

# Module Catalogue

»Courses in English«



**Hochschule  
Augsburg** University of  
Applied Sciences

Fakultät für  
Informatik

**Last updated: November 18, 2022**

The purpose of the module descriptions is to provide a content-related overview of your degree course.  
Only the current version of the university catalogue and examination regulations shall be deemed legally binding.

# Contents

<b>1</b>	<b>International Information Systems Bachelor - Bachelor's Degree</b>	<b>3</b>
1.1	1. Semester	3
1.1.1	1.1.1 1st Foreign Language	3
1.1.2	1.1.2 Mathematics 1	4
1.1.3	1.1.3 Programming 1	6
1.1.4	1.1.4 Introduction to Business Administration, Financial Accounting	8
1.1.5	1.1.5 2nd Foreign Language 1 of 4	10
1.2	2. Semester	11
1.2.1	1.2.1 Database Systems	11
1.2.2	1.2.2 2nd Foreign Language 2 of 4	13
1.2.3	1.2.3 Introduction to Information Systems	14
1.2.4	1.2.4 Programming 2 & Software Engineering	16
1.2.5	1.2.5 Mathematics 2	18
1.3	3. Semester	20
1.3.1	1.3.1 Customizing of Information Systems	20
1.3.2	1.3.2 E-Business	22
1.3.3	1.3.3 2nd Foreign Language 3 of 4	24
1.3.4	1.3.4 Programming of Information Systems	25
1.3.5	1.3.5 Statistics	27
1.4	4. Semester	29
1.4.1	1.4.1 Data Analytics	29
<b>2</b>	<b>Computer Science - Bachelor's Degree</b>	<b>31</b>
2.1	2.1 Project Work 1	31
2.2	2.2 Project Work 2	32
<b>3</b>	<b>Business Information Systems - Bachelor's Degree</b>	<b>33</b>
3.1	3.1 Customizing	33
3.2	3.2 IT Applications Seminar	35
3.3	3.3 Project 1	36
3.4	3.4 Project 2	37
<b>4</b>	<b>Computer Science - Master's Degree</b>	<b>38</b>
4.1	4.1 Master's Seminar	38
<b>5</b>	<b>Business Information Systems - Master's Degree</b>	<b>40</b>
5.1	5.1 Master's Seminar	40
5.2	5.2 Project Work	42
<b>6</b>	<b>Required Electives–Bachelor's Degree</b>	<b>43</b>
6.1	6.1 Computer Games Development	43
6.2	6.2 Digital Transformation in Organizations	45
6.3	6.3 Enterprise Architecture Management	48
6.4	6.4 Interaction Engineering	51
6.5	6.5 IT Sourcing and Cloud Transformation	53
6.6	6.6 Visual Thinking for Business	55
<b>7</b>	<b>Required Electives–Master's Degree</b>	<b>57</b>
7.1	7.1 Computer Games Development	57
7.2	7.2 Data Science	59
7.3	7.3 Digital Transformation in Organizations	61
7.4	7.4 Embedded Security	63
7.5	7.5 Enterprise Architecture Management	65
7.6	7.6 Interaction Engineering	68
7.7	7.7 IT Sourcing and Cloud Transformation	70
7.8	7.8 Secure Concepts and Protocols	72

# 1 International Information Systems Bachelor - Bachelor's Degree

## 1.1 1. Semester

### 1.1.1 1st Foreign Language

Title	1. Fremdsprache
Title in English	1st Foreign Language
Examination number	9770010
Module code	FL1
Modul area	Programming
Module coordinator	Prof. Dr. Svea Schauffler
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Liberal Arts and Sciences
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	1st Foreign Language (4 Credit hours)
Teaching language	The module is usually taught in English.
Content of the module	The course is a combination of teacher input, independent self study, and language teaching based on a communicative methodology which includes the interaction of all participants. Groups usually comprise 20-25 participants.
Qualification aims for the module learning objectives/skills	The aim of this mandatory language course is for participants to use English confidently as part of their studies but also in the workplace. This is achieved using an interactive and application-based methodology for language teaching. The focus is on useful skills such as text comprehension, technical vocabulary, written correspondence, oral communication, presenting, and negotiating in English.
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"><li>• Presentation, 5-20 minutes, 20%</li><li>• Oral examination, 10-20 minutes, 20%</li><li>• Written examination, 90 minutes, none auxiliaries, 60%</li></ul>
Reading list	Will be provided in class.

### 1.1.2 Mathematics 1

Title	Mathematik 1
Title in English	Mathematics 1
Examination number	9770020
Module code	MAT1
Modul area	Mathematics
Module coordinator	Prof. Dr. Caroline Justen
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Liberal Arts and Sciences
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Mathematics 1 (4 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<ul style="list-style-type: none"> <li>• Propositional logic</li> <li>• Infinite sequences and series</li> <li>• Real-valued functions</li> <li>• Financial mathematics</li> <li>• Derivatives</li> <li>• Complex numbers</li> </ul>
Qualification aims for the module learning objectives/skills	<p>Students passing the course successfully will be able to:</p> <ul style="list-style-type: none"> <li>• develop new mathematical knowledge from calculus and linear algebra which are not part of the mathematics 2 modul: <ul style="list-style-type: none"> <li>– understanding problems in mathematical language</li> <li>– solving mathematical problems of low and medium complexity</li> <li>– transferring mathematical knowledge taught in the course to new simple problems</li> </ul> </li> <li>• train logical reasoning</li> <li>• model simple practical problems in mathematical language</li> <li>• use mathematical textbooks to extend the mathematical topics of the lectures</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	The topics are relevant for the mathematics 2 module
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 60 minutes, auxiliaries: 2 DIN A4 pages handwritten formulary; a calculator that can't calculate 70! (70 Faculty)

Reading list	<p><b>Arens; Hettlich; Karpfinger; Kockelkorn; Lichtenegger; Stachel:</b> Mathematik, Spektrum Akademischer Verlag, 4. Auflage. (2018)</p> <p><b>Opitz, O.; Etschberger, S.; Burkart, W.R.; Klein R. :</b> Mathematik, Lehrbuch für das Studium der Wirtschaftswissenschaften, De Gruyter Studium, Oldenbourg, 12. Auflage. (2017)</p>
--------------	--

### 1.1.3 Programming 1

Title	Programmieren 1
Title in English	Programming 1
Examination number	9770030
Module code	PRG1
Modul area	Programming
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Programming 1 (4 Credit hours) Practical work Programming 1 (2 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>This lecture introduces students to the core concepts of programming based on the programming language JAVA. JAVA is one of the important languages of our time and it is widely used in business. The focus of the lecture lies on the concepts and methods of programming. These concepts and methods will be introduced and explained with examples in JAVA.</p> <p>The first part of the lecture provides the context with key terminology of business informatics and software engineering. It then introduces to the fundamentals of programming with basic JAVA language elements, simple data types, variables, expressions and operators. Then control structures, complex data types and methods will be introduced.</p> <p>The second part of the lecture provides an introduction to object-orientation and its application in JAVA.</p> <p>The lecture will provide the concepts and methods that will then be practiced in hands-on exercises with a state-of-the art integrated development environment (IDE, e. g., Eclipse). Students will develop and implement algorithms in JAVA and will be evaluated based on their ability to apply the knowledge from the lecture in practice.</p>
Qualification aims for the module learning objectives/skills	<p>Students will get an introduction to the core concepts of programming using JAVA. After successful participation, students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand and describe key elements of the programming language JAVA</li> <li>• Know the key concepts of OO programming languages</li> <li>• Understand JAVA source code of low to medium complexity</li> <li>• Independently implement algorithms in JAVA</li> <li>• Independently develop own algorithms</li> <li>• Quickly familiarize themselves with other programming languages</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None

Total workload and its constituent parts	Credit hours: 6, ECTS credits: 8, Contact hours: 90h, Independent study: 150h, Total workload: 240h
Type of examination / required course achievements	Written examination, 60 minutes, auxiliaries: authorized lecture notes
Requirements for participation	Practical work Programming 1
Reading list	Literature recommendations will be provided in the lecture.

#### 1.1.4 Introduction to Business Administration, Financial Accounting

Title	Grundlagen der BWL, Buchführung und Bilanzierung
Title in English	Introduction to Business Administration, Financial Accounting
Examination number	9770040
Module code	IBA
Module coordinator	Prof. Dr. Stephan Zimmermann
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Introduction to Business Administration, Financial Accounting (6 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Business Administration:</p> <ul style="list-style-type: none"> <li>• Fundamentals of economics</li> <li>• Scientific approach of business administration</li> <li>• Entrepreneurship and constitutive management decisions (business model, choice of legal form and location, corporate constitution)</li> <li>• Value Chain (marketing and sales, production, materials management)</li> <li>• Organization and human resources management</li> <li>• Operational taxes</li> </ul> <p>Financial accounting:</p> <ul style="list-style-type: none"> <li>• Terms and rules of external accounting</li> <li>• Technique of double-entry bookkeeping</li> <li>• Balance sheet: structure, content, transactions</li> <li>• Profit and loss account: structure, content, business transactions</li> <li>• Basics of balance sheet analysis</li> </ul>
Qualification aims for the module learning objectives/skills	<p>Upon successful completion of the module, students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand elementary theories of economics</li> <li>• Recognize challenges, tasks and methods of business administration</li> <li>• Explain constitutive decisions of companies</li> <li>• Outline basic value chain and leadership processes in a company</li> <li>• Explain the tasks and rules of financial accounting</li> <li>• Apply the system of double-entry bookkeeping.</li> </ul>



Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 6, ECTS credits: 8, Contact hours: 90h, Independent study: 150h, Total workload: 240h
Type of examination / required course achievements	Written examination, 90 minutes, auxiliary: calculator
Reading list	<p><b>Business Administration:</b></p> <p><b>Thommen, Jean-Paul; Grösser, Stefan (2014):</b> Economy, Company, Management. Introduction to Business Administration. Zürich</p> <p><b>Eichhorn, Peter; Towers, Ian (2018):</b> Principles of Management. Efficiency and Effectiveness in the Private and Public Sector. Cham: Springer International Publishing</p> <p><b>Kolmar, Martin (2017):</b> Principles of Microeconomics. An Integrative Approach. Cham: Springer International Publishing</p> <p><b>Pride, William M.; Hughes, Robert J.; Kapoor, Jack R. (2019):</b> Foundations of business. 6E. Boston: Cengage.</p> <p><b>Mazzarol, Tim (2020):</b> Entrepreneurship and Innovation. Fourth edition. Singapore: Springer (Springer Texts in Business and Economics).</p> <p><b>Financial Accounting:</b></p> <p><b>Nothhelfer, Robert:</b> Financial Accounting. Introduction to German GAAP with exercises (2017). München, Wien: De Gruyter Oldenbourg (De Gruyter Textbook).</p> <p><b>Epstein, Lita; Tracy, John A. (2015):</b> Bookkeeping all-in-one for dummies. Hoboken, NJ: John Wiley &amp; Sons (For dummies). 2nd Edition</p>

### 1.1.5 2nd Foreign Language 1 of 4

Title	2. Fremdsprache 1 von 4
Title in English	2nd Foreign Language 1 of 4
Examination number	9771098- 9771504
Module code	II2.FS
Modul area	Foreign Language
Module coordinator	Lecturers at the Faculty of Liberal Arts and Sciences
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Liberal Arts and Sciences
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	2nd Foreign Language 1 of 4 (4 Credit hours)
Teaching language	The module is taught in German for non-native students. Depending on the selection, the module will be taught in Spanish, French, Italian or Chinese language
Content of the module	The course is a combination of linguistic input by the teacher, independent self-study and communicative and application-oriented language teaching, in which all participants are involved. The course takes place in groups of 20-25 participants.
Qualification aims for the module learning objectives/skills	The goal of this compulsory curriculum is to achieve confidence with the terminology of this subject and its professional environment. This is achieved through task-based and interactive teaching in the foreign language. The course puts emphasis on crucial and practical skills such as reading comprehension, technical vocabulary, written correspondence, confident verbal communication, presentation and negotiation.
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: Oral and written parts according to the module specifications of the chosen language of the faculty of Liberal Arts and Sciences
Reading list	Literature recommendations will be provided in the lecture.

## 1.2 2. Semester

### 1.2.1 Database Systems

Title	Datenbanksysteme
Title in English	Database Systems
Examination number	9770050
Module code	DBS
Module coordinator	Prof. Matthias Kolonko, Ph.D. (ONPU)
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Database Systems (4 Credit hours) Practical work Database Systems (2 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Basics of database systems.</p> <p>The course puts a strong focus on semantic data modeling and the system-independent database design and addresses the theory of normal forms into more depth. The architecture of a database management system (RDBMS) and apt physical data structures are illustrated by means of the RDBMS "ORACLE".</p> <p>An Oracle database will be provided for SQL exercises. During the practical training, the design and realization of a database is requested from the students and the extension to a SQL based information system.</p>
Qualification aims for the module learning objectives/skills	<p>After the course, participants shall be able to</p> <ul style="list-style-type: none"><li>• understand basic knowledge about the architecture and functionality of database systems.</li><li>• perform analysis and data modeling (both conceptual and logical database design).</li><li>• perform an analysis of a logical data model with regard to the theory of normal forms.</li><li>• implement and program data structures using SQL</li></ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 6, ECTS credits: 8, Contact hours: 90h, Independent study: 150h, Total workload: 240h
Type of examination / required course achievements	<p>Written examination, 90 minutes, none auxiliaries</p> <p>As an alternative to the written exam, 3 interim tests can be handed in that will be summarized as one final grade.</p> <p>After having chosen to hand in the 3 interim tests, it is not possible to switch back to the written exam at the end of the semester.</p>
Requirements for participation	Practical work Database Systems

Weighting of individual performance in the final grade	Written exam (100%) or 3 interim tests (each with the same weighting)
Reading list	<ul style="list-style-type: none"> <li>• Information concerning the course, Oracle und current issues can be found here:  <a href="https://ohs.informatik.hs-augsburg.de:4443/web/bine">https://ohs.informatik.hs-augsburg.de:4443/web/bine</a></li> <li>• R. Elmasri, S.B. Navathe: Fundamentals of Database Systems</li> </ul>

### 1.2.2 2nd Foreign Language 2 of 4

Title	2. Fremdsprache 2 von 4
Title in English	2nd Foreign Language 2 of 4
Examination number	9771098- 9771504
Module code	II2.FS
Modul area	Foreign Language
Module coordinator	Lecturers at the Faculty of Liberal Arts and Sciences
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Liberal Arts and Sciences
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	2nd Foreign Language 2 of 4 (4 Credit hours)
Teaching language	The module is taught in German for non-native students. Depending on the selection, the module will be taught in Spanish, French, Italian or Chinese language
Content of the module	The course is a combination of linguistic input by the teacher, independent self-study and communicative and application-oriented language teaching, in which all participants are involved. The course takes place in groups of 20-25 participants.
Qualification aims for the module learning objectives/skills	The goal of this compulsory curriculum is to achieve confidence with the terminology of this subject and its professional environment. This is achieved through task-based and interactive teaching in the foreign language. The course puts emphasis on crucial and practical skills such as reading comprehension, technical vocabulary, written correspondence, confident verbal communication, presentation and negotiation.
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	The module 2nd Foreign Language 2 of 4 builds on the 2nd Foreign Language 1 from 4 and is assumed. (recommended)
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: Oral and written parts according to the module specifications of the chosen language of the faculty of Liberal Arts and Sciences
Reading list	Literature recommendations will be provided in the lecture.

### 1.2.3 Introduction to Information Systems

Title	Grundlagen der Wirtschaftsinformatik
Title in English	Introduction to Information Systems
Examination number	9770060
Module code	ISY
Module coordinator	Prof. Dr. Arne Mayer
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Introduction to Information Systems (3 Credit hours) Practical work Introduction to Information Systems (1 Credit hour)
Teaching language	The module is taught in English.
Content of the module	<ul style="list-style-type: none"> <li>• Basics and definitions of information systems</li> <li>• Business Process Management and Modelling</li> <li>• Integrated Information Systems and Application systems</li> <li>• Information Management</li> <li>• Case studies of complex integrated business processes and information systems</li> </ul>
Qualification aims for the module learning objectives/skills	<p>After successful participation in the module, students will be able to:</p> <ul style="list-style-type: none"> <li>• describe the subject areas assigned to information systems. They will be able to explain principles of information systems and its distinction from business administration and computer science.</li> <li>• Master basic terms, methods, concepts and applications of business information processing and integrated systems.</li> <li>• Understand horizontal and vertical integration concepts and their implementation.</li> <li>• Grasp enterprise information requirements.</li> <li>• Model business requirements as fundament for information system implementation</li> <li>• Understand the tasks and challenges of information management</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 60 minutes, none auxiliaries
Requirements for participation	Practical work Introduction to Information Systems



### 1.2.4 Programming 2 & Software Engineering

Title	Programmieren 2 & Software Engineering
Title in English	Programming 2 & Software Engineering
Examination number	9770070
Module code	PRG2
Modul area	Programming
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Programming 2 & Software Engineering (4 Credit hours) Practical work Programming 2 & Software Engineering (2 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>In this lecture, based on foundations of the lecture Programming 1, further concepts and constructs of modern programming languages are taught using JAVA. The module deals with the following content:</p> <ul style="list-style-type: none"> <li>• Repetition and deepening of the foundations and understanding of object-oriented programming</li> <li>• Introduction of other important concepts, such as e. g. helper classes for working with JAVA</li> <li>• Introduction and deepening of input/output concepts such as streams and parallel programming with threads</li> <li>• Introduction to distributed applications</li> <li>• Introduction to functional programming</li> </ul> <p>Larger and more complex software systems are usually developed in teams using a methodical approach. The module introduces to Software Engineering that lays the foundation with concepts, and methods for developing larger software systems.</p>
Qualification aims for the module learning objectives/skills	<p>Qualification aims for the module learning objectives/skills After successful participation in the module, students are able to:</p> <ul style="list-style-type: none"> <li>• Describe basic knowledge of programming including the concepts of object-oriented programming</li> <li>• Grasp requirements and tasks, to abstract them and to solve them using programming language tools</li> <li>• Familiarize themselves with further concepts or other programming languages</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	Module Programming 1 (recommended)
Total workload and its constituent parts	Credit hours: 6, ECTS credits: 8, Contact hours: 90h, Independent study: 150h, Total workload: 240h



Type of examination / required course achievements	Written examination, 60 minutes, none auxiliaries
Requirements for participation	Practical work Programming 2 & Software Engineering
Reading list	Literature recommendations will be provided in the lecture.

### 1.2.5 Mathematics 2

Title	Mathematik 2
Title in English	Mathematics 2
Examination number	9770080
Module code	MAT2
Modul area	Mathematics
Module coordinator	Prof. Dr. Caroline Justen
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Liberal Arts and Sciences
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Mathematics 2 (4 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<ul style="list-style-type: none"> <li>• Integration</li> <li>• Systems of linear equations</li> <li>• Linear Algebra</li> <li>• Multivariable functions</li> <li>• Linear Optimization</li> </ul>
Qualification aims for the module learning objectives/skills	<p>Students passing the course successfully will be able to:</p> <ul style="list-style-type: none"> <li>• develop new mathematical knowledge from calculus and linear algebra which are not part of the mathematics 1 modul: <ul style="list-style-type: none"> <li>– understanding problems in mathematical language</li> <li>– solving mathematical problems of low and medium complexity</li> <li>– transferring mathematical knowledge taught in the course to new simple problems</li> </ul> </li> <li>• train logical reasoning</li> <li>• model simple practical problems in mathematical language</li> <li>• use mathematical textbooks to extend the mathematical topics of the lectures</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	Module Mathematics 1 (recommended)
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 60 minutes, auxiliaries: 2 DIN A4 pages handwritten formulary; a calculator that can't calculate 70! (70 Faculty)

Reading list	<p><b>Arens; Hettlich; Karpfinger; Kockelkorn; Lichtenegger; Stachel:</b> Mathematik, Spektrum Akademischer Verlag, 4. Auflage. (2018)</p> <p><b>Opitz, O.; Etschberger, S.; Burkart, W.R.; Klein R. :</b> Mathematik, Lehrbuch für das Studium der Wirtschaftswissenschaften, De Gruyter Studium, Oldenbourg, 12. Auflage. (2017)</p>
--------------	--

## 1.3 3. Semester

### 1.3.1 Customizing of Information Systems

Title	Customizing von Informationssystemen
Title in English	Customizing of Information Systems
Examination number	9772030
Module code	CUST
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Customizing of Information Systems (4 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>This lecture introduces to Enterprise Systems (ES), that represent a specific category of information systems. They build on pre-packaged industry best practices embedded in standardized product software and target large-scale integration of data and business processes across all company's functional areas and beyond company borderlines.</p> <p>In the first part of the lecture, after an introduction to the key terms and definitions for ES, process-centric ES and in particular Enterprise Resource Planning (ERP) Systems will be discussed in detail. ERP Systems such as SAP S/4 HANA are the core business applications for many organizations. The lecture will examine</p> <ul style="list-style-type: none"> <li>• Fundamentals of ERP Systems</li> <li>• Basic Functionalities of ERP Systems with the example SAP S/4 HANA</li> <li>• Core processes such as "Order to Cash" and "Procure to Cash"</li> </ul> <p>The second part of the lecture presents the core concepts of ES implementations. With these concepts the necessary steps to configure/customize an ERP system such as SAP S/4 HANA are elaborated.</p>
Qualification aims for the module learning objectives/skills	<p>Students will get an introduction to the core concepts of Enterprise Systems as specific category of Information Systems. After successful participation, students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand and describe the different types and concepts of Enterprise Systems</li> <li>• Understand and describe the functions and processes covered by ERP Systems</li> <li>• Use the SAP S/4 HANA System for important core processes</li> <li>• Understand and describe the core concepts of Enterprise System Implementations</li> <li>• Configure/customize core features of the SAP S/4 HANA System</li> </ul>

Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Written examination, 60 minutes, with authorized lecture material, 50%</li> <li>• Project work, 10-30 pages, 50%</li> </ul>
Reading list	Literature recommendations will be provided in the first lecture.

### 1.3.2 E-Business

Title	E-Business
Title in English	E-Business
Examination number	9772040
Module code	EBUS
Module coordinator	Prof. Dr. Arne Mayer
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	E-Business (4 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<ul style="list-style-type: none"> <li>• Areas of e-business</li> <li>• Technical and technological foundations of the internet economy as driver for e-business</li> <li>• Functional view on e-Business information systems</li> <li>• Economics of e-Business, especially electronic commerce</li> <li>• E-business of the future: effects of new technologies</li> <li>• Case based functional analysis and design of e-business information systems</li> </ul>
Qualification aims for the module learning objectives/skills	<ul style="list-style-type: none"> <li>• An understanding of e-business and its areas and their impact on business as well as economy</li> <li>• Abilities for analyzing relevant information systems and their underlying processes and workflows</li> <li>• Practical relevant functional skills for upcoming employments in the industry</li> <li>• Increased their soft skills due to case studies, discussions, and ability to present self-elaborated content</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None; recommended: Introduction to business administration
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 60 minutes, none auxiliaries

Reading list	<p>Kollmann, Tobias.: E-Business, Springer Gabler, 7. Auflage, 2019 (in German)</p> <p>Laudon, Kenneth C.; E-commerce : business, technology, society, Pearson (Boston, MA), 2012.</p> <p>Peitz, Martin; Waldfogel, Joel: The Oxford handbook of the digital economy, Oxford Univ. Press, 2012</p> <p>Reynolds, Jonathan: E-Business : a management perspective, Oxford Univ. Press, 2010</p>
--------------	---

### 1.3.3 2nd Foreign Language 3 of 4

Title	2. Fremdsprache 3 von 4
Title in English	2nd Foreign Language 3 of 4
Examination number	9771098- 9771504
Module code	II2.FS
Modul area	Foreign Language
Module coordinator	Lecturers at the Faculty of Liberal Arts and Sciences
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Liberal Arts and Sciences
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	2nd Foreign Language 3 of 4 (4 Credit hours)
Teaching language	The module is taught in German for non-native students. Depending on the selection, the module will be taught in Spanish, French, Italian or Chinese language
Content of the module	The course is a combination of linguistic input by the teacher, independent self-study and communicative and application-oriented language teaching, in which all participants are involved. The course takes place in groups of 20-25 participants.
Qualification aims for the module learning objectives/skills	The goal of this compulsory curriculum is to achieve confidence with the terminology of this subject and its professional environment. This is achieved through task-based and interactive teaching in the foreign language. The course puts emphasis on crucial and practical skills such as reading comprehension, technical vocabulary, written correspondence, confident verbal communication, presentation and negotiation.
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	The module 2nd Foreign Language 3 of 4 builds on the 2nd Foreign Language 2 and 1 from 4 and is assumed. (recommended)
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: Oral and written parts according to the module specifications of the chosen language of the faculty of Liberal Arts and Sciences
Reading list	Literature recommendations will be provided in the lecture.



### 1.3.4 Programming of Information Systems

Title	Programmierung von Informationssystemen
Title in English	Programming of Information Systems
Examination number	9772020
Module code	PRG3
Modul area	Programming
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Programming 3 (4 Credit hours) Practical work Programming 3 (2 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>This lecture introduces concepts of programming that are required when organizations want to change or extend their Enterprise Systems (ES). This can for example be required in ES implementations, when the organization introduces a new system and the system needs to be adapted to meet business requirements. As technology platform SAP S/4 HANA will be used and the programming language ABAP.</p> <p>The first part of lecture presents the fundamentals of programming for Enterprise Systems such as:</p> <ul style="list-style-type: none"> <li>• Technical fundamentals and architecture</li> <li>• Basic ABAP language elements</li> <li>• ABAP reporting</li> <li>• Simple data types, variables</li> <li>• Expressions and operators</li> <li>• Control structures</li> <li>• Functions</li> <li>• Complex data types</li> </ul> <p>The second part of the lecture introduces advanced programming concepts</p> <ul style="list-style-type: none"> <li>• Object Oriented Reporting with Abap Objects</li> <li>• Events</li> <li>• Interfaces</li> <li>• Inheritance</li> <li>• Exceptions</li> <li>• Advanced programming techniques</li> </ul>

Qualification aims for the module learning objectives/skills	<p>Students will get an introduction to the programming of Enterprise Systems using SAP S/4 HANA and ABAP.</p> <p>After successful participation, students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand and describe key elements of the programming language ABAP</li> <li>• Understand ABAP source code</li> <li>• Independently implement algorithms in ABAP</li> <li>• Independently develop simple algorithms</li> </ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	Programming 1 (recommended)
Total workload and its constituent parts	Credit hours: 6, ECTS credits: 8, Contact hours: 90h, Independent study: 150h, Total workload: 240h
Type of examination / required course achievements	Written examination, 60 minutes, none auxiliaries
Requirements for participation	Practical work Programming of Information Systems
Reading list	Literature recommendations will be provided in the first lecture.

### 1.3.5 Statistics

Title	Statistik
Title in English	Statistics
Examination number	9772010
Module code	STAT
Module coordinator	Prof. Dr. Phil. Alessandra Zarcone
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Statistics (4 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<ul style="list-style-type: none"> <li>• Introduction to statistics and to R</li> <li>• Descriptive statistics: measures of central tendency, measures of dispersion, distributions</li> <li>• Visualization with R</li> <li>• Basic Probability Theory</li> <li>• Looking at relationships: Correlation</li> <li>• Prediction: Regression, Multiple Regression and Logistic regression</li> <li>• Elements of Inferential statistics: hypothesis testing, comparing means, confidence intervals, significance testing, model evaluation</li> <li>• Reporting of statistical models and results</li> </ul>

Qualification aims for the module learning objectives/skills	<p>After successfully completing this module, the students are able to:</p> <ul style="list-style-type: none"> <li>• know and understand the most important statistical properties such as mean, median, percentile, quantile, variance, co-variance, correlation, auto correlation, variation coefficient and confidence intervals</li> <li>• understand descriptive statistics methods and employ them for exploratory data analysis</li> <li>• perform exploratory data analysis with R</li> <li>• understand data visualization and create simple plots using R</li> <li>• understand basic probability theory methods and solve simple problems using them</li> <li>• formulate the assumptions behind different models and understand how to choose an appropriate model</li> <li>• apply inferential statistics methods to evaluate statistical models</li> <li>• apply the methods learned using the statistical software R and to interpret the output coming from the software</li> </ul>
Teaching and learning methods of the module	Seminar format with practical exercises
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 90 minutes, auxiliaries: 2 DIN A4 pages handwritten, statistics software (R) on own laptop
Reading list	<p><b>Field, Andy; Miles, Jeremy; Field, Zoe:</b> Discovering Statistics Using R, SAGE Publications, 1. Aufl. 2012</p> <p><b>Bruce, Peter; Bruce, Andrew; Gedeck, Peter:</b> Practical Statistics for Data Scientists, O'Reilly, 2. Aufl. 2020</p> <p><b>Winter, Bodo: Statistics for Linguists:</b> An Introduction Using R, Routledge. 1. Aufl. 2019</p> <p>Software:</p> <ul style="list-style-type: none"> <li>• R: <a href="https://www.r-project.org/">https://www.r-project.org/</a></li> </ul>

## 1.4 4. Semester

### 1.4.1 Data Analytics

Title	Datenanalyse
Title in English	Data Analytics
Examination number	9772050
Module code	DAT
Module coordinator	Lehrende und Professoren der Hochschule Augsburg
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Database Systems (4 Credit hours) Practical work Database Systems (2 Credit hours)
Teaching language	The module is taught in English or in German.
Content of the module	<p>As a result of advancing digitalization, data is playing an increasingly important role in decision-making in companies. Companies no longer rely solely on traditional business intelligence tools to analyze the data. Under the term advanced analytics, they also use statistics and machine learning methods to make forecasts about future events today and derive recommendations for action. The resulting analytical information systems are used to support decision-makers in companies by providing them with decision-relevant information, models and simulation results for different scenarios. For this purpose, technologies such as Online Analytical Processing (OLAP), data warehousing and mining are used. In companies, the focus is mainly on the topic of business analytics. It describes the process of so-called data refinement and visualization. It is a strategic tool for corporate managers. The focus is not only on the question "What was?" but also on: "What will be?"</p>
Qualification aims for the module learning objectives/skills	<p>After successful participation in the module, students will be able to:</p> <ul style="list-style-type: none"><li>• Explain data and their utilization in a business context to develop new or improve existing business models and processes</li><li>• Execute the data analysis process from data preparation to algorithms for analysis to visualization of analysis results.</li><li>• Examine issues and scenarios based on company data</li><li>• Classify the quality as well as the linkage of data analysis results.</li></ul>
Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 60 minutes, none auxiliaries

Reading list	<p><b>Chamoni, P.; Gluchowski, P</b> Analytische Informationssysteme: Business Intelligence-Technologien und –Anwendungen. 3. Auflage. Springer-Verlag: Berlin, Heidelberg 2006.</p> <p><b>Laudon, K. C.; Laudon, J. P.; Schoder, Detlef</b> Wirtschaftsinformatik – Eine Einführung. 2. Auflage. Pearson Studium: München et al. 2009.</p> <p><b>Laursen, G. H. N.; Thorlund, J.</b> Business Analytics for Managers: Taking Business Intelligence Beyond Reporting. 2. Auflage. Wiley: Hoboken 2016.</p> <p><b>Ware, C.</b> Information Visualization. 3. Auflage. Morgan Kaufmann: Waltham 2012.</p>
--------------	---

## 2 Computer Science - Bachelor's Degree

### 2.1 Project Work 1

Title	Projektarbeit 1
Title in English	Project Work 1
Examination number	3975450
Module code	PA1
Module coordinator	Director of studies
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Project Work 1 (6 credit hours)
Teaching language	German/English
Content of the module	<p>Over the course of one semester, the project work is made up of the following items of work (attendance at each event is compulsory):</p> <ul style="list-style-type: none"> <li>• Project management event (kick-off seminar at the beginning of the semester)</li> <li>• Participation in the project meetings (usually on a weekly basis)</li> <li>• Project presentation event (e.g. project day including colloquium at the end of the semester)</li> <li>• Project implementation</li> </ul>
Qualification aims for the module learning objectives/skills	The students acquire the skills required to carry out an IT project. The students acquire knowledge of project organisation and implementation, other presentation, teamwork, scientific writing and debate culture skills as well as experience with project management tools.
Teaching and learning methods of the module	Project Work
Prerequisites for participation	
Total workload and its constituent parts	Credit hours: 6, ECTS credits: 8, Contact hours: 90h, Independent study: 150h, Total workload: 240h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 10-30 Seiten, 80%</li> <li>• Presentation, 20-40 minutes, 20%</li> </ul>
Reading list	

## 2.2 Project Work 2

Title	Projektarbeit 2
Title in English	Project Work 2
Examination number	3975450
Module code	PA2
Module coordinator	Director of studies
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Project Work 2 (8 credit hours)
Teaching language	German/English
Content of the module	<p>Over the course of one semester, the project work is made up of the following items of work (attendance at each event is compulsory):</p> <ul style="list-style-type: none"> <li>• Project management event (kick-off seminar at the beginning of the semester)</li> <li>• Participation in the project meetings (usually on a weekly basis)</li> <li>• Project presentation event (e.g. project day including colloquium at the end of the semester)</li> <li>• Project implementation</li> </ul>
Qualification aims for the module learning objectives/skills	The students acquire the skills required to carry out an IT project. The students acquire knowledge of project organisation and implementation, other presentation, teamwork, scientific writing and debate culture skills as well as experience with project management tools.
Teaching and learning methods of the module	Project Work
Prerequisites for participation	
Total workload and its constituent parts	Credit hours: 8, ECTS credits: 10, Contact hours: 120h, Independent study: 180h, Total workload: 300h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 10-30 Seiten, 80%</li> <li>• Presentation, 20-40 minutes, 20%</li> </ul>
Reading list	



## 3 Business Information Systems - Bachelor's Degree

### 3.1 Customizing

Title	Customizing
Title in English	Customizing
Examination number	3975460
Module code	CUST
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Customizing of Information Systems (4 Credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>This lecture introduces to Enterprise Systems (ES), that represent a specific category of information systems. They build on pre-packaged industry best practices embedded in standardized product software and target large-scale integration of data and business processes across all company's functional areas and beyond company borderlines.</p> <p>In the first part of the lecture, after an introduction to the key terms and definitions for ES, process-centric ES and in particular Enterprise Resource Planning (ERP) Systems will be discussed in detail. ERP Systems such as SAP S/4 HANA are the core business applications for many organizations. The lecture will examine</p> <ul style="list-style-type: none"> <li>• Fundamentals of ERP Systems</li> <li>• Basic Functionalities of ERP Systems with the example SAP S/4 HANA</li> <li>• Core processes such as "Order to Cash" and "Procure to Cash"</li> </ul> <p>The second part of the lecture presents the core concepts of ES implementations. With these concepts the necessary steps to configure/customize an ERP system such as SAP S/4 HANA are elaborated.</p>
Qualification aims for the module learning objectives/skills	<p>Students will get an introduction to the core concepts of Enterprise Systems as specific category of Information Systems. After successful participation, students will be able to:</p> <ul style="list-style-type: none"> <li>• Understand and describe the different types and concepts of Enterprise Systems</li> <li>• Understand and describe the functions and processes covered by ERP Systems</li> <li>• Use the SAP S/4 HANA System for important core processes</li> <li>• Understand and describe the core concepts of Enterprise System Implementations</li> <li>• Configure/customize core features of the SAP S/4 HANA System</li> </ul>

Teaching and learning methods of the module	Seminar format, practical class and workshop, practical work
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Written examination, 60 minutes, with authorized lecture material, 50%</li> <li>• Project work, 10-30 pages, 50%</li> </ul>
Reading list	Literature recommendations will be provided in the first lecture.

### 3.2 IT Applications Seminar

Title	DVA Seminar
Title in English	IT Applications Seminar
Examination number	3975610
Module code	DVASEM
Module coordinator	Director of studies
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	IT Applications Seminar (2 credit hours)
Teaching language	German/English
Content of the module	The aim of this seminar is to promote the autonomous development of in-depth knowledge of a topic that has been studied as part of the subject area on offer, as well as active participation in the form of individual presentations and other related contributions. Each participant summarises the findings of the seminar and makes a presentation on them.
Qualification aims for the module learning objectives/skills	The students acquire detailed knowledge of the chosen subject area as well as advanced skills in the fields of academic work, presentation techniques and elocution.
Teaching and learning methods of the module	In this course, you choose one specific topic from the numerous subject areas offered by various lecturers. This usually takes place at the end of the previous semester although in some cases this may take place during a brief introductory session. Registration takes place online and is binding. Attendance is compulsory and active participation (discussion, colloquium) is expected
Prerequisites for participation	
Total workload and its constituent parts	Credit hours: 2, ECTS credits: 3, Contact hours: 30h, Independent study: 60h, Total workload: 90h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Written assignment, 5-15 pages, 70%</li> <li>• Presentation, 15-30 minutes, 30%</li> </ul>
Reading list	

### 3.3 Project 1

Title	Projekt 1
Title in English	Project 1
Examination number	3975450
Module code	PRO1
Module coordinator	Director of studies
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Project Work 1 (4 credit hours)
Teaching language	German/English
Content of the module	<p>Over the course of one semester, the project work is made up of the following items of work (attendance at each event is compulsory):</p> <ul style="list-style-type: none"> <li>• Project management event (kick-off seminar at the beginning of the semester)</li> <li>• Participation in the project meetings (usually on a weekly basis)</li> <li>• Project presentation event (e.g. project day including colloquium at the end of the semester)</li> <li>• Project implementation</li> </ul>
Qualification aims for the module learning objectives/skills	The students acquire the skills required to carry out an IT project. The students acquire knowledge of project organisation and implementation, other presentation, teamwork, scientific writing and debate culture skills as well as experience with project management tools.
Teaching and learning methods of the module	Project Work
Prerequisites for participation	
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 8, Contact hours: 60h, Independent study: 180h, Total workload: 240h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 10-30 Seiten, 80%</li> <li>• Presentation, 20-40 minutes, 20%</li> </ul>
Reading list	

### 3.4 Project 2

Title	Projekt 2
Title in English	Project 2
Examination number	3975450
Module code	PRO2
Module coordinator	Director of studies
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Project Work 2 (4 credit hours)
Teaching language	German/English
Content of the module	<p>Over the course of one semester, the project work is made up of the following items of work (attendance at each event is compulsory):</p> <ul style="list-style-type: none"> <li>• Project management event (kick-off seminar at the beginning of the semester)</li> <li>• Participation in the project meetings (usually on a weekly basis)</li> <li>• Project presentation event (e.g. project day including colloquium at the end of the semester)</li> <li>• Project implementation</li> </ul>
Qualification aims for the module learning objectives/skills	The students acquire the skills required to carry out an IT project. The students acquire knowledge of project organisation and implementation, other presentation, teamwork, scientific writing and debate culture skills as well as experience with project management tools.
Teaching and learning methods of the module	Project Work
Prerequisites for participation	
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 8, Contact hours: 60h, Independent study: 180h, Total workload: 240h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 10-30 Seiten, 80%</li> <li>• Presentation, 20-40 minutes, 20%</li> </ul>
Reading list	

## 4 Computer Science - Master's Degree

### 4.1 Master's Seminar

Title	Masterseminar
Title in English	Master's Seminar
Examination number	8900110
Module code	MASEM
Modul area	Academic work
Module coordinator	Prof. Dr. Phil. Alessandra Zarccone
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester, summer semester
Courses that make up the module	Master's seminar (2 credit hours)
Teaching language	English
Content of the module	<p>The aim of the master's seminar is to promote autonomous research work on a particular topic.</p> <p>The students expand their knowledge and understanding of the chosen topic and investigate the methodology, potential critical points and open questions. They summarise the results in a long abstract with two open questions and then present the results to the class. The students review their peers's abstracts and presentations and adopt a critical approach towards their own work. The content of all presentations is thematically related to encourage discussion. Each student submits a paper on the chosen topic.</p>
Qualification aims for the module learning objectives/skills	<p>The students have refined their critical insights and have developed their scientific writing and presentation skills.</p> <p>They are able to</p> <ul style="list-style-type: none"><li>• research a chosen topic</li><li>• structure a scientific publication</li><li>• apply common-practice scientific methodologies</li><li>• analyze and discuss research results</li><li>• identify weak points and strength of scientific publications and provide feedback to their peers</li></ul>

Teaching and learning methods of the module	<p>The topics are announced in advance so that every student who is interested in the module can sign up online, select a topic and do their own research.</p> <p>The students are required to submit an abstract 2 weeks before their presentation. The abstract should include 2 open questions to encourage discussion. Each student receives feedback on the abstract from two of their peers and from the supervisor 1 week before the presentation. Each presentation is followed by a discussion where the students discuss the open questions, and the presenter receives feedback from their peers on their presentation. A critical but productive approach towards one's own work and the peers' work is encouraged.</p> <p>The students submit an article summarizing their results by the middle of the course and a final version (based on the supervisor's feedback) at the end of the course.</p>
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Master's degree Computer Science
Total workload and its constituent parts	Credit hours: 2, ECTS credits: 5, Contact hours: 30h, Independent study: 120h, Total workload: 150h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Presentation and discussion, 20-30 minutes, 30%</li> <li>• Written assignment, 12-18 pages, 70%</li> </ul>
Reading list	

## 5 Business Information Systems - Master's Degree

### 5.1 Master's Seminar

Title	Masterseminar
Title in English	Master's Seminar
Examination number	8004091
Module code	MSEM
Modul area	Module F: Academic Work
Module coordinator	Prof. Dr. Phil. Alessandra Zarcone
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester, summer semester
Courses that make up the module	Master's seminar (2 credit hours)
Teaching language	English
Content of the module	<p>The aim of the master's seminar is to promote autonomous research work on a particular topic.</p> <p>The students expand their knowledge and understanding of the chosen topic and investigate the methodology, potential critical points and open questions. They summarise the results in a long abstract with two open questions and then present the results to the class. The students review their peers's abstracts and presentations and adopt a critical approach towards their own work. The content of all presentations is thematically related to encourage discussion. Each student submits a paper on the chosen topic.</p>
Qualification aims for the module learning objectives/skills	<p>The students have refined their critical insights and have developed their scientific writing and presentation skills.</p> <p>They are able to</p> <ul style="list-style-type: none"> <li>• research a chosen topic</li> <li>• structure a scientific publication</li> <li>• apply common-practice scientific methodologies</li> <li>• analyze and discuss research results</li> <li>• identify weak points and strength of scientific publications and provide feedback to their peers</li> </ul>



Teaching and learning methods of the module	<p>The topics are announced in advance so that every student who is interested in the module can sign up online, select a topic and do their own research.</p> <p>The students are required to submit an abstract 2 weeks before their presentation. The abstract should include 2 open questions to encourage discussion. Each student receives feedback on the abstract from two of their peers and from the supervisor 1 week before the presentation. Each presentation is followed by a discussion where the students discuss the open questions, and the presenter receives feedback from their peers on their presentation. A critical but productive approach towards one's own work and the peers' work is encouraged.</p> <p>The students submit an article summarizing their results by the middle of the course and a final version (based on the supervisor's feedback) at the end of the course.</p>
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Master's degree Business Information Systems
Total workload and its constituent parts	Credit hours: 2, ECTS credits: 5, Contact hours: 30h, Independent study: 120h, Total workload: 150h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Presentation and discussion, 20-30 minutes, 30%</li> <li>• Written assignment, 12-18 pages, 70%</li> </ul>
Reading list	

## 5.2 Project Work

Title	Projektarbeit
Title in English	Project Work
Examination number	8004092
Module code	PROAR
Modul area	Academic work
Module coordinator	Director of studies
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Compulsory module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Project Work (2 credit hours)
Teaching language	English
Content of the module	The project tasks covered in this module derive from specific, practical implementation projects that are carried out by the companies of today. The intention here is to establish practical collaboration with companies. The students organise themselves into project teams, analyse the commercial issues, draft potential alternative solutions and make the decision as to which approach to take. Once the framework is in place, the implementation stage begins based on this decision.
Qualification aims for the module learning objectives/skills	The students master the planning and execution of a system implementation project by selecting and applying appropriate project management techniques.
Teaching and learning methods of the module	Project work, regular project status meetings, project-related tuition in blocks of seminars, coaching.
Prerequisites for participation	No specific master's modules.
Total workload and its constituent parts	Credit hours: 2, ECTS credits: 5, Contact hours: 30h, Independent study: 120h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Project work, 20-40 Seiten, 80%</li> <li>• Presentation, 20-40 minutes, 20%</li> </ul>
Reading list	

## 6 Required Electives–Bachelor's Degree

### 6.1 Computer Games Development

Title	Computer Games Development
Title in English	Computer Games Development
Examination number	IN 3970322, 2970788 TI 2976562 WI 3975708
Module code	CGDEV4.WP
Module coordinator	Philip McClenaghan
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	The module is regularly offered as a block course during the semester break. (February/March) and (August/September)
Courses that make up the module	Computer Games Development (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	The aim of this course is to provide students with an understanding of computer game theory and design. This is not a technical course. Conceptual design and critical analysis exercises allow students to explore a range of relevant topics in order to gain the ability to look at computer games objectively and from an informed standpoint. Students present their work (in English) both verbally and in written form through presentations and analysis documents.
Qualification aims for the module learning objectives/skills	On completion of this module, the student will be able to demonstrate: <ul style="list-style-type: none"> <li>• An appreciation of the computer games industry</li> <li>• An understanding of computer games design and the ability to critically evaluate computer games</li> <li>• An understanding of design implementation</li> <li>• The ability to create a pre-production games proposal document</li> <li>• The ability to articulate course related ideas and concepts in English, both verbally and in written form</li> </ul>
Teaching and learning methods of the module	Seminar format, practical classes and workshops
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Required elective for bachelor's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Presentation, 10-30 minutes, 40%</li> <li>• Written assignment, 8-25 pages, 60%</li> </ul>

Reading list	<p><b>Sylvester, T.</b> (2013) Designing Games: A Guide to Engineering Experiences. O'Reilly</p> <p>Gamasutra Website (<a href="http://www.gamasutra.com/">http://www.gamasutra.com/</a>)</p>
--------------	---

## 6.2 Digital Transformation in Organizations

Title	Digitale Transformation in Organisationen
Title in English	Digital Transformation in Organizations
Examination number	IN 3970377, 2970875 TI 2976686 WI 3975795
Module code	DTO4.WP
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Digital Transformation in Organizations (4 credit hours)
Teaching language	The module is taught in English.

Content of the module	<p>Digitalization is one of the megatrends of our time. We live in a time where digital technologies and their applications make astonishing progress. Cars become driverless, computers beat humans in chess and Jeopardy and 3D-printers create houses. In the first part of this course the terms digitalization and digital transformation will be defined and the foundations are laid. Specifically, the following topics will be covered:</p> <ul style="list-style-type: none"> <li>• Digital transformation – why it is one of the biggest buzzwords but also megatrends of our time</li> <li>• Digitalization and digital transformation: Definition and delimitation</li> <li>• A framework for organizations, individuals, and digital technology</li> <li>• Historical evolution of industry and (digital) technologies</li> <li>• Key digital technologies of our time</li> <li>• Influence of digital technologies on organizations</li> </ul> <p>Many organizations are confronting the question of how to design and manage the digital transformation. Based on phase-models of innovation adoption, the generic transformation process will be explained. Along this process, specific tasks and challenges that an organization needs to design and manage will be introduced. Specifically, the following topics will be covered:</p> <ul style="list-style-type: none"> <li>• Stage models for digital transformation in organizations</li> <li>• Key design aspects for digital transformations</li> <li>• Methods and instruments to design, manage and facilitate digital transformations</li> </ul> <p>Overall, this course is aimed at giving students the opportunity to learn and practice important aspects of digital transformations in organizations, one of the most pressing topics of our time for businesses around the globe. Group work with (research) papers and case studies will be used to complement the concepts and examples from the lecture. In industry talks, practitioners will share their own experiences from digital transformation management.</p>
-----------------------	---

Qualification aims for the module learning objectives/skills	<p>Students that aim at learning the design and management aspects of digitalization in organizations will create and deepen their knowledge. Students will be prepared for working in digital transformation projects in business organizations. After successful participation, students particularly will:</p> <ul style="list-style-type: none"> <li>• Understand the term and the reasons for accelerated digital transformation in organizations</li> <li>• Understand the technological and conceptual foundations of digital transformation</li> <li>• Remember the historical evolution of industries and (digital) technologies</li> <li>• Understand the influence of digital technologies on organizations</li> <li>• Understand the typical phases and tasks in digital transformations</li> <li>• Analyze and evaluate design and management problems in digital transformations</li> <li>• Apply methods and instruments to create solutions for real world problems in the context of digital transformation projects</li> </ul>
Teaching and learning methods of the module	Seminar format, practical group work and case studies, industry talks
Prerequisites for participation	Students should have acquired basic skills in informatics or business information systems to understand core concepts/fundamentals behind business organizations and digital technologies. Bachelor (5th semester) or master in business information systems or computer science is recommended.
Possibility to use module within student's own study programme or other programmes	Required elective for bachelor's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 50%</li> <li>• Written assignment, 10-15 pages, 50%</li> </ul>
Reading list	Literature recommendations will be provided in the lecture

## 6.3 Enterprise Architecture Management

Title	Enterprise Architecture Management
Title in English	Enterprise Architecture Management
Examination number	IN 3970357, 2970853 TI 2976664 WI 3975771
Module code	EAM4.WP
Module coordinator	Prof. Dr. Stephan Zimmermann
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	The duration of the module is one semester. The module is offered regularly in the summer semester.
Courses that make up the module	Enterprise Architecture Management (4 credit hours)
Teaching language	The module is taught in English.



Content of the module	<p>Information technology used in companies is becoming more and more important and complex. A numerous and increasing number of enterprise applications and systems used in business processes substantiates this development. Enterprise architecture management (EAM) helps companies to address related challenges. In this regard, EAM describes the management practice based on the business strategy to support the transformation of the IT landscape by defining, communicating and using a coherent set of guidelines, governance and architectural principles.</p> <p>In this course students will learn about the fundamental concepts of enterprise architectures and their management. They also get to know basic techniques to develop business models, digital strategies and transform these into business, information system and technology architectures. Students will solve several case studies regarding enterprise architecture challenges in practice. This provides a good overview of typical IT landscapes and systems, as well as related methods in managing the complexity within the enterprise.</p> <p>Knowledge focus:</p> <ul style="list-style-type: none"> <li>• Introduction to Enterprise Architecture (EA): Business Architecture, Information System Architecture (Application and Data Architecture) and Technology Architecture</li> <li>• Digital Strategy Development and Business IT Alignment as a starting point for the design of Enterprise Architectures (EA)</li> <li>• Business Capability Management</li> <li>• Application/Service Portfolio Management</li> <li>• EA Governance as the basis for a Strategic EA Transformation</li> <li>• Frameworks in the EA context: e.g. Zachman Framework, TOGAF (The Open Group Architecture Framework)</li> <li>• Architectural views and visualization of IT landscapes</li> <li>• Methods for modelling architecture domains with the modelling language Archimate</li> <li>• Market overview of selected software tools for EA management (EAM lab)</li> <li>• Selected EAM Challenges from practice (Standardization, Transformation, Shadow IT...)</li> </ul>
Qualification aims for the module learning objectives/skills	<p>After successful participation in the module, the students are able to:</p> <ul style="list-style-type: none"> <li>• demonstrate competencies with the application of EA methods and IT landscape modelling</li> <li>• understand how to develop business, information systems and technology architectures</li> <li>• apply business model development methods and business capability and application portfolio techniques</li> <li>• illustrate enterprise architecture frameworks</li> <li>• solving practical case studies and scenarios</li> <li>• articulate course related ideas and concepts in English</li> </ul>

Teaching and learning methods of the module	Lecture and seminar lessons with laboratory exercises and case studies to apply the knowledge acquired. In addition, the exercises support self-study.
Prerequisites for participation	The requirements for this course are basic skills in business management and enterprise applications (e.g. enterprise resource planning), good command of the English language, and an interest in understanding the complexity and management of enterprise architectures and business models.
Possibility to use module within student's own study programme or other programmes	Required elective for bachelor's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Project work, 15-30 pages, 80%</li> <li>• Presentation, 10-20 minutes, 20%</li> </ul>
Reading list	<p><b>Ahlemann, F., Stettiner, E., Messerschmidt, M., Legner, C. (2012):</b> Strategic Enterprise Architecture Management Challenges, Best Practices, and Future Developments, Springer-Verlag Berlin Heidelberg.</p> <p><b>Lankhorst M. (2013):</b> Enterprise architecture at work: Modelling, communication, and analysis. Springer, Berlin.</p> <p><b>Peppard J., Ward J. (2016):</b> The strategic management of information systems: Building a digital strategy. Wiley, Chichester, West Sussex.</p> <p><b>The Open Group (2018),</b> The Open Group Architectural Framework (TOGAF) Version 9.2. The Open Group, Reading, UK.</p>

## 6.4 Interaction Engineering

Title	Interaction Engineering
Title in English	Interaction Engineering
Examination number	IN 3970326, 2970796 TI 2976571
Module code	INTENG4.WP
Module coordinator	Prof. Dr. Michael Kipp
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Interaction Engineering (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>In the course students will learn about fundamental concepts of human-computer interaction and various research areas that try to improve traditional ways of human-computer interaction by including touch, gesture, facial and bodily actions to make the interaction more intuitive, natural and efficient.</p> <p>Students will also get to know and apply methods to evaluate interactive systems objectively (measurable aspects) and subjectively (user feedback).</p>
Qualification aims for the module learning objectives/skills	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Fundamentals of human-computer interaction</li> <li>• Touch interaction</li> <li>• Gestural interaction</li> <li>• Tangible interaction</li> <li>• Proxemic, spatial, full-body interaction</li> <li>• Cross-device interaction</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>• Understanding and presenting a research publication</li> <li>• Implementing a running prototype of an interactive system</li> <li>• Applying evaluation methods for an interactive system</li> <li>• Critically discussing research publications</li> <li>• Working in a team</li> </ul> <p><b>Competencies</b></p> <ul style="list-style-type: none"> <li>• Understanding and further developing a research topic</li> <li>• Informally evaluating a prototype</li> </ul>

Teaching and learning methods of the module	The course includes a series of lectures by the lecturer. Students will give oral presentations and work on assignments at home, both individually and in teams. Students will also work on a final team project which engages them in scientific thinking, practical implementation and critical reflection.
Prerequisites for participation	The requirements for this course are solid programming skills, prior experience with working scientifically, a good command of the English language (reading, writing and speaking) and an interest in working both analytically and creatively to develop novel interaction methods.
Possibility to use module within student's own study programme or other programmes	Required elective for bachelor's degree programs: Computer Science and Computer Engineering
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Presentation, 15 minutes, 25%</li> <li>• Project work, 50%</li> <li>• Written assignment, 15-20 pages, 25%</li> </ul>
Reading list	<p><b>B. Buxton, S. Greenberg, S. Carpendale, N. Marquardt (2012)</b> Sketching User Experiences: The Workbook, Morgan Kaufmann, 262 pages.</p> <p><b>B. Albert, T. Tullis (2013)</b> Measuring the User Experience, 2. Edition, Morgan Kaufmann, 301 pages.</p> <p><b>J. Butler, K. Holden, W. Lidwell (2010)</b> Universal Principles of Design, Rockport Publishers, 272 pages.</p>

## 6.5 IT Sourcing and Cloud Transformation

Title	IT Sourcing and Cloud Transformation
Title in English	IT Sourcing and Cloud Transformation
Examination number	IN 3970380, 2970878 TI 2976689 WI 3975798
Module code	ITSCT4.WP
Module coordinator	Prof. Dr. Arne Mayer
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	IT Sourcing and Cloud Transformation (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Offshoring and outsourcing as well as the change from classic IT models to the cloud are a 'must have' for organizations in high-wage countries like Germany. This stems not only from an economic point of view, but also against the background of the permanent shortage of IT specialists. As a result, complexity and demands on the IT of organizations increase significantly. In this module - with a strong focus on relevant, current problems - students are prepared for opportunities and challenges in their future professional life.</p> <p>The following blocks are covered:</p> <ul style="list-style-type: none"> <li>• Off- and nearshoring (regional IT sourcing)</li> <li>• Outsourcing (external IT sourcing)</li> <li>• Transformation to the Cloud / Everything as a Service</li> <li>• Low code platforms as game changers in software development</li> </ul>
Qualification aims for the module learning objectives/skills	<p>With successful participation in the module, students can:</p> <ul style="list-style-type: none"> <li>• Understand the challenges in today's information management</li> <li>• Be familiar with and discuss the IT measures and technologies mentioned</li> <li>• Generate solution proposals for current problems and create implementation approaches</li> </ul>
Teaching and learning methods of the module	Seminar-based instruction at the beginning - Supported by case studies, group discussions and guest lectures. In the further course, work in small groups, in which the students work out the practice-relevant content themselves.
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Required elective for bachelor's degree programs

Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 60 minutes, auxiliary: non-programmable calculator
Reading list	Will be announced in the first lecture

## 6.6 Visual Thinking for Business

Title	Visual Thinking for Business
Title in English	Visual Thinking for Business
Examination number	IN 3970353, 2970849 TI 2976659 WI 3975767
Module code	VISTH.WP
Module coordinator	Philip McClenaghan
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	The module is regularly offered as a block course during the semester break. (February/March) and (August/September)
Courses that make up the module	Visual Thinking for Business (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Companies in the modern business world are turning to new ways of working such as Design Thinking and Lean Start-Up to keep pace with constantly evolving marketplaces and technological advancements. The visual tools and methods of Visual Thinking support these new working practices by making information, ideas, concepts and processes visible and thus accessible to all.</p> <p>Visual Thinking extends the verbal and written language using visualization methods that enable the graphic representation of ideas and complex content. In the new world of design thinking, agile innovation, lean start-up, etc., this is essential.</p> <p>This course is suitable for all students who want to think through new ideas, complex content and procedures in a structured manner and communicate effectively in their professional life.</p>
Qualification aims for the module learning objectives/skills	<p>The students should develop the following skills during the course:</p> <ul style="list-style-type: none"> <li>• Basic understanding of the theoretical aspects of visual thinking and visual communication.</li> <li>• Application and further development of visual storytelling methods.</li> <li>• The ability to communicate ideas and complex content visually.</li> <li>• The ability to independently use visual thinking in a business environment.</li> </ul>
Teaching and learning methods of the module	Seminar format, practical classes and workshops
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Required elective for bachelor's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h

Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Presentation, 10-25 minutes, 40%</li> <li>• Written assignment, 10-15 pages, 60%</li> </ul>
Reading list	Will be announced in the first lecture.



## 7 Required Electives–Master’s Degree

### 7.1 Computer Games Development

Title	Computer Games Development
Title in English	Computer Games Development
Examination number	BIS2019 8005036, BIS2011 7953400 MIN2017 8900730
Module code	COMGA.WP
Module coordinator	Philip McClenaghan
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	The module is regularly offered as a block course during the semester break. (February/March) and (August/September)
Courses that make up the module	Computer Games Development (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	The aim of this course is to provide students with an understanding of computer game theory and design. This is not a technical course. Conceptual design and critical analysis exercises allow students to explore a range of relevant topics in order to gain the ability to look at computer games objectively and from an informed standpoint. Independent research projects enable students to gain indepth knowledge of specific aspects of computer games design. Students present their work (in English) both verbally and in written form through presentations, analysis documentation and research reports.
Qualification aims for the module learning objectives/skills	On completion of this module, the student will be able to demonstrate: <ul style="list-style-type: none"> <li>• An understanding of computer games design and the ability to critically evaluate computer games.</li> <li>• An understanding of design implementation and the ability to critically reflect on design processes and decisions.</li> <li>• The ability to create a pre-production games proposal document.</li> <li>• The ability to articulate course related ideas and concepts in English, both verbally and in written form.</li> <li>• The ability to independently research computer games design and critically interpret the results.</li> </ul>
Teaching and learning methods of the module	Seminar format, practical classes and workshops
Prerequisites for participation	None
Possibility to use module within student’s own study programme or other programmes	Required elective for master’s degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h

Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Presentation, 10-30 minutes, 40%</li> <li>• Written assignment, 8-25 pages, 60%</li> </ul>
Reading list	<p><b>Sylvester, T.</b> (2013) Designing Games: A Guide to Engineering Experiences. O'Reilly</p> <p>Gamasutra Website (<a href="http://www.gamasutra.com/">http://www.gamasutra.com/</a>)</p>

## 7.2 Data Science

Title	Data Science
Title in English	Data Science
Examination number	BIS2019 8005026, BIS2011 7953250 MIN2017 8900650
Module code	DASC4.WP
Module coordinator	Prof. Dr.-Ing. Honorary Doctor of ONPU Thorsten Schöler
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Data Science (4 credit hours)
Teaching language	The module is taught in English, if necessary also in German
Content of the module	<p>Introduction to Data Science: Introduction, Data Science and the Internet of Things</p> <p>Short introduction to Python</p> <p>Extract Transform Load (ETL): Setup, ETL and Hadoop, How Uber designed it's big data platform, Accessing SQL databases, Airline delay data set, Unstructured/semi-structured data, Time series analysis of earth oscillation data, Further examples, Additional open data sources</p> <p>Visualisation: Introduction, Curve plotting, Using panels, Scatterplots, Histograms, Bar graphs, Image visualisation, Selected graphical examples with pandas, Advanced data learning representation, Feature importance, Further material</p> <p>Statistics and classification: Literature, Statistics, Linear regression, Correlation and covariance, Classification</p> <p>Machine Learning: Introduction, Unsupervised learning, Supervised learning, (Reinforcement learning)</p> <p>Deep learning: Introduction, Darknet, ConvNetJS MNIST demo, Lasagne MNIST, Another deep learning MNIST example in Lasagne and other toolkits, Introduction to TensorFlow, Introduction to Keras,</p> <p>Datenkraken: Examples, Workshop</p> <p>Sensor data fusion: Introduction, JDL data fusion model, Subsumption architecture, Literature</p>
Qualification aims for the module learning objectives/skills	The participants understand the basic procedures and methods in the field of Big Data and Data Science. They can use various software libraries in the field of data science and machine learning. They are able to analyse, visualise and evaluate or classify large amounts of data. Within the framework of a small project, you will develop your own methods for data analysis in a self-imposed task.

Teaching and learning methods of the module	<ul style="list-style-type: none"> <li>• Seminar format</li> <li>• Scientific Seminar</li> <li>• Studies</li> <li>• Small projects</li> </ul>
Prerequisites for participation	<ul style="list-style-type: none"> <li>• Good programming skills (Python, Java, etc.)</li> <li>• Interest in scientific challenges</li> <li>• Solid mathematical understanding</li> </ul>
Possibility to use module within student's own study programme or other programmes	Required elective for master's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written assignment, 8-20 pages
Reading list	<p><b>Y. Hofstetter</b>, Sie wissen alles: Wie intelligente Maschinen in unser Leben eindringen und warum wir für unsere Freiheit kämpfen müssen. München: C. Bertelsmann Verlag, 2014.</p> <p><b>W. McKinney</b>, Datenanalyse mit Python: Auswertung von Daten mit Pandas, NumPy und IPython, 1. Auflage, O'Reilly, 2015.</p> <p><b>J. Grus</b>, Einführung in Data Science: Grundprinzipien der Datenanalyse mit Python, 1. Auflage, O'Reilly, 2016.</p> <p><b>R. Bruns und J. Dunkel</b>, Event-Driven Architecture: Softwarearchitektur für ereignisgesteuerte Geschäftsprozesse, 1. Auflage, Berlin u.a.: Springer, 2010.</p>

## 7.3 Digital Transformation in Organizations

Title	Digitale Transformation in Organisationen
Title in English	Digital Transformation in Organizations
Examination number	BIS2019 8005083, BIS2011 ——— MIN2017 8901240
Module code	DTO4.WP
Module coordinator	Prof. Dr. Jens Lauterbach
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	Digital Transformation in Organizations (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Digitalization is one of the megatrends of our time. We live in a time where digital technologies and their applications make astonishing progress. Cars become driverless, computers beat humans in chess and Jeopardy and 3D-printers create houses. In the first part of this course the terms digitalization and digital transformation will be defined and the foundations are laid. Specifically, the following topics will be covered:</p> <ul style="list-style-type: none"> <li>• Digital transformation – why it is one of the biggest buzzwords but also megatrends of our time</li> <li>• Digitalization and digital transformation: Definition and delimitation</li> <li>• A framework for organizations, individuals, and digital technology</li> <li>• Historical evolution of industry and (digital) technologies</li> <li>• Key digital technologies of our time</li> <li>• Influence of digital technologies on organizations</li> </ul> <p>Many organizations are confronting the question of how to design and manage the digital transformation. Based on phase-models of innovation adoption, the generic transformation process will be explained. Along this process, specific tasks and challenges that an organization needs to design and manage will be introduced. Specifically, the following topics will be covered:</p> <ul style="list-style-type: none"> <li>• Stage models for digital transformation in organizations</li> <li>• Key design aspects for digital transformations</li> <li>• Methods and instruments to design, manage and facilitate digital transformations</li> </ul> <p>Overall, this course is aimed at giving students the opportunity to learn and practice important aspects of digital transformations in organizations, one of the most pressing topics of our time for businesses around the globe. Group work with (research) papers and case studies will be used to complement the concepts and examples from the lecture. In industry talks, practitioners will share their own experiences from digital transformation management.</p>

Qualification aims for the module learning objectives/skills	<p>Students that aim at learning the design and management aspects of digitalization in organizations will create and deepen their knowledge. Students will be prepared for working in digital transformation projects in business organizations. After successful participation, students particularly will:</p> <ul style="list-style-type: none"> <li>• Understand the term and the reasons for accelerated digital transformation in organizations</li> <li>• Understand the technological and conceptual foundations of digital transformation</li> <li>• Remember the historical evolution of industries and (digital) technologies</li> <li>• Understand the influence of digital technologies on organizations</li> <li>• Understand the typical phases and tasks in digital transformations</li> <li>• Analyze and evaluate design and management problems in digital transformations</li> <li>• Apply methods and instruments to create solutions for real world problems in the context of digital transformation projects</li> </ul>
Teaching and learning methods of the module	Seminar format, practical group work and case studies, industry talks
Prerequisites for participation	Students should have acquired basic skills in informatics or business information systems to understand core concepts/fundamentals behind business organizations and digital technologies. Bachelor (5th semester) or master in business information systems or computer science is recommended.
Possibility to use module within student's own study programme or other programmes	Required elective for master's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 50%</li> <li>• Written assignment, 10-15 pages, 25%</li> <li>• Presentation, 15-25 minutes, 25%</li> </ul>
Reading list	Literature recommendations will be provided in the lecture

## 7.4 Embedded Security

Title	Embedded Security
Title in English	Embedded Security
Examination number	BIS2019 8005037, BIS2011 7953410 MIN2017 8900740
Module code	EMBSEC.WP
Module coordinator	Prof. Dr.-Ing. Dominik Merli
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Embedded Security (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<ol style="list-style-type: none"> <li>1. Introduction, Standards and Processes <ul style="list-style-type: none"> <li>• Standards for Secure Components</li> <li>• Secure Development Process</li> </ul> </li> <li>2. Fundamental Embedded Security Building Blocks <ul style="list-style-type: none"> <li>• Random Number Generators</li> <li>• Cryptographic Implementations</li> <li>• Secure Memory and Data Storage</li> <li>• Secure Device Identity</li> <li>• Secure Communication</li> </ul> </li> <li>3. Hardware and Firmware Level Security Measures <ul style="list-style-type: none"> <li>• Secure Boot Process</li> <li>• Secure Firmware Update</li> <li>• Robust Device Architecture</li> </ul> </li> <li>4. Operating System Level Security Measures <ul style="list-style-type: none"> <li>• Access Control and Management</li> <li>• System Monitoring</li> </ul> </li> </ol>
Qualification aims for the module learning objectives/skills	<p>After successful participation, students are able to:</p> <ul style="list-style-type: none"> <li>• derive security requirements for embedded systems and a secure development process</li> <li>• explain fundamental embedded security building blocks</li> <li>• name countermeasures for typical attacks on embedded systems</li> <li>• describe advantages and disadvantages of different cryptographic implementations and protection measures</li> <li>• explain device security concepts on hardware, firmware and operating system level and the reasoning behind them</li> </ul>

Teaching and learning methods of the module	Seminar-like lectures and supporting practical exercises
Prerequisites for participation	None
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Written examination, 90 minutes, auxiliary: calculator, English-Dictionary
Reading list	<p><b>D. Mukhopadhyay, R. S. Chakraborty:</b> "Hardware Security: Design, Threats, and Safeguards", Chapman and Hall/CRC, 2014</p> <p><b>S. Mangard, E. Oswald, T. Popp:</b> "Power Analysis Attacks: Revealing the Secrets of Smart Cards", Springer, 2007</p> <p><b>C. Paar, J. Pelzl:</b> "Understanding Cryptography: A Textbook for Students and Practitioners", Springer, 2010</p> <p><b>C. K. Koc (Ed.):</b> "Cryptographic Engineering", Springer, 2009</p>



## 7.5 Enterprise Architecture Management

Title	Enterprise Architecture Management
Title in English	Enterprise Architecture Management
Examination number	BIS2019 8005055, BIS2011 7953630 MIN2017 8900970
Module code	EAM4.WP
Module coordinator	Prof. Dr. Stephan Zimmermann
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	The duration of the module is one semester. The module is offered regularly in the summer semester.
Courses that make up the module	Enterprise Architecture Management (4 credit hours)
Teaching language	The module is taught in English.

Content of the module	<p>Information technology used in companies is becoming more and more important and complex. A numerous and increasing number of enterprise applications and systems used in business processes substantiates this development. Enterprise architecture management (EAM) helps companies to address related challenges. In this regard, EAM describes the management practice based on the business strategy to support the transformation of the IT landscape by defining, communicating and using a coherent set of guidelines, governance and architectural principles.</p> <p>In this course students will learn about the fundamental concepts of enterprise architectures and their management. They also get to know basic techniques to develop business models, digital strategies and transform these into business, information system and technology architectures. Students will solve several case studies regarding enterprise architecture challenges in practice. This provides a good overview of typical IT landscapes and systems, as well as related methods in managing the complexity within the enterprise.</p> <p>Knowledge focus:</p> <ul style="list-style-type: none"> <li>• Introduction to Enterprise Architecture (EA): Business Architecture, Information System Architecture (Application and Data Architecture) and Technology Architecture</li> <li>• Digital Strategy Development and Business IT Alignment as a starting point for the design of Enterprise Architectures (EA)</li> <li>• Business Capability Management</li> <li>• Application/Service Portfolio Management</li> <li>• EA Governance as the basis for a Strategic EA Transformation</li> <li>• Frameworks in the EA context: e.g. Zachman Framework, TOGAF (The Open Group Architecture Framework)</li> <li>• Architectural views and visualization of IT landscapes</li> <li>• Methods for modelling architecture domains with the modelling language Archimate</li> <li>• Market overview of selected software tools for EA management (EAM lab)</li> <li>• Selected EAM Challenges from practice (Standardization, Transformation, Shadow IT...)</li> </ul>
-----------------------	--

Qualification aims for the module learning objectives/skills	<p>After successful participation in the module, the students are able to:</p> <ul style="list-style-type: none"> <li>• demonstrate competencies with the application of EA methods and IT landscape modelling</li> <li>• make informed judgements on the development and complex issues of business, information systems and technology architectures</li> <li>• apply business model development methods and business capability and application portfolio techniques</li> <li>• use and evaluate enterprise architecture frameworks</li> <li>• discuss the status and value of EA management and governance</li> <li>• evaluate, solve and present practical challenges in enterprise architectures</li> <li>• articulate course related ideas and concepts in English.</li> </ul>
Teaching and learning methods of the module	Lecture and seminar lessons with laboratory exercises and case studies to apply the knowledge acquired. In addition, the exercises support self-study.
Prerequisites for participation	The requirements for this course are basic skills in business management and enterprise applications (e.g. enterprise resource planning), good command of the English language, and an interest in understanding the complexity and management of enterprise architectures and business models.
Possibility to use module within student's own study programme or other programmes	Required elective for master's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	<p>Portfolio exam:</p> <ul style="list-style-type: none"> <li>• Project work, 15-30 pages, 60%</li> <li>• Presentation A, 10-20 minutes, 10%</li> <li>• Presentation B, 30-40 minutes, 30%</li> </ul>
Reading list	<p><b>Ahlemann, F., Stettiner, E., Messerschmidt, M., Legner, C. (2012):</b> Strategic Enterprise Architecture Management Challenges, Best Practices, and Future Developments, Springer-Verlag Berlin Heidelberg.</p> <p><b>Lankhorst M. (2013):</b> Enterprise architecture at work: Modelling, communication, and analysis. Springer, Berlin.</p> <p><b>Peppard J., Ward J. (2016):</b> The strategic management of information systems: Building a digital strategy. Wiley, Chichester, West Sussex.</p> <p><b>The Open Group (2018),</b> The Open Group Architectural Framework (TOGAF) Version 9.2. The Open Group, Reading, UK.</p>

## 7.6 Interaction Engineering

Title	Interaction Engineering
Title in English	Interaction Engineering
Examination number	BIS2019 8005031, BIS2011 7953330 MIN2017 8900510
Module code	INTENG.WP
Module coordinator	Prof. Dr. Michael Kipp
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, winter semester
Courses that make up the module	Interaction Engineering (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>In the course students will learn about fundamental concepts of human-computer interaction and various research areas that try to improve traditional ways of human-computer interaction by including touch, gesture, facial and bodily actions to make the interaction more intuitive, natural and efficient.</p> <p>Students will also get to know and apply methods to evaluate interactive systems objectively (measurable aspects) and subjectively (user feedback).</p>
Qualification aims for the module learning objectives/skills	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Fundamentals of human-computer interaction</li> <li>• Touch interaction</li> <li>• Gestural interaction</li> <li>• Tangible interaction</li> <li>• Proxemic, spatial, full-body interaction</li> <li>• Cross-device interaction</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>• Understanding and presenting a research publication</li> <li>• Implementing a running prototype of an interactive system</li> <li>• Applying evaluation methods for an interactive system</li> <li>• Critically discussing research publications</li> <li>• Working in a team</li> </ul> <p><b>Competencies</b></p> <ul style="list-style-type: none"> <li>• Finding and formulating a research topic</li> <li>• Formally evaluating a prototype</li> </ul>

Teaching and learning methods of the module	The course includes a series of lectures by the lecturer. Students will give oral presentations and work on assignments at home, both individually and in teams. Students will also work on a final team project which engages them in scientific thinking, practical implementation and critical reflection.
Prerequisites for participation	The requirements for this course are solid programming skills, prior experience with working scientifically, a good command of the English language (reading, writing and speaking) and an interest in working both analytically and creatively to develop novel interaction methods.
Possibility to use module within student's own study programme or other programmes	Required elective for master's degree programs: Interactive Media Systems, Computer Science and Business Information Systems
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h
Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Presentation, 15 minutes, 25%</li> <li>• Project work, 50%</li> <li>• Written assignment, 15-20 pages, 25%</li> </ul>
Reading list	<p><b>B. Buxton, S. Greenberg, S. Carpendale, N. Marquardt (2012)</b> Sketching User Experiences: The Workbook, Morgan Kaufmann, 262 pages.</p> <p><b>B. Albert, T. Tullis (2013)</b> Measuring the User Experience, 2. Edition, Morgan Kaufmann, 301 pages.</p> <p><b>J. Butler, K. Holden, W. Lidwell (2010)</b> Universal Principles of Design, Rockport Publishers, 272 pages.</p>

## 7.7 IT Sourcing and Cloud Transformation

Title	IT Sourcing and Cloud Transformation
Title in English	IT Sourcing and Cloud Transformation
Examination number	BIS2019 8005086, BIS2011 ——— MIN2017 8901270
Module code	ITSCT4.WP
Module coordinator	Prof. Dr. Arne Mayer
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	1 semester, summer semester
Courses that make up the module	IT Sourcing and Cloud Transformation (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Offshoring and outsourcing as well as the change from classic IT models to the cloud are a 'must have' for organizations in high-wage countries like Germany. This stems not only from an economic point of view, but also against the background of the permanent shortage of IT specialists. As a result, complexity and demands on the IT of organizations increase significantly. In this module - with a strong focus on relevant, current problems - students are prepared for opportunities and challenges in their future professional life.</p> <p>The following blocks are covered:</p> <ul style="list-style-type: none"> <li>• Off- and nearshoring (regional IT sourcing)</li> <li>• Outsourcing (external IT sourcing)</li> <li>• Transformation to the Cloud / Everything as a Service</li> <li>• Low code platforms as game changers in software development</li> </ul>
Qualification aims for the module learning objectives/skills	<p>With successful participation in the module, students can:</p> <ul style="list-style-type: none"> <li>• Understand the challenges in today's information management</li> <li>• Be familiar with and discuss the IT measures and technologies mentioned</li> <li>• Generate solution proposals for current problems and create implementation approaches</li> </ul>
Teaching and learning methods of the module	Seminar-based instruction at the beginning - Supported by case studies, group discussions and guest lectures. In the further course, work in small groups, in which the students work out the practice-relevant content themselves.
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Required elective for master's degree programs
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h

Type of examination / required course achievements	Portfolio exam: <ul style="list-style-type: none"> <li>• Written examination, 60 minutes, auxiliary: non-programmable calculator, 70%</li> <li>• Presentation, 15 minutes, plus 10 minutes Discussion, 30%</li> </ul>
Reading list	Will be announced in the first lecture

## 7.8 Secure Concepts and Protocols

Title	Sichere Konzepte und Protokolle
Title in English	Secure Concepts and Protocols
Examination number	BIS2019 8005054, BIS2011 7953620 MIN2017 8900960
Module code	SKUP.WP
Module coordinator	Prof. Dr. Alexander von Bodisco
Name of university lecturer	You can find the name of the lecturer for the current semester in the timetable.
Faculty	Faculty of Computer Science
Module type	Required elective module
Duration of module / frequency of module offer	The module is held in summer or winter term on an irregular basis depending on the demand.
Courses that make up the module	Secure Concepts and Protocols (4 credit hours)
Teaching language	The module is taught in English.
Content of the module	<p>Methods and concepts for performance evaluation:</p> <ul style="list-style-type: none"> <li>• Security concepts <ul style="list-style-type: none"> <li>– Model classification</li> <li>– Access control</li> <li>– Flow of information</li> </ul> </li> <li>• Key Management <ul style="list-style-type: none"> <li>– Key certification</li> <li>– Key generation</li> <li>– Key exchange</li> <li>– Key recovery</li> </ul> </li> <li>• Authentication <ul style="list-style-type: none"> <li>– Authentication through knowledge, biometry or distributed systems</li> </ul> </li> <li>• Security in Computer Networks Firewall technology, OSI-security architecture, secure communication, IPSec, SSL/TLS</li> <li>• Security requirements in industrial networks</li> <li>• Secure mobile wireless communication <ul style="list-style-type: none"> <li>– GSM, UMTS, Long Term Evolution (LTE) and SAE, WLAN, Bluetooth</li> </ul> </li> </ul>
Qualification aims for the module learning objectives/skills	Student know and understand the basics of security concepts and communication protocols. Students are able to evaluate and compare security concepts with regard to security vulnerabilities.
Teaching and learning methods of the module	Lecture and practical exercises to deepen the gained knowledge.
Prerequisites for participation	None
Possibility to use module within student's own study programme or other programmes	Required elective module for master's degree programs, Compulsory module for the master degree 'Industrial Safety and Security'.
Total workload and its constituent parts	Credit hours: 4, ECTS credits: 5, Contact hours: 60h, Independent study: 90h, Total workload: 150h



Type of examination / required course achievements	Written examination, 90 minutes
Reading list	<p><b>Eckert, C.;</b> "IT-Sicherheit -Konzepte -Verfahren -Protokolle", 9te Auflage, De Gruyter Oldenbourg, ISBN-13:978-3486200003.</p> <p><b>Kurose, J. und Ross, K.;</b> "Computernetzwerke - Der Top-Down Ansatz", 6te Auflage, Pearson IT, ISBN-13:978-3-86894-237-8.</p> <p><b>Tanenbaum, A. S.;</b> "Computernetzwerke", 5te Auflage, Pearson Studium, ISBN-13:978-3-8689-4137-1.</p> <p><b>Sauter, M.;</b> "Grundkurs Mobile Kommunikationssysteme: UTMS, HSPA und LTE, GSM, GPRS, Wireless LAN und Bluetooth", 5te Auflage, Springer Vieweg, ISBN-13:978-3-6580-1460-5.</p>

# Index

1st Foreign Language , 3  
2nd Foreign Language 1 of 4 , 10  
2nd Foreign Language 2 of 4 , 13  
2nd Foreign Language 3 of 4 , 24

Computer Games Development , 43, 57  
Customizing , 33  
Customizing of Information Systems , 20

Data Analytics , 29  
Data Science , 59  
Database Systems , 11  
Digital Transformation in Organizations , 45, 61

E-Business , 22  
Embedded Security , 63  
Enterprise Architecture Management , 48, 65

Interaction Engineering , 51, 68  
Introduction to Business Administration, Financial  
Accounting , 8

Introduction to Information Systems , 14  
IT Applications Seminar , 35  
IT Sourcing and Cloud Transformation , 53, 70

Master's Seminar , 38, 40  
Mathematics 1 , 4  
Mathematics 2 , 18

Programming 1 , 6  
Programming 2 & Software Engineering , 16  
Programming of Information Systems , 25  
Project 1 , 36  
Project 2 , 37  
Project Work , 42  
Project Work 1 , 31  
Project Work 2 , 32

Secure Concepts and Protocols , 72  
Statistics , 27

Visual Thinking for Business , 55