Module catalogue
"Information Technology and Management" Master

as of: 19th April 2015

Module 1: Communication Systems I

Study course:	Information Technology and Management
Name of module (German):	Nachrichtenübertragung I
Name of module (English):	Communication Systems I
Abbreviation:	CS I
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. A. Ahrens
Lecturer:	Prof. Dr.-Ing. habil. A. Ahrens
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of electrical engineering, grounded knowledge of signal and system theory, knowledge of communications, basic knowledge of numerical mathematics
Learning objectives / Skills:	Basic knowledge of the transmission of digital signals via disturbed channels; analysis and design of system components, evaluation of useful and interference signals
Contents:	• Basic principles of information theory • Basic principles of communication systems, development and components of communication systems • Baseband digital transmission, error rate and signal-to-noise ratio
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Goldsmith, A.: Wireless Communications. New York: Cambridge, 2005 🕮 Öberg, T.: Modulation, Detection and Coding. Chichester: Wiley, 2001 🕮 Proakis, J. G.: Digital communications. Boston: McGraw-Hill, 2000 🕮 Kammeyer, K. D. : Nachrichtenübertragung. Wiesbaden: Teubner+Vieweg, 2008 🕮 Kammeyer, K. D.; Kühn, V.: MATLAB in der Nachrichtentechnik. Weil der Stadt: J. Schlembach Fachverlag, 2002 🕮 Lindner, J.: Informationsübertragung. Berlin, Heidelberg:

	Springer, 2004 📖 Pätzold, M.: Mobilfunkkanäle. Braunschweig, Wiesbaden: Vieweg, 1999 📖 Haykin, S.; Moher, M.: Modern Wireless Communications. New Jersey: Pearson Prentice Hall, 2005 📖 Haykin, S.; Moher, M.: Communication Systems. Chichester: Wiley, 2010 📖 Ziemer, R.E.; Tranter, W. H.: Principles of Communications: Systems, Modulation and Noise. Chichester: Wiley, 2010

Module 2: Economics for Engineers

Study course:	Information Technology and Management
Name of module (German):	Betriebswirtschaft für Ingenieure
Name of module (English):	Economics for Engineers
Abbreviation:	BWL
Semesters:	1 semester
Person responsible for module:	Prof. Dr. O. Bassus
Lecturer:	Prof. Dr. O. Bassus
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	keine
Learning objectives / Skills:	The students to become familiar with the generally recognised and practically applicable principles of modern management economics. They are able to analyse companies from a macroeconomic perspective, systemise based on characteristics (legal forms, size, factor input and similar) and derive fundamental conclusions for company management. The students will be familiar with the interrelationships of the performance and financial cycle and be able to analyse and critically assess the effects of changes occurring in the cycle to the balance sheet and the income statement, while drawing consequences for management decisions. The students will possess the skills to logically justify both conclusions to be derived and suggestions for management decisions, while presenting them in a convincing manner. They will have the ability to independently design further learning processes based on this introductory module. Furthermore, they will be aware that management also includes an element of ethical/social responsibility.
Contents:	Macroeconomic analysis of a company, structuring the BWL by industry, factor theory, function theory, management science and meta/cross-section function theory, fundamental relationships of the performance

	and financial cycle in a company • Framework components of company business • Cycle model principles, balance sheet, income statement • Performance processes and financial management • Strategy and social responsibility
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Paul, Joachim: Praxisorientierte Einführung in die Allgemeine Betriebswirtschaftslehre. Springer Gabler 2015 🕮 Opresnic, M.O., Rennhack, K: Allgemeine Betriebswirtschaftslehre, Springer Gabler 2015 🕮 Wöhe, Einführung in die Allgemeine BWLVahlen 2013 🕮 Härdler, Jürgen: Economics for Engineers, Hanser 2012

Module 3: Accountancy for Engineers

Study course:	Information Technology and Management
Name of module (German):	Rechnungswesen für Ingenieure
Name of module (English):	Accounting for Engineers
Abbreviation:	RW
Semesters:	1 semester
Person responsible for module:	Prof. Dr. O. Bassus
Lecturer:	Prof. Dr. O. Bassus
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	none
Learning objectives / Skills:	The students to be familiar with the basic relationships of financial accounting, account balancing and cost and management accounting. In addition to communicating the general principles, the aim here is to enhance the expertise of the students with regard to their core commercial competence in external and internal accounting. Their ability to recognise the function of external and internal accounting for the entire company and its stakeholder groups is supported by a large number of case studies.
Contents:	Recordkeeping, accounting (balance sheet), management accounting Principles of financial accounting • Basic concepts of external accounting • Principles of balance-sheet policy • Cost recording and cost allocation • Contribution margin accounting

	• Costing (calculation) • Standard costing • Operating income statement
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Eisele, W.: Technik des betrieblichen Rechnungswesens, Vahlen 2015 🕮 Fließ, S. Kosten und Leistungsrechnung, Beck 2015 🕮 Wöhe, G./Kussmaul.H.: Grundzüge der Buchführung und Bilanztechnik, Verlag Vahlen, 8th edition 2012

Module 4: Channel Coding and Cryptography

Study course:	Information Technology and Management
Name of module (German):	Kanalcodierung und Kryptographie
Name of module (English):	Channel Coding and Cryptography
Abbreviation:	CC
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. A. Ahrens
Lecturer:	Prof. Dr.-Ing. habil. A. Ahrens
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of numerical mathematics and communication technology
Learning objectives / Skills:	Basic knowledge on the effectiveness and application possibilities of processes designed to increase the security in communication channels and in modern communication networks
Contents:	• Basic principles of information theory • Linear block codes • Convolutional codes • Channel coding quality • Code chaining, interleaving • Basic encryption methods • Encryption in today's communication networks
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Friedrichstr. Kanalcodierung - Grundlagen und Anwendungen in Kommunikationssystemen. Berlin: Springer, 1995 🕮 Goldsmith, A.: Wireless Communications. New York:

	Cambridge, 2005 📖 Richardson, T.; Urbanke, R.: Modern Coding Theory. New York: Cambridge, 2008 📖 Öberg, T.: Modulation, Detection and Coding. Chichester: Wiley, 2001 📖 Schneider-Obermann, H.: Kanalcodierung - Theorie und Praxis fehlerkorrigierender Codes. Braunschweig/Wiesbaden: Vieweg, 1998 📖 Kühn, V.: Wireless Communications over MIMO Channels - Applications to CDMA and Multiple Antenna Systems, Wiley, Chichester, 2006 📖 Proakis, J. G.: Digital communications. Boston: McGraw-Hill, 2000 📖 Mollin, R.A.: RSA and Public-Key Cryptography. Boca Raton, London, New York: CRC Press, 2003. 📖 Paar, C.; Pelzl, J.: Understanding Cryptography: Textbook for Students and Practitioners. Berlin, Heidelberg: Springer, 2009. 📖 Delfs, H., Knebl, H.: Introduction to Cryptography. Principles and Applications. Berlin, Heidelberg: Springer, 2002.

Module 5: Communication Technology

Study course:	Information Technology and Management
Name of module (German):	Kommunikationstechnik
Name of module (English):	Communications Technology
Abbreviation:	KT
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. S. Lochmann
Lecturer:	Prof. Dr.-Ing. habil. S. Lochmann
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of numerical mathematics and the structure of computers
Learning objectives / Skills:	The ability to analyse communication protocols and their classification in reference models; the ability to analyse computer networks and their components
Contents:	• Network topologies • Ethernet, technology and protocols • TCPIP protocol family, routing, troubleshooting • RIP protocol • DSL transmission • PPPoE transmission protocol

Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Badach, A.; Hoffmann, E.: Technik der IP-Netze; Hanser-Verlag 2015 🕮 Stehle, W.: Digitale Netze: Grundlagen – Protokolle – Anwendungen. Schlembach-Verlag, Weil 2001 🕮 Siegmund, G.: Technik der Netze. Huethig – Verlag, Heidelberg 1999 🕮 Lienemann, G.: TCP/IP-Grundlagen: Protokolle und Routing. Heise-Verlag, Hannover 2003

Module 6: Communication Systems II

Study course:	Information Technology and Management
Name of module (German):	Nachrichtenübertragung II
Name of module (English):	Communication Systems I
Abbreviation:	CS II
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. A. Ahrens
Lecturer:	Prof. Dr.-Ing. habil. A. Ahrens
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Knowledge of communications
Learning objectives / Skills:	• Basic knowledge of the analysis and design of system components for data transmission via disturbed channels
Contents:	• Linear and non-linear modulation methods • Characteristics of transmission channels • Receiver optimisation of channels with multipath propagation
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Goldsmith, A.: Wireless Communications. New York: Cambridge, 2005 🕮 Öberg, T.: Modulation, Detection and Coding. Chichester: Wiley, 2001 🕮 Proakis, J. G.: Digital communications. Boston: McGraw-Hill, 2000 🕮 Kammeyer, K. D. : Nachrichtenübertragung. Wiesbaden: Teubner+Vieweg, 2008 🕮 Kammeyer, K. D.; Kühn, V.: MATLAB in der

	Nachrichtentechnik. Weil der Stadt: J. Schlembach Fachverlag, 2002 🕮 Lindner, J.: Informationsübertragung. Berlin, Heidelberg: Springer, 2004 🕮 Pätzold, M.: Mobilfunkkanäle. Braunschweig, Wiesbaden: Vieweg, 1999 🕮 Haykin, S.; Moher, M.: Modern Wireless Communications. New Jersey: Pearson Prentice Hall, 2005 🕮 Haykin, S.; Moher, M.: Communication Systems. Chichester: Wiley, 2010 🕮 Ziemer, R.E.; Tranter, W. H.: Principles of Communications: Systems, Modulation and Noise. Chichester: Wiley, 2010

Module 7: Network Security and Management

Study course:	Information Technology and Management
Name of module (German):	Netzwerksicherheit und Management
Name of module (English):	Network Security and Management
Abbreviation:	NSM
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. E. Jonas
Lecturer:	Prof. Dr.-Ing. E. Jonas
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of informatics, mathematics, operating systems, communication technology
Learning objectives / Skills:	• Acquiring the knowledge of the development, structure and functionality of computer networks • Ability to evaluate the security architecture of networked computer systems • Ability to evaluate attack mechanisms and security-relevant aspects of networked computer systems • Ability to understand and assess mechanisms and strategies to increase the securities of computer networks • Ability to manage security-specific mechanisms in computer networks
Contents:	• Motivation and OSI security architecture, • Security engineering: procedure model, security problems, threats • Cryptology, symmetrical and asymmetrical cryptosystems and processes

	• Cryptographic hash functions (MD4/5, Wirpool) • Security measures • WLAN security • Complex security mechanisms (IPSec, SSL/TSL, ssh) • Firewall systems
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Claudia Eckert: IT-Sicherheit, 5. Auflage, Oldenbourg-Verlag, 2007 🕮 Helmar Gerloni, Barbara Oberhaitzinger, Helmut Reiser, Jürgen Plate: Praxisbuch Sicherheit für Linux-Server und –Netze, Hanser-Verlage, 2004 🕮 Charles P. Pfleeger, Sharie L. Pfleeger: Security in Computing, Pearson 2006/2008 🕮 Simson Garfikel, Gene Spafford: Practical UNIX & Security, O'Reilly, 2003 🕮 Seymour Bosworth, M. E. Kabay: Computer Security Handbook, John Willey & Sons, 2003 🕮 Bruce Schneider: Angewandte Kryptographie, Pearson Studium, 2005 🕮 Charly Kaufman, Radia Perlman, Mike Speciner: Network Security, Prentice Hall, 2002 🕮 Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman: Building Internet Firewalls, O'Reilly, 2002 🕮 Martin Kappes: Netzwerk- und Datensicherheit, Eine praktische Einführung, Springer Vieweg, 2013

Module 8: Investment and Financing

Study course:	Information Technology and Management
Name of module (German):	Investition und Finanzierung
Name of module (English):	Investment and Financing
Abbreviation:	IUF
Semesters:	1 semester
Person responsible for module:	Prof. Dr. O. Bassus, Prof. Dr.-Ing. habil. A. Ahrens
Lecturer:	Prof. Dr. O. Bassus, Prof. Dr.-Ing. habil. A. Ahrens
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	none
Learning objectives / Skills:	The students become familiar with the interrelationships of investment

	and financing; they are able to assess interactions between this areas. They know the organisational requirements for the safeguarding of investment planning and are able to classify the investment calculation into planning, oversight and control relationships. They recognise relationships/interactions between the investment calculation and other established corporate accounting, and are sensitised for possible sources of error. The students are able to select suitable investment calculation processes against the background of the type/importance of investments as well as of the corporate objectives pursued, and apply to concrete decision-making cases. They are able to precisely determine the informative value of the results against the backdrop of the theoretical background of the assessment procedure used. The students become familiar with the central elements of corporate finance and are able to calculate the capital requirements of a company as well as assess its influencing factors in an interdisciplinary manner and on a scientific basis. They are able to formulate the possibilities of meeting these capital requirements by the use of classical and modern financial instruments. The students acquire skills enabling them to structure a company' financing on a modern basis. They are able to argumentatively demonstrate modern financing concepts according to the situation – both internally and externally.
Contents:	Investment calculation, corporate financing • Investment planning and financial management of the company • Static investment calculation methods • Dynamic investment calculation methods • Performing calculations • Informative value of the results against the background of theoretical model assumptions and differences of the assessment in theory and practice • Multi-dimensional evaluation of investment activities and projects • Calculating present values • Calculating yields and effective interest rates • Internal financing • External financing • Capital requirements and capital requirements calculation, including financial planning
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Becker, H.-P. Investition und Finanzierung, Springer Gabler 2013 🕮 Bleis, Ch. Grundlagen Investition und Finanzierung, Oldenbourg 2011

Module 9: Business Simulation

Study course:	Information Technology and Management
Name of module (German):	Unternehmensplanspiel
Name of module (English):	Business Simulation
Abbreviation:	BS
Semesters:	1 semester

Person responsible for module:	Prof. Dr. O. Bassus
Lecturer:	Prof. Dr. O. Bassus
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues; simulation, the organisation of the teamwork ensues in small groups (3 to 4 students)
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	none
Learning objectives / Skills:	The students link the contents communicated in the previous economics modules into a holistic company management concept. The students independently create tools for the integrated business planning (in MS-Excel, for example). The management decision-making ensues in small groups (max. 5 participants), the task distribution within the team and the coordination of interdependent decisions develops both the ability to work in a team and communication skills, while the actions taken at a competitive level also develop the ability for entrepreneurial thinking and operating.
Contents:	Open PC-based general management simulation, development of a target system, corporate strategy, business planning and control. • Running an industrial enterprise (as a team) on a competitive basis • Operative, tactical and strategic corporate planning • Decision-making in the areas of: marketing, production, logistics and financing • Results analysis, development of a controlling system • Optimisation of subdivisions using OR instruments • Development of an Excel-based integrated corporate planning • Documentation of quarterly planning and analyses • Producing an annual report (financial statement)
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Böttcher, Tido LUDUS Entscheidungsfeld, Books on Demand 🕮 Böttcher, Tido, LUDUS, Ergebnisrechnung, Books on Demand 🕮 Handbuch LUDUS, Aktuelles Skript

Module 10: Database Systems in Business Environments

Study course:	Information Technology and Management
Name of module (German):	Datenbanksysteme im betriebswirtschaftlichen Umfeld
Name of module (English):	Database Systems in Business Environments
Abbreviation:	DBSys

Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. A. Raab-Düsterhöft
Lecturer:	Prof. Dr.-Ing. A. Raab-Düsterhöft
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of economics, mathematics, informatics, programming
Learning objectives / Skills:	• Familiarisation with the application areas of relational database systems in business environments • Ability to efficiently design relational databases • Ability to formulate complex SQL queries • Acquiring basic DBMS administration skills • Acquiring basic knowledge of the concepts: data warehouse, OLAP, business intelligence
Contents:	• Fundamentals, principles, architectures and applications of relational databases in business environments • Data modelling and database designs • SQL and database programming • Overview of the concepts: data warehouse, OLAP, business intelligence • Practical exercises with the relational DBMS PostgreSQL and Oracle
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Kemper , A. Eickler: Datenbanksysteme – Eine Einführung, 7th edition. Oldenbourg Verlag, 2009 🕮 R. A. Elmasr, S. B. Navathe: Grundlagen von Datenbanksystemen, 3rd edition, Pearson Studium, 2009 🕮 A. Heuer, G. Saake: Datenbanken –Konzepte und Sprachen. 3rd edition, MITP Verlag, 2008 🕮 Vossen, G.; Datenbankmodelle, Datenbanksprachen und Datenbankmanagement-Systeme. Oldenbourg, München, 2008 🕮 Heuer, A., Saake, G., Sattler, K.; Datenbanken kompakt mitp-Verlag, Bonn, 2001 🕮 Sönke Cordts, Gerold Blakowski, and Gerhard Brosius. Datenbanken für Wirtschaftsinformatiker. Vieweg + Teuber Verlag, Springer Fachmedien Wiesbaden GmbH, 2011 🕮 Kiumars Farkisch. Data-Warehouse Systeme kompakt. Springer Verlag Berlin Heidelberg, 2011 🕮 Peter Gluchowski, Roland Gabriel, and Carsten Dittmar. Management Support Systeme und Business Intelligence. Springer Berlin Heidelberg, 2008 🕮 Dokumentation Oracle-DBMS 🕮 Dokumentation PostgreSQL-DBMS

Module 11: Selected Aspects of Digital Signal Processing and Communications

Study course:	Information Technology and Management
Name of module (German):	Ausgewählte Aspekte der digitalen Signalverarbeitung und Nachrichtentechnik
Name of module (English):	Advanced Topics of Communications
Abbreviation:	ATC
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. A. Ahrens
Lecturer:	Prof. Dr.-Ing. habil. A. Ahrens
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of digital data transmission
Learning objectives / Skills:	• Basic knowledge of multiple-access methods of digital transmission via wireless channels • Introduction of OFDM and MIMOtechnology as efficient use of “frequency” and “space” resources • Understanding of the design of wireless networks
Contents:	• OFDM multi-carrier process • Transmission and access methods for wireless communication (CDMA, FDMA, TDMA and SDMA) • MIMO systems (capacity considerations), spatial diversity concepts • Resource allocation methods (bit and performance allocation methods)
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Goldsmith, A.: Wireless Communications. New York: Cambridge, 2005 🕮 Öberg, T.: Modulation, Detection and Coding. Chichester: Wiley, 2001 🕮 Proakis, J. G.: Digital communications. Boston: McGraw-Hill, 2000 🕮 Kammeyer, K. D. : Nachrichtenübertragung. Wiesbaden: Teubner+Vieweg, 2008 🕮 Kammeyer, K. D.; Kühn, V.: MATLAB in der Nachrichtentechnik. Weil der Stadt: J. Schlembach Fachverlag, 2002 🕮 Lindner, J.: Informationsübertragung. Berlin, Heidelberg: Springer, 2004

	🕮 Pätzold, M.: Mobilfunkkanäle. Braunschweig, Wiesbaden: Vieweg, 1999 🕮 Haykin, S.; Moher, M.: Modern Wireless Communications. New Jersey: Pearson Prentice Hall, 2005 🕮 Haykin, S.; Moher, M.: Communication Systems. Chichester: Wiley, 2010 🕮 Ziemer, R.E.; Tranter, W. H.: Principles of Communications: Systems, Modulation and Noise. Chichester: Wiley, 2010

Module 12: Optical Communications

Study course:	Information Technology and Management
Name of module (German):	Optische Nachrichtentechnik
Name of module (English):	Optical Communications
Abbreviation:	OC
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. S. Lochmann
Lecturer:	Prof. Dr.-Ing. habil. S. Lochmann
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Knowledge of the principles of communications
Learning objectives / Skills:	Ability to analyse and describe optical communications and their components
Contents:	• Benefits and application areas of optical transmission • Types and parameters of fibre optic cables • Dispersion in fibre optic cables • Optical transmitters and receivers • Design of optical systems • Fibre optical components • Optical amplifiers DWDM communication
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Eberlein, D.: Lichtwellenleiter-Technik: Grundlagen, Verbindungs- und Messtechnik, Systeme, Trends. Expert-Verlag, Renningen 2002 🕮 Kauffels, F.: Optische Netze. mitp-Verlag, Bonn 2002 🕮 Krauss, O.:: DWDM und optische Netze: Eine Einführung in die Terabit-Technologie. Publicis Corp. Publ. Erlangen 2002 🕮 Brückner, V.: Optische Nachrichtentechnik. Teubner-Verlag

	Leipzig 2003

Module 13: Integrated Circuit Design

Study course:	Information Technology and Management
Name of module (German):	Schaltkreisentwurf
Name of module (English):	Integrated Circuit Design
Abbreviation:	SKE
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. I. Müller
Lecturer:	Prof. Dr.-Ing. I. Müller
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	Basic knowledge of digital circuit technology, programming
Learning objectives / Skills:	Ability to design complex digital circuits in VHDL and implement complex circuits in FPGAs
Contents:	• Architectures of programmable logic circuits • Circuit design with hardware-description languages • Programming in VHDL • Simulation and implementation of complex digital Circuits Practical laboratory course
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Wannemacher, M.: Das FPGA – Kochbuch. 1st edition, Bonn, Internat. Thomson Publ., 1998 🕮 Sikora, A.: Programmierbare Logikbausteine. Hanser – Verlag 2001 🕮 Auer, A.: Programmierbare Logic – IC. 2nd edition, Hüthig Verlag Heidelberg 1994 🕮 Auer, A.; Rudolf, D.: FPGA.Hüthig – Verlag Heidelberg 1995 🕮 Herrmann, G.; Müller, D.: ASIC – Entwurf und Test. Fachbuchverlag Leipzig 2004 🕮 Reifschneider, N.: CAE-gestützte IC-Entwurfsmethoden. Prentice Hall 🕮 Mäder, A.: VHDL Kompakt. 🕮 Ritter, J.; Molitor, P.: VHDL eine Einführung. Pearson 2004 🕮 Jorke, G.: Rechnergestützter Entwurf digitaler

	Schaltungen., Hanser - Verlag 2004 🕮 Reichardt, J.; Schwarz, B.: VHDL-Synthese. Oldenbourg Verlag 2007 🕮 Hervé, Y.: VHDL-AMS. Oldenbourg Verlag 2006 🕮 Siemers, Ch.: Prozessorbau. Hanser Verlag 1999 🕮 Kesel. F; Bartholomä, R.: Entwurf von digitalen Schaltungen und Systemen mit HDLs und FPGAs. Oldenbourg Verlag 2006

Module 14: Technical-Economic Project Seminar

Study course:	Information Technology and Management
Name of module (German):	Technisch-wirtschaftliches Projektseminar
Name of module (English):	Technical-Economic Project Seminar
Abbreviation:	TWP
Semesters:	1 semester
Person responsible for module:	Prof. Dr.-Ing. habil. A. Ahrens Prof. Dr. O. Bassus
Lecturer:	Prof. Dr.-Ing. habil. A. Ahrens
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	Self-study on the basis of tutorial notes and literature – plus other teaching materials and teaching methods such as CDs, lecture DVDs and internet-based teaching, as appropriate; attendance events for the purpose of examination preparation and clarification of open/unresolved issues
Workload:	125 hrs, of which 10 hrs attendance study
Credits:	5 CR
Requirements:	In-depth skills in engineering and economic principles
Learning objectives / Skills:	Ability to independently deal with typical engineering tasks with references to economics
Contents:	• Understanding the phases and mastering the approaches in association with the practical processing of engineering tasks with references to economics • Independent processing of practical tasks in project groups • The progress of the project is discussed among the project groups under the supervision of university teachers
Study/Examination performances:	120-minute written examination, or 90-minute written examination plus alternative examination performance, or project work, or alternative examination performance
Literature:	🕮 Current literature adapted to the topic

Module 15: Master Thesis and Colloquium

Study course:	Information Technology and Management
Name of module (German):	Masterarbeit und Kolloquium
Name of module (English):	Master Thesis and Colloquium
Abbreviation:	MT
Semesters:	1 semester
Person responsible for module:	Evaluation of the Master thesis and the colloquium by two examiners, of which at least one must be an authorised examiner in accordance with § 36 Section 4 State Higher Education Act (LHG) and active at the University of Wismar; supervision of the Master thesis by one of the examiners
Language:	German or English
Usability:	Compulsory module in Information Technology and Management Master study course
Teaching form:	The Master thesis is the independent, mentored, individual composition of an academic final paper. The colloquium (oral presentation and defence of the contents of the Master thesis) takes place in the form of an event open to a university audience, unless the students object to this or the topic in question has to be held in camera.
Workload:	500 hrs and 30-45 min. Colloquium
Credits:	20 CR
Requirements:	The subject matter of the Master thesis will be assigned when 60 credits can be verified in accordance with the examination regulations. The requirement for participation in the colloquium is the successful passing of the Master thesis
Learning objectives / Skills:	The purpose of a Master study course is not only to provide the practical, subject-specific contents leading to a profession, but also to enable students to perform independent, scientific and interdisciplinary research and problem analysis. The Master thesis provides the framework to document the ability of the students to independently handle a subject-specific problem within a specified period with the technical and methodological knowledge gained in the study course based on academic methods as well as be able to analyse in-depth and further develop the subject matter and demonstrate the results gained in the course of the academic and practical discussion. The Master thesis is complemented by the colloquium. The colloquium is intended to determine whether the students are able to both orally present and independently justify the results of their Master thesis in a convincing manner, taking into account the technical principles and interdisciplinary contexts, while – as appropriate – incorporating its practical significance. The colloquium also provides the students with the opportunity to respond to any ambiguities and weaknesses in their thesis and correct them.
Contents:	It is a practice-oriented theoretical discussion, including current questions of a specific segment of the study. The Master thesis should be set out in a scientifically, theoretically, well-founded manner that is demanding in content while nevertheless applicable in practice. By using the analysis and evaluation of current insights in the subject matter, the students are expected to use their knowledge to set out

	their own positions, develop solution concepts and present them in an appropriate manner. The key part of the colloquium is the oral presentation of the contents and results of the prior Master thesis completed by the students. Following the oral presentation, a discussion then takes place both to resolve any ambiguities or weaknesses contained in the thesis and address cross-thematic issues concerning the study course. The assignment of the subject matter for the Master thesis ensues in consultation with the mentor taking account of the following points: - Placing it in the context of the study course - Scope - Academic standard - Relevance in practice - Sufficient literature existing on the subject matter The colloquium deals with the subject of the Master thesis presented by the students as well as contents related to the study course.
Literature:	The literature required in writing a Master thesis shall be researched and provided by the students on and independent basis. In this regard, attention should be paid to suitability, relevance and topicality as well as a sufficient range in order to ensure comparability and a representative nature. For the colloquium, further supplementary literature may be drawn on, as appropriate.