for participation:</b> none	<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> RE / HA	
<b>Contact hours:</b> 28 hrs.		<b>Self-study hours:</b> 32 hrs.			
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Management of Non-Profit Organizations		Prof. Dr. Ernst		S	1+1
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
<ul style="list-style-type: none"> <li>- Legal system (European social law, SGB I-XII)</li> <li>- Basic pattern of the social system</li> <li>- Management approaches</li> </ul>					
<b>Learning objectives and competencies to be imparted</b>					
<p>Students will learn about the unique structures of the non-profit sector. At the same time, the relevance of the logics that apply there should also be recognized for profit organizations. In particular, students should be able to transfer approaches of NPO management to the profit sector, such as corporate health management, corporate culture.</p> <p>Knowledge of the relevant economic, social and legal framework.  Knowledge of current concepts of management of NPOs.  Competence to develop appropriate management strategies to achieve organizational goals.</p>					
<b>Literature and teaching aids</b>					
<p>Arnold, U./Grunwald, K./Maelicke, B., eds. (2014): Lehrbuch der Sozialwirtschaft, 4th edition, Baden-Baden  Decker, F. (1997): Das große Handbuch Management für soziale Institutionen, Landsberg/Lech  Halfar, B. (1999): Finanzierung sozialer Dienste und Einrichtungen, Baden-Baden  Haller, S. (2017): Dienstleistungsmanagement: Grundlagen, Konzepte, Instrumente, 7th edition, Wiesbaden  Reh, D. A./Kilz, G. (1997): Der Weg in die Teilzeitgesellschaft, Berlin  Reh, D. A./Kilz, G. (1997): Einführung in die Telearbeit, Berlin  Schauhoff, S./Bott, H. (2010): Handbuch der Gemeinnützigkeit: Verein, Stiftung, GmbH; Recht, Steuern, Personal, 3rd edition, Munich  Simsa, R./Meyer, M./Badelt, C., Hrsg. (2013): Handbuch der Nonprofit-Organisation: Strukturen und Management, 5th edition, Stuttgart  Simsa, R. (2016): Leadership in Non-Profit-Organisationen: Die Kunst der Führung ohne Profitdenken, 2nd edition, Wiley,  Stöger, R./Salcher, M. (2006): NPOs erfolgreich führen: Handbuch für Nonprofit-Organisationen in Deutschland, Österreich und der Schweiz, Stuttgart  Wöhe, G./Döring, U./Brösel, G. (2016): Einführung in die Allgemeine Betriebswirtschaftslehre, 26th edition, Munich</p>					



**WPF 9 Rail Transport in Practice**

<b>No:</b> WPF 9	<b>Mandatory module:</b> Rail Transport in Practice	<b>Language:</b> German		<b>Credit points:</b> 2	
		<b>Frequency:</b> each spring term		<b>Term:</b> from the 4th Term	
		<b>Workload:</b> 60 hrs.		<b>Form of examination:</b> KL30	
	<b>Prerequisites for participation:</b> none	<b>Contact hours:</b> 28 hrs.	<b>Self-study hours:</b> 32 hrs.		
<b>Courses:</b>		<b>Module commissioner:</b>		<b>Teaching and learning types:</b>	<b>Scope (SWS):</b>
Rail Transport in Practice		Prof. Dr. Santel		S	2
This module is used for the following degree programs: cross-curricular					
<b>Contents</b>					
<p>After some basic introductory lectures: visits to railroad companies in Lower Saxony, experts for railroad technology, system house Siemens, etc., including a two-day seminar "Railway Experience Days" in BS (ER.bahn-consulting GmbH) with two short theory blocks on railroad systems and vehicle technologies and subsequent practical activities, e.g. in signal boxes, on the traction unit or when coupling wagon trains</p>					
<b>Learning objectives and competencies to be imparted</b>					
<p>This module provides an in-depth look at the day-to-day practice of rail transportation for interested students from transportation and logistics programs. In addition to the transfer of knowledge in terms of content, contacts in the rail industry are made, which can be important for the students' further careers. Direct exchange with players on the ground paints the real picture of this industry.</p>					
<b>Literature and teaching aids</b>					
<p>Janicki, Jürgen (2016): "Systemwissen Eisenbahn", DB-Fachbuch, Bahn-Fachverlag, ISBN 978-3-943214-15-4          Janicki, Jürgen; Reinhard, Horst (2008): „Schienenfahrzeugtechnik“, DB-Fachbuch, Bahn-Fachverlag, ISBN 978-3-9808002-5-9          Jänsch, Eberhard (Ed.) (2016): „Handbuch: Das System Bahn“, Eurailpress, ISBN 978-3-87154-511-5          Lichtberger, Bernhard (2010): „Handbuch Gleis: Unterbau, Oberbau, Instandhaltung, Wirtschaftlichkeit“, Eurailpress, ISBN 978-3-7771-0400-3          Janicki, J. (2002): „Fahrzeugtechnik - Triebfahrzeuge“, Heidelberg          Breuer, B. (2006): „Bremsenhandbuch - Grundlagen, Komponenten, Systeme, Fahrdynamik“, Wiesbaden          IVE, Universität Hannover (Hrsg.) (2006) „Handbuch Dynamis – Fahrdynamische Berechnungen beliebiger Zugkonfigurationen“, Hannover          Wende, D. (2003), "Fahrdynamik des Schienenverkehrs", Stuttgart</p>					

