

Hochschule Karlsruhe

**Faculty for Computer Science and Business
Information Systems**

Module manual

**Course of studies Media and Communication
Computer Science (Bachelor), ER 3**

Summer semester 2023

Module Media and Communication Computer Science (Bachelor), ER 3

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| Module Computer Science 1 | |
|---|--|
| Internal number | MKIB1103 |
| Coordinator | Prof. Dr. Patrick Baier |
| Scope | 8 ECTS points, 8 Contact hours |
| Placement | 1st Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | The courses of this module teach the students fundamental programming and algorithmic skills. The students should be enabled to analyze small problems, find solutions to these problems, and develop them in the Java programming language. |
| Exams | Individual exams |
| Lecture Computer Science 1 | |
| Internal number | MKIB1113 |
| Lecturer | Prof. Dr. Christian Pape |
| Scope | 5 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | After attending the lecture, the students are able to solve small computer science problems with the Java programming language. They know common design methods, basic search and sort procedures, and can apply them in practice. |
| Recommended reading | Selected exercises with solutions, slides in PDF format, Java programs and their documentation as Javadoc. Supplementary Java exercises with solutions to deepen the programming skills. |
| Exams | Written Exam 120 Min. (graded) |
| Comments | Lecture participation. Solving simple exercises in the lecture with teacher support. |
| Lecture Computer Science 1 Exercise | |
| Internal number | MKIB1123 |
| Lecturers | Prof. Dr. Heiko Körner Prof. Dr. Christian Pape |
| Scope | 3 ECTS points, 4 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | The students turn small computer sciences problems into practice (design, implementation with Java, testing, debugging). The students are able to create their own homepage. |

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| Recommended reading | |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Practical assignment in a computer laboratory. |

| Module Media Design | |
|---|---|
| Internal number | MKIB1203 |
| Coordinator | Prof. Thomas Hinz |
| Scope | 7 ECTS points, 6 Contact hours |
| Placement | 1st Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | |
| Exams | Individual exams |
| Lecture Media Design | |
| Internal number | MKIB1213 |
| Lecturer | Prof. Thomas Hinz |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The students become acquainted with the theoretical foundations of media design. This includes knowledge about creativity techniques, design rules and gestalt principles, systems of organisation, micro- and macro typography, colour theory, logos/pictograms/icons as well as grid systems for layouts. Additionally, they gain insights into analog and digital photography and the conception and design of digital media content exemplified through web applications. The students explore the history of design, starting at the dawn of industrialisation and including the seminal design movements of the 19th and 20th centuries as well as contemporary trends in design. This overview enables students to categorise and evaluate different design styles, allowing an integration of the acquired knowledge into their own design processes. |
| Recommended reading | <ul style="list-style-type: none"> - M. Jäger: "Grafik und Gestaltung: Mediengestaltung von A bis Z verständlich erklärt", Rheinwerk Verlag, 2014, ISBN 978-3-8362-2513-7 - S. M. Weinschenk: "100 Dinge, die jeder Designer über Menschen wissen muss", Addison-Wesley Verlag, 2011, ISBN 978-3827330994 - M. Pricken: "Kribbeln im Kopf", Schmidt Hermann Verlag, 2010, ISBN 978-3874397971 - T. Rempen, Uwe Stoklossa: "Blicktricks", Schmidt Hermann Verlag, 2005, ISBN 978-3874396813 - C. Berents: "Kleine Geschichte des Design: Von Gottfried Semper bis Philippe Starck", C.H. Beck, 2011, ISBN 978-3406622410 |
| Exams | Concept 1 Semester (graded) |
| Comments | |
| Lecture Media Design Exercise | |

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| Internal number | MKIB1223 |
| Lecturer | Prof. Thomas Hinz |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Exercise 1 Semester (not graded) |
| Comments | |

| Module Theoretical Computer Science | |
|---|---|
| Internal number | MKIB1303 |
| Coordinator | Prof. Dr. Heiko Körner |
| Scope | 4 ECTS points, 4 Contact hours |
| Placement | 1st Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | Participants of this lecture will be in a position to recognize the fundamental limitations of today's computers when solving important problems. Hence, this course gives an introduction to the basic areas of modern theoretical computer science. The Chomsky hierarchy helps the students to classify formal languages by their algorithmic complexity. Furthermore, the students use computational models (finite state automata, push-down automata) to represent today's computers and to understand their limits. Due to these limitations, several problems are shown to be unsolvable. Proving all these results requires precise mathematical and logical arguments, and the students are intensively trained to use them correctly. |
| Exams | Individual exams |
| Lecture Theoretical Computer Science | |
| Internal number | MKIB1313 |
| Lecturer | Prof. Dr. Heiko Körner |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>This course gives an introduction to the theory of formal languages. The Chomsky hierarchy will serve as a model to classify these languages by their computational complexity. Modern computers are represented by finite state automata, showing their principal limits. The students also learn how to apply several proof techniques.</p> <p>The lecture include the following areas of theoretical computer science: mathematical logic, formal languages, proof techniques, the O-calculus, finite automata, regular languages and expressions, the Chomsky hierarchy, the pumping lemma for regular and context-free languages and the minimization of finite automata by the theorem of Myhill-Nerode. Furthermore, the course covers pushdown automata, the CYK algorithm and closure properties of regular and context-free languages.</p> |

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| Recommended reading | <p>The substance of the lecture will be discussed at the blackboard. Lecture notes containing the complete material are also available. Furthermore, there are sample solutions to all exercises.</p> <p>Literature: D. W. Hoffmann: Theoretische Informatik, 3. Auflage. Hanser, 2015. M. Sipser: Introduction to the Theory of Computation, 3rd edition. Cengage Learning, Inc., 2012.</p> |
| Exams | Written Exam 90 Min. (graded) |
| Comments | This course will take place as a pure lecture. Numerous exercises deepen selected areas and will be discussed in tutorials. |

| Module Mathematics 1 | |
|---|--|
| Internal number | MKIB1403 |
| Coordinator | Prof. Dr. Frank Schaefer |
| Scope | 8 ECTS points, 6 Contact hours |
| Placement | 1st Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | Participants learn the mathematical basics from linear algebra, which are often used in computer science. These basics are specifically needed in computer graphics, robotic, cryptography. |
| Exams | Individual exams |
| Lecture Mathematics 1 | |
| Internal number | MKIB1413 |
| Lecturer | Prof. Dr. Frank Schaefer |
| Scope | 5 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>The participants should learn basic knowledge of mathematics and especially of linear algebra and acquire the methods to solve smaller mathematical tasks by themselves. In the part on linear algebra we will focus on knowledge needed in computer graphic and 3D simulations.</p> <p>Content of the lectures: Proof methods, relations, euqivalence relations, modulo-calculation, Euklid's algorithm, functions, operations, groups, rings, fields, polynomial rings, finite fields, interpolation, vector spaces, basis, dimension, linear equations, rank, Gauß-Jordan-algorithm, determinant, matrices, linear map, inverse matrices, rotation, translation, scaling, scalarproduct, norm, vectorproduct, orthogonal matrizen, eigenvalues, eigenvectors, homogeneous coordinates.</p> |
| Recommended reading | Own writings from the blackboard, Exercises and summaries from the internet, Textbook: Peter Stingl: Mathematik für Fachhochschulen, Hanser Verlag, 8. Auflage, 2009, ISBN-10: 3-446-42065-7 |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Lecture, Exercises, Summary of the solutions in the lecture, Tutorials for further assistance |
| Lecture Mathematics 1 Laboratory | |
| Internal number | MKIB1423 |
| Lecturer | Prof. Dr. Frank Schaefer |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |

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| Language of instruction | German |
| Content | Improving the knowledge of the related lectures, basics in computer-algebra systems, mathematical problem solving with computer assistance. With the help of the computer algebra system Maple different, applied mathematical questions from the fields of geometry, curves, interpolation and linear equations will be solved. It will be focussed on matrices and homogenous coordinates, which are an important foundation for computer graphic. |
| Recommended reading | Short introduction will be given. Exercises distributed in the classes and also available on the internet. |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Exercises in the labs with Maple (instructor will be present). |

| Module Language Competence | |
|---|---|
| Internal number | MKIB1503 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 4 ECTS points, 4 Contact hours |
| Placement | 1st Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | The learning of a foreign language is an integral component of the in the course of studies communicated key qualification. |
| Exams | Individual exams |
| Lecture Foreign Languages | |
| Internal number | MKIB1513 |
| Lecturer | Mehrere Dozenten |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | English |
| Content | <p>After a grading test students can deepen their English skills to three grades. The entry level requires the competence grade A2 (basic user) in the six-stage common European reference framework. The first two grades (English for advanced learners 1 and 2) engage besides a recapitulation of grammar mainly in issues of job-oriented common language and cultural studies, e.g. job application letters, descriptions of products and services, business telephone calls, progress of formal and informal conferences, presentations etc. The thus achieved grade complies with 173 points in the TOEFL (computer-based) or the competence grade B2 (independent user) of the European reference framework. In the following grade special language skills (English for science and technics) are learnt: In business English the priority is on spoken language and small study groups. At the beginning of the semester each group founds its own company which advances dynamically during the course of the semester. At the same time vocabulary and phrasing in respect of topics like company structures, meetings, negotiation, marketing, production and sale, finances, comprehending of reports and presentations are gone through in order to make the attendees handle the language instruments to cope with each step of the simulation in English. The highlights of the course are a simulated exhibition, a hiring procedure and the group presentation. In technical English the priority is on the learning and practice of a technical basis vocabulary and typical expressions of technical communication.</p> |
| Recommended reading | Literature depends on grade, PowerPoint presentations, excercises, Videos, DVDs |
| Exams | Written Exam 120 Min. (graded) |

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| Comments | Lecture participation, short talks, discussions |
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| Module Computer Science 2 | |
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| Internal number | MKIB2103 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 7 ECTS points, 6 Contact hours |
| Placement | 2nd Semester |
| Pre-requisites with regard to content | Theoretische Informatik, Informatik 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | The module is based on module "Informatik 1". The students will learn to develop a computer science project using object oriented techniques in Java. They become acquainted with advanced analysis, design and realization competences as well as abstract data types and their implementation by data structures and algorithms. The students will learn to choose an appropriate data type depending on the application area and the given runtime conditions. Furthermore they will be familiar with graphical user interfaces and object-based programming with JavaScript. |
| Exams | Individual exams |
| Lecture Computer Science 2 | |
| Internal number | MKIB2113 |
| Lecturers | Prof. Dr.-Ing. Holger Vogelsang Dipl.-Ing. Christian Meder |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | This lecture consists of four parts. The first one introduces basic concepts of object oriented programming on the basis of the programming language Java. The main issues are among other things: Language elements of Java, data abstraction and encapsulation, inheritance, polymorphism, generic programming, error handling and runtime type information. Based on these techniques an introduction in modeling of class diagrams with UML is made. Additional practical exercises with a standard IDE deepen the knowledge. The second part introduces the development of mobile Apps with graphical user interfaces for Android. The third part of the lecture deals with some important data structures like lists, hash tables, tree and graphs and introduces basic algorithms to operate on them. The fourth part introduces the modularization of applications with Spring. |

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| Recommended reading | <p>On the lecture homepage: PowerPoint presentation, program examples, script</p> <p>Books:</p> <ul style="list-style-type: none"> - Christian Ullenboom, Java ist auch eine Insel, Galileo Computing - R. C. Martin, Clean Code, mitp - B. Lahres, G. Raýman, Objektorientierte Programmierung, Galileo Computing - G. Popp, Konfigurationsmanagement mit Subversion, Maven und Redmine, dpunkt - M. Jeckle, C. Rupp, J. Hahn, B. Zengler, S. Queins, UML 2 - glasklar, Hanser-Verlag - G. Saake, K. Sattler, Datenstrukturen und Algorithmen: Eine Einführung mit Java, dpunkt - O. Zeigermann: "JavaScript für JavaEntwickler", entwickler.press - D. Flanagan: "JavaScript - kurz & gut", O'Reilly - M. Haverbeke: "Eloquent JavaScript", kostenlos unter http://eloquentjavascript.net/ - JavaScript-Referenz: https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Preparation of lecture contents and exam |
| Lecture Computer Science 2 Exercise | |
| Internal number | MKIB2123 |
| Lecturers | Prof. Dr.-Ing. Holger Vogelsang Dr. Martin Holzer |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | The students solve Java and JavaScript exercises and model small applications using UML class diagrams. |
| Recommended reading | Script, compulsory and optional exercises on the homepage, solutions for optional exercises |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Practical exercise with discussion of solutions |

| Module Software Project | |
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| Internal number | MKIB2203 |
| Coordinator | Prof. Dr. Martin Sulzmann |
| Scope | 5 ECTS points, 4 Contact hours |
| Placement | 2nd Semester |
| Pre-requisites with regard to content | Informatik 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | <p>The students learn to apply the theoretical knowledge of "Informatik 2" using the programming language C++. They have design and implement projects with an increasing level of difficulty. The main topics are:</p> <ul style="list-style-type: none"> - Practicing object oriented programming techniques - Preferring abstractions over concrete implementations - Modeling class and package diagrams before starting an implementation - Code quality assurance by writing automated tests - Teamwork |
| Exams | Individual exams |
| Lecture Software Project | |
| Internal number | MKIB2213 |
| Lecturers | Prof. Dr. Martin Sulzmann Prof. Dr. Christian Pape |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The students implement projects with an increasing complexity in C++. They have to use generic classes, inheritance, polymorphism, abstract classes and interfaces and concepts for error handling and detection like exceptions and assertions. Additionally they will learn to use elements of the STL and to model the classes and their relationships with UML. |
| Recommended reading | <p>On the homepage: Project description with a step-by-step instruction, Java script, optional exercise with solutions, books:</p> <ul style="list-style-type: none"> - Ulrich Breymann, C++ - Einführung und professionelle Programmierung, Hanser-Verlag |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Laboratory work |
| Lecture Software Project Exercise | |
| Internal number | MKIB2223 |
| Lecturers | Prof. Dr. Martin Sulzmann Prof. Dr. Heiko Körner Prof. Dr. Christian Pape |

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| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Exercise 1 Semester (not graded) |
| Comments | |

| Module Technologies of the Internet | |
|---|---|
| Internal number | MKIB2303 |
| Coordinator | Prof. Dr. Christian Zirpins |
| Scope | 5 ECTS points, 4 Contact hours |
| Placement | 2nd Semester |
| Pre-requisites with regard to content | Informatik 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | The two lectures on the topic of distributed systems ("Distributed Systems 1" and "Distributed Systems 2") teach both foundational and advanced principles that are illustrated through practical examples of existing paradigms and technologies. Principles treated in this course encompass foundations of goals and classes of distributed systems, as well as their architectures, processes, communication and name systems. Advanced principles include synchronisation, consistency and replicability, error-tolerance and security. The principles introduced in this course are exemplified through the paradigms of web-based systems and component-based systems. This includes sample implementations of individual principles. In addition, the course gives an introduction into the development of corresponding systems using actual technologies as examples. |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Distributed Systems 1 | |
| Internal number | MKIB2313.a |
| Lecturer | Prof. Dr. Christian Zirpins |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The course provides a practical introduction to the concepts and paradigms of distributed systems using the example of web technologies and application development on the web. This initially involves an introduction of the world wide web with basic protocols such as HTTP and other standards in the context of the Internet. After that an introduction to the design and construction of web applications is provided. This includes firstly the frontend development with HTML5, CSS3 as well as client-side JavaScript and secondly the backend development with server-side JavaScript on the Node.js platform. Interactions between frontend and backend follow modern REST/HTTP and AJAX techniques. In addition, mechanisms for personalization with cookies and sessions as well as to authenticate users are presented. The course closes with a detailed discussion of web application security. |

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| Recommended reading | <ul style="list-style-type: none"> - Semmy Purewal, "Learning Web App Development", O'Reilly, 1. Auflage, 2014 - David Gourley, Brian Totty, "HTTP: The Definite Guide", O'Reilly, 2002 - Mark Pilgrim, "HTML5 Up and Running", O'Reilly, 2010 (Online: http://diveintohtml5.info) - Marijn Haverbeke, "Eloquent JavaScript", No Starch Press, 2014 (Online: http://eloquentjavascript.net) - Peter Gasston, "The Book of CSS3 - A Developer's Guide to the Future of Web Design", 2nd Edition, No Starch Press, 2014 - Andy Budd, Emil Björklund, "CSS Mastery", Third Edition, Apress, 2016 (Online verfügbar im Hochschulnetz) - Ethan Brown, "Web development with Node and Express", O'Reilly, 2014 - Robert Prediger ; Ralph Winzinger, "Node.js : Professionell hochperformante Software entwickeln", Hanser, 2015 (Online verfügbar im Hochschulnetz) - Additional literature will be announced during the lecture |
| Exams | Module exam |
| Comments | In preparation for individual lecture units, the self-study of basic content is required by means of the accompanying literature (relevant chapters will be announced in the event). Further independent work concerns the follow-up of the lecture contents and the exam preparation. |
| Lecture Interfacedesign | |
| Internal number | MKIB2313.b |
| Lecturer | Prof. Daniel Schwarz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | This course provides students with the theoretical and applied knowledge about the creation of media-based web applications. This includes the foundations of the markup language HTML and Cascading Style Sheets, how to embed different types of media, as well as the conception, design and programming of responsive web applications. |
| Recommended reading | Lecture notes, slides (PDF), multiple examples of programs |
| Exams | Module exam |
| Comments | Preparation of lecture contents and exam |

| Module Mathematics 2 | |
|---|------------------------------------|
| Internal number | MKIB2403 |
| Coordinator | Prof. Dr.-Ing. Astrid Laubenheimer |
| Scope | 7 ECTS points, 6 Contact hours |
| Placement | 2nd Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Analysis | |
| Internal number | MKIB2413.a |
| Lecturer | Prof. Dr.-Ing. Astrid Laubenheimer |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |
| Lecture Statistics | |
| Internal number | MKIB2413.b |
| Lecturer | Prof. Dr. Reimar Hofmann |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |

| Module Computer Engineering | |
|---|--|
| Internal number | MKIB2503 |
| Coordinator | Prof. Dr. Christian Langen |
| Scope | 7 ECTS points, 6 Contact hours |
| Placement | 2nd Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | Students will learn the basic concepts of computer engineering. They learn the mathematical concepts of number representation and Boolean algebra, which are required for the analysis and design of hardware circuits. They understand how the basic digital computing elements are constructed and how to combine them into complex switching networks. Furthermore, the students will be able to explain the structure and operation of current standard circuits such as adders or shift registers. Additionally, students are familiar with internal functions of typical processors. They are able to implement the hardware related software parts using the "C" programming language including the use of typical peripherals. All knowledge gained is reinforced by practical work in the laboratory. |
| Exams | Individual exams |
| Lecture Computer Engineering | |
| Internal number | MKIB2513 |
| Lecturers | Prof. Dr. Christian Langen Prof. Dr. Dirk Hoffmann |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | On the processor side, the lecture will cover the following, basic processor hardware, processor architecture, addressing modes, instructions, memory mapping, peripherals and bit processing. The special features of the programming languages C / C++ needed for hardware programming will also be covered. |
| Recommended reading | Powerpoint slide, personal notes, web based exercises and the suggested solution (provided upon request). |
| Exams | Written Exam 90 Min. (graded) |
| Comments | The student will be required to come prepared to participate in the lecture and will be expected to be able to develop a summary upon completion of the lecture, all exercises provided for reinforcement will be required to be individual work. |
| Lecture Digital Technology Laboratory | |

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| Internal number | MKIB2523 |
| Lecturers | Prof. Dr. Albrecht Ditzinger Prof. Dr. Dirk Hoffmann |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | Lab experiments will be conducted using: - Digital Circuits - Microcontrollers - Peripherals - Timers and Counters |
| Recommended reading | Exercises, equipment provided and various manuals and other support material. |
| Exams | Exercise 1 Semester (not graded) |
| Comments | All laboratory work will be group work. It will include the conduct of the experiment, demonstration of the required result and be prepared to answer questions on the work and the results. Groups are on their own and are required to come to the laboratory prepared to conduct the exercise. Each group will prepare a final documentation of the exercise. |

| Module System Software | |
|---|--|
| Internal number | MKIB3103 |
| Coordinator | Prof. Dr. Thomas Fuchß |
| Scope | 9 ECTS points, 8 Contact hours |
| Placement | 3rd Semester |
| Pre-requisites with regard to content | Theoretische Informatik, Softwareprojekt, Informatik 2, Informatik 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | Participants should know the design and implementation principles of modern operating systems. They should learn how to think in parallel structures and solve problems with the parallel programming paradigm. |
| Exams | Individual exams |
| Lecture System Software | |
| Internal number | MKIB3113 |
| Lecturer | Prof. Dr. Thomas Fuchß |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture System Software Laboratory | |
| Internal number | MKIB3123 |
| Lecturer | Prof. Dr. Carsten Sinz |
| Scope | 5 ECTS points, 4 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | <p>The course is organized in three exercises, covering compiler construction and interprocess communication. Starting with a scanner, the students consolidate their skills in handling large dynamic data structures, pointers, and doing low level IO. The second exercise focuses on the development of a recursive descendent parser and a short introduction to semantic analysis and code generation. The third exercise is an introduction to the field of interprocess communication. Within the exercise, elementary techniques and concepts are trained:</p> <ul style="list-style-type: none"> - generating processes / threads - terminating processes / threads - synchronizing processes / threads |

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| Recommended reading | Slides and textbooks: - Eduard Glatz. Betriebssysteme: Grundlagen, Konzepte, Systemprogrammierung - dpunkt.verlag, 2010 - A.V. Aho, M.S. Lam, R. Sethi und J.D. Ullman. Compiler - Prinzipien, Techniken und Werkzeuge - 2nd Edition - München: Pearson Studium, 2008. - D. Grune et. al. Modern compiler design - Wiley, 2000. - Andrew S. Tanenbaum. Betriebssysteme, Entwurf und Realisierung Teil 1 - Hanser, 1990. |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Attended teamwork and three lectures. |

| Module Databases and Communication Networks 1 | |
|---|--|
| Internal number | MKIB3203 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 7 ECTS points, 6 Contact hours |
| Placement | 3rd Semester |
| Pre-requisites with regard to content | Theoretische Informatik, Mathematik 1, Informatik 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | <p>The students know the current models of communication and database technology and are able to classify and evaluate unknown, e.g. new systems. They are familiar with the advantages and disadvantages of different architectures and will be considered when selecting the architecture for their own products.</p> <p>In the database area, they are largely familiar with the SQL-92 standard and are able to select, set up and safely operate database systems. The students are able to analyze given facts, to transfer these facts into a normalized data model, to create this data model under SQL and to use the resulting SQL databases under object-oriented languages.</p> <p>In the field of communication networks, students know the individual layers of the TCP/IP layer model and understand the tasks and service models of each layer. They can characterize and compare different protocols of each layer. They can analyze the requirements of a given application, select the most suitable protocols for that application, and combine them into a functioning network stack. You can also use the client-server approach and socket programming techniques to solve your own problems.</p> |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Databases 1 | |
| Internal number | MKIB3213.a |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | Introduction to information systems, basics of database systems, database organization, data models, database schema, architecture: 3-layer model, client-server architecture, language interfaces: SQL92 (queries, DDL, DML), SQL:2003 (object-oriented extensions, NF2), JDBC, recovery and transactions, ERM, mapping of entities and relationships to relational data models, normalization, OR mapping. |

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| Recommended reading | <ul style="list-style-type: none"> - Script - Example databases of the lecture for the common database systems - Exercises - Sample programs - Collection of old exams and their solutions - Edwin Schicker, "Datenbanken und SQL", Springer Vieweg, 2017, ISBN: 978-3834817327 - Gunter Saake, Kai-Uwe Sattler, "Datenbanken - Konzepte und Sprachen", mitp, 2013, ISBN: 978-3286694530 |
| Exams | Module exam |
| Comments | |

Lecture Communication Networks 1

| | |
|-------------------------|---|
| Internal number | MKIB3213.b |
| Lecturer | Prof. Dr. Oliver P. Waldhorst |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>Distributed systems; data transmission and communication networking techniques (circuit/packet switching); Serial / Parallel, fault detection-/protection mechanisms; service and protocol specification; flow control; negotiating qualities of service; multiplexing; time charts and finite state machines as a means of describing protocols; OSI reference model (Layers, protocols, services), protocol-stacks; the physical layer: analog and digital transmission, transmission media, STP/UDP, ISDN, xDSL; the data link layer: character and bitorientierte protocols (BSC, HDLC), Local area networks (LAN e.g.ETHERNET, Token Ring), topology, access procedures; the network layer: connection oriented and connectionless services, routing, congestion control; the transport layer: transport layer classes; RPC; socketprogramming; TCP / IP; the application system: Internet, services and protocols in the Internet environment (Telnet, FTP , SMTP, SNMP, DNS, Web, HTML / HTTP);</p> |
| Recommended reading | <ul style="list-style-type: none"> • Word handouts • Tanenbaum: Computer Networks, Pearson Studies, 2003 (german edition) • Collection of old exams and their solutions |
| Exams | Module exam |
| Comments | Lecture supported by transparencies and Power Point Slides. Student questions are welcome. In parallel to the lecture the participants should control their knowledge using the old exams and their solutions (available on the server). |

Lecture Databases 1 Laboratory

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|-----------------|--|
| Internal number | MKIB3223 |
| Lecturers | <p>M.Sc. Amir Bukhari</p> <p>Prof. Dr.-Ing. Holger Vogelsang</p> |
| Scope | 3 ECTS points, 2 Contact hours |

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|-------------------------|---|
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | A database application for a flight reservation system is designed and prototypically implemented. This includes setting up a DB scheme, the design and testing of SQL queries, the use of transactions and transaction levels, as well as programming a seat reservation transaction with Java, JDBC and SQLJ-based on Oracle. |
| Recommended reading | Sample database, JUnit test cases, test-GUI; Textbooks: - "Grundlagen von Datenbanksystemen", Ausgabe Grundstudium (Taschenbuch) von Ramez Elmasri, Shamkant B. Navathe, Pearson, 2005, ISBN: 3827371538 - "Datenbanksysteme" von Alfons Kemper, Andre Eickler, Oldenbourg, 2006, ISBN: 3486576909 - "Datenbanken & Java. JDBC, SQLJ, ODMG und JDO" von Gunter Saake, Kai-Uwe Sattler, Dpunkt Verlag, 2003, ISBN: 3898642283 |
| Exams | Laboratory Work 1 Semester (not graded) |
| Comments | Supervised laboratory with final presentation on the computer, self-work, preparation and after working of lab sessions, prepare a report of the laboratory tasks. |

| Module Man-Machine-Communication 1 | |
|---|--|
| Internal number | MKIB3303 |
| Coordinator | Prof. Dr. Ulrich Bröckl |
| Scope | 5 ECTS points, 3 Contact hours |
| Placement | 3rd Semester |
| Pre-requisites with regard to content | Informatik 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | The courses of this module teach the students fundamental programming and algorithmic skills. The students should be enabled to analyze small problems, find solutions to these problems, and develop them in the Java programming language. By means of periodic evening events they get basic understanding of association work, concretely the work of the Usability Professionals' Association (UPA). |
| Exams | Individual exams |
| Lecture Man-Machine-Communication | |
| Internal number | MKIB3313 |
| Lecturer | Prof. Dr. Ulrich Bröckl |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | - "GUI Design Essentials " von Susan Weinschenk, Pamela Jamar, Sarah C. Yeo, Verlag John Wiley & Sons, 1997, ISBN: 0471175498 |
| Exams | Written/verbal Exam 20 Min. (graded) |
| Comments | |
| Lecture Man-Machine-Communication Design | |
| Internal number | MKIB3323 |
| Lecturer | B.Sc. Valeria Zitz |
| Scope | 3 ECTS points, 1 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | An MMC-task which is standard practice is designed starting from task analysis up to the paper prototype. This prototype is subject - possibly over several iterations - of a usability test until the specified quality targets are reached. |
| Recommended reading | Script, eye-tracker and user monitoring space in the Usability Lab Textbooks: - "GUI Design Essentials " von Susan Weinschenk, Pamela Jamar, Sarah C. Yeo, Verlag John Wiley & Sons, 1997, ISBN: 0471175498 |

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| Exams | Homework 1 Semester (not graded) |
| Comments | Supervised group work with presentation and discussion; test the usability of the prototype, prepare a test report with proposals for improvements. |

| Module Media Project | |
|---|----------------------------------|
| Internal number | MKIB3403 |
| Coordinator | Prof. Thomas Hinz |
| Scope | 5 ECTS points, 5 Contact hours |
| Placement | 3rd Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | |
| Exams | Individual exams |
| Lecture Media Project | |
| Internal number | MKIB3413 |
| Lecturer | Prof. Thomas Hinz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Concept 1 Semester (graded) |
| Comments | |
| Lecture Media Project Exercise | |
| Internal number | MKIB3423 |
| Lecturer | Prof. Thomas Hinz |
| Scope | 3 ECTS points, 3 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Exercise 1 Semester (not graded) |
| Comments | |

| Module Business Administration and Service Management | |
|--|--|
| Internal number | MKIB3503 |
| Coordinator | Prof. Dr. Uwe Haneke |
| Scope | 6 ECTS points, 6 Contact hours |
| Placement | 3rd Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Business Administration | |
| Internal number | MKIB3513.a |
| Lecturer | Prof. Dr. Uwe Haneke |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>Es werden folgende Kenntnisse vermittelt:</p> <ul style="list-style-type: none"> - Java-Grundkenntnissen: Variablen, Kontrollstrukturen, Methoden, Klassen, Objekte, Felder, Schnittstellen, Dokumentation mit Javadoc, Testen mit JUnit, Programmierkonventionen. - Rekursion als Problemlösungs- und Programmierkonzept. - Objekt-orientierte Analyse und Entwurf mit Hilfe der UML (Grundlagen von Aktivitäts-, Klassen-, Objekt- und Paketdiagramm). - Entwurf und die Aufwandsabschätzung von Algorithmen anhand typischer Such- und Sortierverfahren sowie Backtracking. - Entwurfsmethodiken wie die Schrittweise Verfeinerung, Bottom-Up, Top-Down und Teile-und-Beherrsche. |
| Recommended reading | <p>Tafelmitschrift, Übungsaufgaben mit Lösungen, Java-Programme und deren Dokumentation als Javadoc. Weitere Java-Übungsaufgaben mit Lösungen zur Vertiefung.</p> <p>Joachim Goll, Cornelia Heinisch, "Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java", Springer Vieweg, 7. Auflage, 2014.</p> <p>James Gosling, Bill Joy, Guy Steele, Gilad Bracha, Alex Buckley, "The Java Language Specification, Java SE 8 Edition", Oracle America, 8. Auflage, März 2015</p> |
| Exams | Module exam |
| Comments | Vorlesungsteilnahme. Lösen einfacher Aufgaben während der Vorlesung. |
| Lecture IT Service Management | |
| Internal number | MKIB3513.b |

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|-------------------------|-------------------------------------|
| Lecturer | Prof. Dr. rer. pol. Mathias Philipp |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |

| Module Internship Preparation and Roundup | |
|---|--|
| Internal number | MKIB4P03 |
| Coordinator | Prof. Dr. Heiko Körner |
| Scope | 6 ECTS points, 4 Contact hours |
| Placement | 4th Semester |
| Pre-requisites with regard to content | Informatik 1 |
| Pre-requisites according to the examination regulations | Vorstudium |
| Competences | The students improve their vocational skills which are also important for the internship. Topics include managing projects, time and cost planning. The students will learn how to use standard software like the MS-Office products for evaluating calculations and presenting them attractively. In addition to that, macro skripts will be taught to solve recurring problems. |
| Exams | Individual exams |
| Lecture Internship Preparation | |
| Internal number | MKIB4P13 |
| Lecturers | Dr. Martin Holzer B.Sc. Veit Richter |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | This course deals with the general handling of MS Office products and gives specifically an introduction to the main functions of MS-Excel. Topics include input methods, formulas, chart depictions and search functions. Basic knowledge about the programming in VBA are also taught. These methods will also be used for macro skripts in MS-Word. Afterwards, the students have learned how to solve typicals problems efficiently with these today's standard programs. |
| Recommended reading | MS-PowerPoint slides, an accompanying script for reference, exercises. |
| Exams | Exercise 1 Week (not graded) |
| Comments | The course consists of of a lecture (50%) and supervised, practical exercises (50%). |
| Lecture Internship Roundup | |
| Internal number | MKIB4P23 |
| Lecturers | Dipl. WiInf. Lars Thoralf Thielemann Prof. Dr. Heiko Körner |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |

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| Content | <p>This course aims to systematically reflect the internship done by each student and especially to advise them with their written assignments to be submitted. To this end, we will discuss the entire process of scientific writing, address each particular step in more detail, and deduce general guidelines towards a smooth implementation into practice. Furthermore, this course provides a thorough introduction to the use of LaTeX, a typesetting system widespread throughout the scientific community.</p> |
| Recommended reading | <ul style="list-style-type: none"> - Slides provided by lecturer, individual notes taken by students - General literature on scientific writing (e.g., "Writing scientific English" by Tim Skerns) - General literature / online tutorials on the LaTeX typesetting system |
| Exams | Exercise 1 Week (not graded) |
| Comments | <p>Students are expected to attend this course regularly and to actively take part in discussions and practical lab exercises. To pass this course, they must further submit their written assignment by the end of the course (meeting the demands specified by the lecturer in the first session).</p> |

| Module Internship | |
|---|--|
| Internal number | MKIB4PX3 |
| Coordinator | Prof. Dr. Thomas Fuchß |
| Scope | 24 ECTS points, 0 Contact hours |
| Placement | 4th Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | Vorstudium |
| Competences | The internship is designed to deepen the previously acquired knowledge and skills by qualified collaboration in a larger project. The focus is on improving the technical competence and the development of social and personal skills. The student needs to assert himself as an independent member of the team. He becomes acquainted with new fields of duty and will become familiar with new tools. He learns to evolve himself and to assess his skills. The internship may be pursued in a company, in a research facility or an authority. |
| Exams | Individual exams |
| Lecture Internship | |
| Internal number | MKIB4PX13 |
| Lecturer | Prof. Dr. Thomas Fuchß |
| Scope | 24 ECTS points, 0 Contact hours |
| Type/mode | On-the-job Training |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Hands-on Work 95 Days (not graded) |
| Comments | |

| Module Software Engineering and Distributed Systems 2 | |
|--|---|
| Internal number | MKIB5103 |
| Coordinator | Prof. Dr. Thomas Fuchß |
| Scope | 8 ECTS points, 7 Contact hours |
| Placement | 5th Semester |
| Pre-requisites with regard to content | Datenbanken und Kommunikationsnetze 1, Informatik 2, Mensch-Maschine-Kommunikation 1, Praxistätigkeit, Technologien des Internets |
| Pre-requisites according to the examination regulations | none |
| Competences | <p>The students learn how to work independently and productively in large software projects. This includes the decomposing of development tasks as well as the determination and assessment of appropriate architectures. They are able to capture the necessary steps in the context of a given task, to structure and clarify their decisions using suitable tools and methodologies, independently.</p> <p>In this context, the students also gain the ability to recognize and classify goals and problems of distributed software systems. They can explain the general concepts of architectures, processes, communication, naming, coordination, replication fault tolerance and security, and apply them to the construction of distributed software services and applications.</p> |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Software Engineering | |
| Internal number | MKIB5113.a |
| Lecturer | Prof. Dr. Thomas Fuchß |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>The course "software engineering" concentrates on methods and techniques for the structured development of large software systems. Beyond the repetition of well-known object oriented concepts, the focus lies on establishing the fundamentals of modern and agile software development process. Based on their experiences made during internship, the students discover the real challenges associated to such a development process. The lecture is accompanied by a course-project, to gain experiences in practice. This covers agile and component based development techniques, containing requirement engineering, analysis, and design as well as a prototypical implementation of the software system in java.</p> |

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| Recommended reading | <p>Slides, textbooks, and other literature:</p> <ul style="list-style-type: none"> - Craig Larman. Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, 3. ed. - Upper Saddle River, NJ: Prentice Hall, 2004. - I. Jacobson, G. Booch, and Rumbaugh. The unified software development process - Reading, Mass.: Addison-Wesley, 1999. - Jim Arlow, Ila Neustadt. UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2. ed. - Addison-Wesley Professional, 2005. - Bernd Oestereich. Developing Software with UML: Object-Oriented Analysis and Design in Practice 2. ed. - Addison-Wesley Professional, 2003. - Bernd Oestereich. Analyse und Design mit UML 2.1: Objektorientierte Softwareentwicklung, 8. ed. - München; Wien; Oldenbourg, 2006. - OMG Object Management Group. UML 2.4.1 Superstructure Specification - Needham Ma: OMG, 2011. - Schwaber, K. and Sutherland, J. The Scrum Guide: The Definitive Guide to Scrum - Scrum.org, 2011. - Shimp, D. and Rawsthorne, D. Exploring Scrum: The Fundamentals - CreateSpace, 2011. - Sommerville, Ian. Software Engineering (9. Ausgabe) - Pearson Studium, 2012. |
| Exams | Module exam |
| Comments | The lecture will take the form of seminars with exercises. |
| Lecture Distributed Systems 2 | |
| Internal number | MKIB5113.b |
| Lecturer | Prof. Dr. Christian Zirpins |
| Scope | 3 ECTS points, 3 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>The lecture conveys both fundamental and extended principles of distributed systems and illustrates these in practical form on the basis of concrete paradigms and technologies. The spectrum of principles covered includes fundamental aspects of the objectives and classes of distributed systems, as well as their architectures, processes, communications, and naming. Advanced principles include coordination, consistency and replication, fault tolerance and security. The covered principles are exemplified by various paradigms. Here, exemplary implementations of individual principles are presented. In addition, an introduction to the development of corresponding systems based on concrete software technologies is given.</p> |
| Recommended reading | <ul style="list-style-type: none"> - Andrew S. Tannenbaum, Marten van Steen, "Verteilte Systeme, Prinzipien und Paradigmen", 2. aktualisierte Auflage, Pearson Studium, 2008, ISBN 978-3-8273-7293-2 - George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, "Distributed Systems, Concepts and Design", Fifth Edition, Addison-Wesley, 2012, ISBN 978-0-13-214301-1 - Additional literature will be announced during the lecture |

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| Exams | Module exam |
| Comments | Autonomous work includes pre- and post processing of lectures, exercises and exam preparation. |
| Lecture Softwareengineering Laboratory | |
| Internal number | MKIB5123 |
| Lecturer | Prof. Dr. Thomas Fuchß |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | Accompanying the software engineering lecture this course project covers a complete step in a modern software development process. Beginning with requirement engineering and analysis, central use cases are designed and finally implemented in Java. By this students learn more than facts, they get experiences and they understand the meaning of terms like architecture-oriented, iterative, incremental, or component-based. |
| Recommended reading | <p>Slides, textbooks, and other literature:</p> <ul style="list-style-type: none"> - Craig Larman. Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, 3. ed. - Upper Saddle River, NJ: Prentice Hall, 2004. - I. Jacobson, G. Booch, and Rumbaugh. The unified software development process - Reading, Mass.: Addison-Wesley, 1999. - Jim Arlow, Ila Neustadt. UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2. ed. - Addison-Wesley Professional, 2005. - Bernd Oestereich. Developing Software with UML: Object-Oriented Analysis and Design in Practice 2. ed. - Addison-Wesley Professional, 2003. - Bernd Oestereich. Analyse und Design mit UML 2.1: Objektorientierte Softwareentwicklung, 8. ed. - München; Wien; Oldenbourg, 2006. - OMG Object Management Group. UML 2.4.1 Superstructure Specification - Needham Ma: OMG, 2011. - Schwaber, K. and Sutherland, J. The Scrum Guide: The Definitive Guide to Scrum - Scrum.org, 2011. - Shimp, D. and Rawsthorne, D. Exploring Scrum: The Fundamentals - CreateSpace, 2011. - Sommerville, Ian. Software Engineering (9. Ausgabe) - Pearson Studium, 2012. |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Attended teamwork |

| Module Databases and Communication Networks 2 | |
|---|--|
| Internal number | MKIB5203 |
| Coordinator | Prof. Dr. Zoltán Nochta |
| Scope | 5 ECTS points, 4 Contact hours |
| Placement | 5th Semester |
| Pre-requisites with regard to content | Datenbanken und Kommunikationsnetze 1 |
| Pre-requisites according to the examination regulations | none |
| Competences | |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Databases 2 | |
| Internal number | MKIB5213.a |
| Lecturer | Prof. Dr. Zoltán Nochta |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | - "Datenbanksysteme" von Alfons Kemper, Andre Eickler - "Database Solutions" von Thomas Connolly, Carolyn Begg |
| Exams | Module exam |
| Comments | |
| Lecture New Lecture | |
| Internal number | MKIB5213.b |
| Lecturer | Prof. Dr. Oliver P. Waldhorst |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The buzzword "Cloud" represents a variety of interesting technologies which gained importance in the life of a computer science professional. Those are being collected, examined, explained and understood during the course. Primary objective is usefulness for the student, regardless of whether he acts as a cloud user, developer, administrator or even entrepreneur. Understand the broad meaning of "Cloud Computing" from a variety of perspectives: Definition, use cases, technology basics, key players, APIs, scaling, redundancy ... |
| Recommended reading | Powerpoint slides |
| Exams | Module exam |
| Comments | |

| Module Computer Graphics abd Computer Vision | |
|---|--|
| Internal number | MKIB5303 |
| Coordinator | Prof. Dr. Peter Henning |
| Scope | 7 ECTS points, 5 Contact hours |
| Placement | 5th Semester |
| Pre-requisites with regard to content | Informatik 1, Informatik 2, Technologien des Internets |
| Pre-requisites according to the examination regulations | none |
| Competences | |
| Exams | Written Exam 120 Min. (graded) |
| Lecture Computer Graphics | |
| Internal number | MKIB5313.a |
| Lecturer | Prof. Dr. Peter Henning |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | Henning, Taschenbuch Multimedia. |
| Exams | Module exam |
| Comments | |
| Lecture Computer Vision | |
| Internal number | MKIB5313.b |
| Lecturer | Prof. Dr.-Ing. Astrid Laubenheimer |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |
| Lecture Computer Graphics Laboratory | |
| Internal number | MKIB5323 |
| Lecturer | Prof. Dr. Peter Henning |
| Scope | 3 ECTS points, 1 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |

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| Content | Graphical primitives, polygonalmodels, transformations. Coloring, lighting and textures. Animation through sensors and interpolators. Elements of OpenGL: Vertices, polygons, transformation matrices. Lighting and textures |
| Recommended reading | Material from the lecture |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Presence required, solution of lab problems |

| Module Student Research Project | |
|---|--|
| Internal number | MKIB5403 |
| Coordinator | Prof. Dr. Heiko Körner |
| Scope | 6 ECTS points, 4 Contact hours |
| Placement | 5th Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | The students gain the ability to elaborate an individual solution of a clearly defined design requirement. In addition to the practical work the students will develop a documentation which clearly defines their individual work. The students will demonstrate the ability to present resultant work in a colloquial setting. |
| Exams | Individual exams |
| Lecture Student Research Projekt | |
| Internal number | MKIB5413 |
| Lecturer | Alle Dozenten |
| Scope | 5 ECTS points, 4 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |
| Content | The project will require individual work to solve problems in both the software and hardware arenas. Normally the work will be comprised of a practical problem, but instead may include software or hardware evaluation or literature research. The student will prepare a final documentation for the project. The format, content, size, etc. will be determined by the project advisor depending upon the requirements set forth in the initial project. The project is concluded by a colloquium in which the student will defend his work. |
| Recommended reading | |
| Exams | Homework 1 Semester (not graded) |
| Comments | All work will be individual work and will include basic literature research, system analysis, coding, documentation, and oral presentation. |
| Lecture Student Research Projekt Colloquium | |
| Internal number | MKIB5423 |
| Lecturer | Alle Dozenten |
| Scope | 1 ECTS points, 0 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |

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| Content | The colloquium is the final step in completing the project work. The colloquium will include a description of the project, the work conducted and the final solution. |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | All work will be individual work and will include the presentation, discussion, defense of the work. |

| Module Elective courses 1 | |
|---|--|
| Internal number | MKIB5503 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 4 ECTS points, 4 Contact hours |
| Placement | 5th Semester |
| Pre-requisites with regard to content | none |
| Pre-requisites according to the examination regulations | none |
| Competences | The student should be able to lay his emphasis on individual interests. |
| Exams | Individual exams |
| Lecture New Lecture | |
| Internal number | I W156 |
| Lecturer | Prof. Dr. Martin Sulzmann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | English |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Business Intelligence | |
| Internal number | I W179 |
| Lecturer | Prof. Dr. Uwe Haneke |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <ul style="list-style-type: none"> - Introduction and business-management background - The concept of data warehousing - Business Analytics and Balanced Scorecard (BSC) - CRM and Data Mining - Trends in Business Intelligence-Case studies |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Parallel Systems | |
| Internal number | I W391 |
| Lecturer | Prof. Dr. Christian Langen |

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| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture IT-Security Management | |
| Internal number | I W394 |
| Lecturer | Prof. Dr. rer. pol. Mathias Philipp |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W501 |
| Lecturer | Prof. Dr. Frank Schaefer |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W502 |
| Lecturer | Prof. Dr. Thomas Morgenstern |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Presentation 20 Min. (graded) |
| Comments | |
| Lecture „Empathic-pragmatic“. Methods in User Research. | |

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|--|--|
| Internal number | I W503 |
| Lecturer | Dipl.Design. Heike Biscosi |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>User Research - methods all around fictitious and real users, to to establish a "human centered approach" in projects.</p> <p>Teaching contents are methods which contribute to a better understanding of people and their usage contexts, to improve the development, design and evaluation of interactive products and systems.</p> <p>Following topics - in theory and praxis - will be part of the seminar:</p> <ul style="list-style-type: none"> - Creative and qualitative research methods, such as target group analysis, mental models, persona design, persona-moodboard, job stories, cultural probes, user diaries, focus groups, interviews, scenarios and storyboards, user journeys, acceptance and usability testings. - Basic principles of different quantitative methods: survey and questionnaire design, descriptive statistics, laboratory-based studies, experimental studies. - Evaluation of quantitative methods, as described in research reports. |
| Recommended reading | <ul style="list-style-type: none"> - Lecture notes, - Case studies from practice, - further literature references will be given in the lecture. |
| Exams | Homework 1 Semester (graded) |
| Comments | Seminaristic lecture with practical exercises. |
| Lecture ERP Systems with Laboratory | |
| Internal number | I W551 |
| Lecturer | Prof. Dr. rer. pol. Mathias Philipp |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>Contents: ERP basics, system integration, system architectures, and logistics: Distribution (SD), Materials Management (MM), Production Planning and Control (PP) as well as Financial Accounting (FI) and Controlling (CO). In addition, an overview is given to the software selection.</p> |
| Recommended reading | <p>Recommended reading: Lecture material completely as PowerPoint documents, blackboard notes for interactive development of central problem positions, a main textbook to ERP, a main textbook to SAP ECC 6.0.</p> |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Kind of work: Lecture participation |
| Lecture Game Programming | |
| Internal number | I W620 |
| Lecturer | Prof. Dr. Peter Henning |
| Scope | 2 ECTS points, 2 Contact hours |

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| Type/mode | Lecture |
| Language of instruction | English |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Computer Vision Laboratory | |
| Internal number | I W773 |
| Lecturer | Prof. Dr.-Ing. Astrid Laubenheimer |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Laboratory Work 1 Semester (graded) |
| Comments | |
| Lecture App Programming | |
| Internal number | I W912 |
| Lecturer | M.Sc. Adrian Wörle |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The lecture teaches the construction of mobile media applications. The main concepts are discussed using the Android platform. In a first part, the basic technologies and limitations of mobile devices are shown. The second part examines different development strategies like native applications, device independent abstractions and web applications. A main part of the lecture is the integration of different media types into mobile applications and the constraints the developer has to keep in mind. |
| Recommended reading | will be announced |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Lecture with exercise |
| Lecture Cloud Computing | |
| Internal number | I W913 |
| Lecturers | Dipl. Inform. (FH) Michael Fischer Dipl. Inform. (FH) Georg Magschok |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |

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| Content | The buzzword "Cloud" represents a variety of interesting technologies which gained importance in the life of a computer science professional. Those are being collected, examined, explained and understood during the course. Primary objective is usefulness for the student, regardless of whether he acts as a cloud user, developer, administrator or even entrepreneur. Understand the broad meaning of "Cloud Computing" from a variety of perspectives: Definition, use cases, technology basics, key players, APIs, scaling, redundancy ... |
| Recommended reading | Powerpoint slides |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Affective Computing | |
| Internal number | I W924 |
| Lecturers | Prof. Thomas Hinz M.Sc. Bernd Dudzik |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | Emotional expressions are important signals for people to make sense of situations, actions and relationships in their social interactions with each other. Is the empowerment of technological systems with the capacity to also sense and express emotions able to improve their users' interactions with them? This question is the driving force behind the field of Affective Computing. The students know different theories of emotions, contrast them with each other and debate them. They apply the acquired knowledge by addressing problems from within the primary areas of application for Affective Computing through the development of prototypical interactive systems that are capable of sensing or expressing emotions. |
| Recommended reading | Lecture notes, case studies. |
| Exams | Homework 1 Semester (graded) |
| Comments | |
| Lecture Video | |
| Internal number | I W925 |
| Lecturers | Marc Steinmetz Prof. Thomas Hinz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Homework 1 Semester (graded) |
| Comments | |

| Lecture Big Data Engineering | |
|---|--|
| Internal number | I W926 |
| Lecturer | Prof. Dr. Christian Zirpins |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>The lecture Big Data Engineering addresses the systematic construction of data-intensive systems. Generic architectural approaches are introduced in order to design robust, performant and scalable data systems for various applications. For different architectural areas various kinds of data storage and processing models are discussed. Topics include, among others, distributed file systems, serialization, batch and stream processing with MapReduce and other programming models, queuing mechanisms and NoSQL databases. These are both conceptually described as well as implemented by means of exemplary tools and techniques. The focus is on established industry standards such as Apache Thrift, Hadoop, Kafka, Cassandra, Storm. These are illustrated by means of an exemplary Web Analytics application.</p> <p>During the course students acquire, among others, the following abilities:</p> <ul style="list-style-type: none"> - They evaluate different approaches of data systems for given application problems with specific requirements. - They describe structure and function of specific architectural approaches for Big Data systems. - They categorize tools and techniques for Big Data systems and utilize them professionally. - They design architecture and data models as well as processing logic and queries for given Big Data applications and implement these based on specific open source tools and techniques. |
| Recommended reading | <ul style="list-style-type: none"> - Nathan Marz, James Warren, "Big Data: Principles and best practices of scalable realtime data systems", Manning, 2015, ISBN: 1-617290-34-3 - Martin Kleppmann, "Designing Data-Intensive Applications", O'Reilly, 2014 (Early Release), ISBN: 978-1-4493-7332-0 - Tom White, "Hadoop: the definitive guide: storage and analysis at internet scale", 4. ed., O'Reilly, 2015, ISBN: 978-1-491-90163-2 - Michael Frampton, "Big Data Made Easy: A Working Guide to the Complete Hadoop Toolset", Apress, 2015, ISBN: 978-148-420-094-0 - Vivek Mishra, "Beginning Apache Cassandra Development", Apress, 2014, ISBN: 978-148-420-142-8 <p>- Additional literature will be announced during the lecture</p> |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Independent work relates to the preparation and followup of lectures, laboratory exercises and exam preparation. |
| Lecture Digital Transformation & digital marketing | |
| Internal number | I W929 |

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| Lecturers | Prof. Thomas Hinz Marc Steinmetz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Homework 1 Semester (graded) |
| Comments | |
| Lecture Empatically pragmatic | |
| Internal number | I Wxxx |
| Lecturers | Dipl.Design. Heike Biscosi Prof. Thomas Hinz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Verbal Exam/Concept 20 Min. (graded) |
| Comments | |

| Module Embedded Software | |
|---|---|
| Internal number | MKIB6103 |
| Coordinator | Prof. Dr. Dirk Hoffmann |
| Scope | 5 ECTS points, 4 Contact hours |
| Placement | 6th Semester |
| Pre-requisites with regard to content | Informatik 1, Informatik 2, Technische Informatik |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | The courses of this module teach the students the fundamental concepts about embedded systems. Students know the basic terminology about embedded systems and they are able to distinguish different types of real-time systems from each other. By studying the CAN bus technology, students get to know a typical communication medium and acquaint with the CDMA technology an important coding scheme for data transmission. Students are able to implement typical programming tasks in the field of embedded systems in C. Furthermore, students learn how to deal with software tools that are suited for analyzing and developing embedded systems. |
| Exams | Individual exams |
| Lecture Embedded Software | |
| Internal number | MKI3B611 |
| Lecturer | Prof. Dr. Dirk Hoffmann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The lecture introduces software development methods for embedded real time systems. Embedded systems within the meaning of this lecture are systems that are controlled by computer software and are part of a larger system whose primary function is not compute-oriented. For real-time systems, the result has to be computed within a specified time frame. In particular, topics from the following areas are covered: Design and architecture of automotive ECUs, bus architectures, data transmission encodings, Embedded C. |
| Recommended reading | Slides, blackboard, exercise sheets |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Lecture |
| Lecture Embedded Software Laboratory | |
| Internal number | MKIB6123 |
| Lecturer | Prof. Dr. Dirk Hoffmann |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |

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| Language of instruction | German |
| Content | With the help of the modeling tool CANoe the participants design a control unit in the field of automotive electronics. The project also includes tasks from the field of signal decoding. |
| Recommended reading | Software and hardware tools für designing automotive ECUs |
| Exams | Exercise 1 Semester (not graded) |
| Comments | Practical work |

| Module Man-Machine-Communication 2 | |
|---|--|
| Internal number | MKIB6203 |
| Coordinator | Prof. Dr. Matthias Wölfel |
| Scope | 4 ECTS points, 4 Contact hours |
| Placement | 6th Semester |
| Pre-requisites with regard to content | Computergrafik und Computer Vision, Informatik 1, Informatik 2, Mediengestaltung, Medienprojekt, Mensch-Maschine-Kommunikation 1, Softwareengineering und Verteilte Systeme, Softwareprojekt |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | This module integrates different media technologies. The students will be able to write user interfaces for rich fat clients and mobile media applications. They learn how computer vision works and how computer vision ist used in media applications. |
| Exams | Individual exams |
| Lecture Graphical User Interfaces | |
| Internal number | MKIB6213 |
| Lecturer | Prof. Dr. Matthias Wölfel |
| Scope | 3 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The lecture first deals with SWT/JFace and the Eclipse Rich Client Platform 4 (RCP), which uses SWT and JFace as its basis. The most important topics are the model-view-controller pattern, layout management and event handling using the observer pattern. Based upon this techniques advanced technologies like the separation of business logic and user interface code using data binding and dialog control are presented. Other topics are internationalization and multithreading in the context of user interfaces. The last part of the lecture shows the declarative construction of user interfaces and the application of the RCP framework. |

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| Recommended reading | Books and Web sites: - Marc Teufel, "Eclipse 4", entwickler.press, Oktober 2012 - Lars Vogel, "Eclipse 4 Application Development", Mai 2012 - M. Marinilli, "Professional Java User Interfaces", Wiley & Sons, 2006 - R. Warner, R. Harris, "The Definite Guide to SWT and JFace", Apress, 2007 - M. Scarpino et.al., "SWT/JFace in Action", Manning Publications Co., 2005 - J. McAffer, J. M. Lemieux, "Eclipse Rich Client Platform", Addison-Wesley Longman (Pearson Education), 2010 - G. Wütherich, N. Hartmann, B. Kolb, M. Lübken, "Die OSGi Service Platform", dpunkt-Verlag, 2008 - http://www.ralfebert.de/rcpbuch/ - http://www.eclipse.org/swt/ - http://www.eclipse.org/articles/Article-UI-Guidelines/Index.html - http://www.eclipse.org/swt/snippets/ - http://wiki.eclipse.org/index.php/JFaceSnippets - http://www.java2s.com/ |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Lecture preparation, exam preparation, implementing the bonus exercise, 30% of the lecture is held as a computer exercise |
| Lecture App-Programming | |
| Internal number | MKIB6223 |
| Lecturer | Prof. Dr. Matthias Wölfel |
| Scope | 1 ECTS points, 2 Contact hours |
| Type/mode | Exercise |
| Language of instruction | German |
| Content | The lecture teaches the construction of mobile media applications. The main concepts are discussed using the Android platform. In a first part, the basic technologies and limitations of mobile devices are shown. The second part examines different development strategies like native applications, device independent abstractions and web applications. A main part of the lecture is the integration of different media types into mobile applications and the constraints the developer has to keep in mind. |
| Recommended reading | will be announced |
| Exams | Module exam |
| Comments | Lecture with exercise |

| Module Communication Competence | |
|---|--|
| Internal number | MKIB6303 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 7 ECTS points, 5 Contact hours |
| Placement | 6th Semester |
| Pre-requisites with regard to content | Praxistätigkeit |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | The student should learn how a common, computer science-related content will be refurbished for a specific group of audiants. Additionnally he should have learned how to give his presentation and defend it. |
| Exams | Individual exams |
| Lecture Seminar | |
| Internal number | MKIB6313 |
| Lecturer | Alle Dozenten |
| Scope | 6 ECTS points, 5 Contact hours |
| Type/mode | Seminar |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Homework 1 Semester (not graded) |
| Comments | |
| Lecture Presentation | |
| Internal number | MKIB6323 |
| Lecturer | Alle Dozenten |
| Scope | 1 ECTS points, 0 Contact hours |
| Type/mode | Seminar |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | |

| Module Key Qualification | |
|---|---|
| Internal number | MKIB6403 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 6 ECTS points, 6 Contact hours |
| Placement | 6th Semester |
| Pre-requisites with regard to content | Sprachkompetenz |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | The job marked has an increased demand for graduates with certain key skills. In the context of globalization the most important skills are the ability to communicate with people of other culture groups and basic knowledge of laws to write contract documents. The third important capability the students will learn is a good self-manifestation to present their work results in an optimal manner. |
| Exams | Individual exams |
| Lecture Intercultural Communication | |
| Internal number | MKIB6413 |
| Lecturer | Prof. Dr. Andrea Cnyrim |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | English |
| Content | <ul style="list-style-type: none"> - Central aspects of intercultural communication (e.g. cultural determined standards, behaviors, values, verbal and non verbal communication) with special interest in differences between object oriented cultures such as Germany and relationship-oriented cultures such as China and India - Influence of different cultural standards on international business relations (e.g. Business preparation, negotiations, personnel management, decision making, conflict resolution etc.) - Empirical investigations (e.g. Geert Hofstede, Fons Trompenaars etc.) - Case studies from different cultural areas (e.g. Germany, France, the USA, Japan, China, India etc.) |
| Recommended reading | |
| Exams | Exercise 1 Semester (not graded) |
| Comments | |
| Lecture Presentation techniques | |
| Internal number | MKIB6423 |
| Lecturer | Dr. Martin Holzer |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Exercise |

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| Language of instruction | German |
| Content | To exist in the political, social, economical and cultural living nowadays the students must be able to held speeches and to participate in discussions without stoppages. This seminar shows how to express oneself independently of a concrete text. |
| Recommended reading | PowerPoint slides |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | Lectures and practical exercises |
| Lecture Law | |
| Internal number | MKIB6433 |
| Lecturer | RA Karin Bähr |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <ul style="list-style-type: none"> - Introduction to the right - That "Bürgerliches Gesetzbuch" (BGB) - The "Handelsgesetzbuch" (HGB) - The judicial procedure |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |

| Module Elective courses 2 | |
|---|---|
| Internal number | MKIB6503 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 8 ECTS points, 8 Contact hours |
| Placement | 6th Semester |
| Pre-requisites with regard to content | Praxistätigkeit, Praxisvor- und -nachbereitung |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | The student should be able to lay his emphasis on individual interests. |
| Exams | Individual exams |
| Lecture New Lecture | |
| Internal number | EITB622A |
| Lecturer | Prof. Dr. Christian Langen |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | English |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |
| Lecture HKA-APP | |
| Internal number | I W155 |
| Lecturers | Prof. Dr. Manfred Seifert M.Sc. Daniel Weisser |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Hands-on Work 1 Semester (graded) |
| Comments | |
| Lecture Graphical-geometric algorithms | |
| Internal number | I W158 |
| Lecturer | Prof. Dr. Christian Pape |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |

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| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture Augmented and virtual reality | |
| Internal number | I W171 |
| Lecturer | Prof. Dr. Matthias Wölfel |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture ERP Special Chapters | |
| Internal number | I W182 |
| Lecturer | Prof. Dr. rer. pol. Mathias Philipp |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | Enterprise analysis, software choice, system integration, basics of customizing, small development task in ABAP in addition to an ABAP introduction, optional: project office: integrated project and service processing with SAP ECC 6.0 |
| Recommended reading | Lecture material completely as pdf documents, blackboard notes for interactive development of central problem positions, extensive material for every case study. |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Lecture, workshops, lab: Case study based participation in group oriented workshops about enterprise analysis, presentation of group results, independent implementation of the analysis results of into SAP by appropriate system customizing in the lab. Independent treatment of another lab task (e.g., ABAP course, case study project office) |
| Lecture IT Security | |
| Internal number | I W210 |
| Lecturers | Dipl. Inform. (FH) Michael Fischer Dipl. Inform. (FH) Georg Magschok |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |

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|---|---|
| Language of instruction | German |
| Content | Technological and topological mechanisms for securing networks, attack patterns and defense mechanisms against them. Basics of, variants of and defense against malicious software. Analysis and judgement of security mechanisms and related activities. Exercises at the end of each semester provide practical experience in dealing with security topics. |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Presentation with a lot of room for discussions and interaction. Finalized by a hands-on session. |
| Lecture Robotics | |
| Internal number | I W233 |
| Lecturer | Prof. Dr. Björn Hein |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture Advanced Embedded Software | |
| Internal number | I W300 |
| Lecturer | Prof. Dr. Dirk Hoffmann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Graphical User Interfaces | |
| Internal number | I W332 |
| Lecturer | Dipl.-Inf. Per Sterner |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |

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| Content | The lecture first deals with SWT/JFace and the Eclipse Rich Client Platform 4 (RCP), which uses SWT and JFace as its basis. The most important topics are the model-view-controller pattern, layout management and event handling using the observer pattern. Based upon this techniques advanced technologies like the separation of business logic and user interface code using data binding and dialog control are presented. Other topics are internationalization and multithreading in the context of user interfaces. The last part of the lecture shows the declarative construction of user interfaces and the application of the RCP framework. |
| Recommended reading | Books and Web sites: - Marc Teufel, "Eclipse 4", entwickler.press, Oktober 2012 - Lars Vogel, "Eclipse 4 Application Development", Mai 2012 - M. Marinilli, "Professional Java User Interfaces", Wiley & Sons, 2006 - R. Warner, R. Harris, "The Definite Guide to SWT and JFace", Apress, 2007 - M. Scarpino et.al., "SWT/JFace in Action", Manning Publications Co., 2005 - J. McAffer, J. M. Lemieux, "Eclipse Rich Client Platform", Addison-Wesley Longman (Pearson Education), 2010 - G. Wütherich, N. Hartmann, B. Kolb, M. Lübken, "Die OSGi Service Platform", dpunkt-Verlag, 2008 - http://www.ralfebert.de/rcpbuch/ - http://www.eclipse.org/swt/ - http://www.eclipse.org/articles/Article-UI-Guidelines/Index.html - http://www.eclipse.org/swt/snippets/ - http://wiki.eclipse.org/index.php/JFaceSnippets - http://www.java2s.com/ |
| Exams | Written Exam 90 Min. (graded) |
| Comments | Lecture preparation, exam preparation, implementing the bonus exercise, 30% of the lecture is held as a computer exercise |
| Lecture Softwareengineering Special Chapters | |
| Internal number | I W342 |
| Lecturers | M.Sc. Alexander Hasel Prof. Dr. Thomas Fuchß |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | The course focuses on fundamental object-oriented design methods with an emphasis on design patterns and model driven concepts. The students learn to recognize, to know when to use, and to apply design patterns in varying situations in the context of an evolutionary development process. Furthermore the ability of an axiomatic rule base application of patterns, within a model driven approach, are discussed. |

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| Recommended reading | Slides, textbooks, and other literature: Folien-Skript, Lehrbücher: - Gamma, Erich et. al. Entwurfsmuster: Elemente wiederverwendbarer objektorientierter Software - München : Addison-Wesley, 2001. - Buschmann, Frank. A system of patterns (Pattern-Oriented Software Architecture Volume 1) - John Wiley & Sons. 1996. - Schmidt, Douglas C. Patterns for concurrent and networked objects (Pattern-Oriented Software Architecture Volume 2) - John Wiley & Sons. 2000. - Michael Kircher, Prashant Jain. Patterns for Resource Management (Pattern-Oriented Software Architecture Volume 3) - John Wiley & Sons. 2004. - Frank Buschmann, Kevlin Henney, Douglas C. Schmidt. A Pattern Language for Distributed Computing (Pattern-Oriented Software Architecture Volume 4) - John Wiley & Sons. 2007. - Frank Buschmann, Kevlin Henney, Douglas C. Schmidt. On Patterns and Pattern Languages (Pattern-Oriented Software Architecture Volume 5) - John Wiley & Sons. 2007. - Fowler, Martin. Analysemuster: wiederverwendbare Objektmodelle: Ein Pattern-Katalog für Business-Anwendungen - Addison-Wesley-Longman. 1999. - OMG Object Management Group. Meta Object Facility (MOF) Specification - Version 2.4.1: OMG, 2011. |
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| Exams | Verbal Exam/Concept 20 Min. (graded) |
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| Comments | The lecture will take the form of seminars with exercises. |
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Lecture IT Consulting

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| Internal number | I W433 |
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| Lecturer | Prof. Dr. rer. pol. Mathias Philipp |
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| Scope | 2 ECTS points, 2 Contact hours |
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| Type/mode | Lecture |
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| Language of instruction | German |
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| Content | Consulting market, basic methods and analysis tools, peculiarities of IT consulting, basis types of case studies. |
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| Recommended reading | Lecture material completely as pdf documents, blackboard notes for interactive development of central problem positions, instructions for interactive role play and case study material |
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| Exams | Written Exam 90 Min. (graded) |
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| Comments | Participation lecture, development of an interactive role play in the group, individual execution of a short case study. |
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Lecture New Lecture

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| Internal number | I W502 |
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| Lecturer | Prof. Dr. Thomas Morgenstern |
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| Scope | 2 ECTS points, 2 Contact hours |
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| Type/mode | Lecture |
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| Language of instruction | German |
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| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W779 |
| Lecturer | Prof. Dr. Zoltán Nochta |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |
| Lecture Python frameworks | |
| Internal number | I W800 |
| Lecturer | Prof. Dr. Jürgen Zimmermann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Sound design | |
| Internal number | I W801 |
| Lecturer | B.Sc. Noah Ibers |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 60 Min. (graded) |
| Comments | |
| Lecture Business Process Management | |
| Internal number | I W854 |
| Lecturer | Prof. Dr. Uwe Haneke |
| Scope | 2 ECTS points, 2 Contact hours |

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| Type/mode | Lecture |
| Language of instruction | German |
| Content | <ul style="list-style-type: none"> - Defining a business process and types of business processes - Analyzing business processes - Modelling business processes - Tools for modelling business processes - Simulating business processes with ARENA - Enterprise SOA: SAP's vision of a service-oriented-architecture - KPI's for the evaluation of business processes |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Databases Special Chapters | |
| Internal number | I W907 |
| Lecturer | M.Sc. Tobias Wink |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture SAP Certification | |
| Internal number | I W908 |
| Lecturers | M.Sc. Matthias Mruzek-Vering Prof. Dr. rer. pol. Mathias Philipp |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | <p>TERP10: SAP ERP - Integration of Business Processes is a 10-day training course held at the universities participating in the pilot project. The students learn how the fundamental integrative business processes in procurement, production, planning, project management, sales, customer service, asset management, financial accounting, human resources, and analytics interact within the SAP ERP application.</p> <p>The course provides students with a broad basic knowledge of the core business processes, business interrelations, and integration of business processes in SAP ERP.</p> <p>At the end of the course, students take a certification examination. If they pass the examination, they receive an SAP certificate, which is a fully recognized qualification in the industry.</p> |

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| Recommended reading | course book |
| Exams | Written Exam 90 Min. (graded) |
| Comments | 10-day training: in the morning: theory in the evening: laboratory last day: SAP certification 3 hours multiple choice and multiple response questions |
| Lecture Serious Games | |
| Internal number | I W910 |
| Lecturer | Prof. Daniel Schwarz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Model-based Software Development | |
| Internal number | I W911 |
| Lecturer | Prof. Dr. Martin Sulzmann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | Formal Modelling Languages Synchronous languages (Lustre/SCADE) Temporal Specifications (LTL) Domain-specific Extensions Textual versus visual modelling Modeltransformation via internal DSLs Modelling guide lines Formal testing and verification Coverage criteria Testcasegeneration Static analysis and model-checking |
| Recommended reading | - lectures notes and slides - exercises - online references |
| Exams | Written Exam 90 Min. (graded) |

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| Comments | Prerequisites: - UML Basics - C++, - Logic (propositional), - Lexer, Parser, EBNF (Compiler basics) Mix of lecture (2/3) and practical exercises/project work (1/3) |
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Lecture Mobile communication

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|-------------------------|--------------------------------|
| Internal number | I W914 |
| Lecturer | Prof. Dr. Oliver P. Waldhorst |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | |

Lecture Concept, Design und Presentation of interactive Projects

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|-------------------------|--------------------------------|
| Internal number | I W915 |
| Lecturer | Prof. Thomas Hinz |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Homework 1 Semester (graded) |
| Comments | |

Lecture CC Operation

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|-------------------------|--------------------------------|
| Internal number | I W917 |
| Lecturer | Dr. Günther Schreiner |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |

| Lecture In-memory Databases | |
|------------------------------------|--------------------------------|
| Internal number | I W920 |
| Lecturer | Prof. Dr. Zoltán Nochta |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W927 |
| Lecturer | Dr.-Ing. Wilfried Jakob |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W928 |
| Lecturer | Prof. Dr. Martin Sulzmann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | English |
| Content | |
| Recommended reading | |
| Exams | Module exam |
| Comments | |
| Lecture Microservices | |
| Internal number | I W930 |
| Lecturer | Prof. Dr. Jürgen Zimmermann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |

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|---|---------------------------------------|
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture App Programming for iOS | |
| Internal number | I W931 |
| Lecturer | B.Sc. David von Knobelsdorff |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Thesis |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W934 |
| Lecturer | Prof. Dr. Jürgen Zimmermann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture Microtechnology Laboratory | |
| Internal number | I W935 |
| Lecturer | Prof. Dr. rer. nat. Oliver Schecker |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Hands-on Work 1 Semester (not graded) |
| Comments | |

| Module Elective courses 3 | |
|---|--|
| Internal number | MKIB7103 |
| Coordinator | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 8 ECTS points, 8 Contact hours |
| Placement | 7th Semester |
| Pre-requisites with regard to content | Praxistätigkeit, Praxisvor- und -nachbereitung |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | The student should be able to lay his emphasis on individual interests. |
| Exams | Individual exams |
| Lecture Autonomous Systems Labor | |
| Internal number | I W276 |
| Lecturers | Prof. Dr. Norbert Link M.Sc. Mickael Cormier |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Project Lecture |
| Language of instruction | German |
| Content | Project 1: Implementation of an image-processing-based handling system, which performs transport activities on the basis of information extracted from a digital video camera Project 2: Implementation of the core functionality of an aircraft docking guidance system, which directs aircraft to their respective stopping position at the airport gate Project 3: Autonomous navigation, obstacle avoidance and object following with robots |
| Recommended reading | Lecture notes, task descriptions, project guidelines and FAQs, all accessible via the internet. Handbooks and relevant literature is available on site and for homework in the library. |
| Exams | Laboratory Work 1 Week (graded) |
| Comments | Theoretical familiarisation, practical work, reporting, partly as self-responsible work |
| Lecture Software Quality | |
| Internal number | I W392 |
| Lecturer | Prof. Dr. Dirk Hoffmann |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |

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| Content | A database application for a flight reservation system is designed and prototypically implemented. This includes setting up a DB scheme, the design and testing of SQL queries, the use of transactions and transaction levels, as well as programming a seat reservation transaction with Java, JDBC and SQLJ-based on Oracle. |
| Recommended reading | Sample database, JUnit test cases, test-GUI; Textbooks: - "Grundlagen von Datenbanksystemen", Ausgabe Grundstudium (Taschenbuch) von Ramez Elmasri, Shamkant B. Navathe, Pearson, 2005, ISBN: 3827371538 - "Datenbanksysteme" von Alfons Kemper, Andre Eickler, Oldenbourg, 2006, ISBN: 3486576909 - "Datenbanken & Java. JDBC, SQLJ, ODMG und JDO" von Gunter Saake, Kai-Uwe Sattler, Dpunkt Verlag, 2003, ISBN: 3898642283 |
| Exams | Presentation 20 Min. (graded) |
| Comments | Supervised laboratory with final presentation on the computer, self-work, preparation and after working of lab sessions, prepare a report of the laboratory tasks. |
| Lecture New Lecture | |
| Internal number | I W393 |
| Lecturer | B.Sc. Michael Siebers |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Concept 1 Semester (graded) |
| Comments | |
| Lecture Project Management | |
| Internal number | I W422 |
| Lecturer | Prof. Dr. Uwe Haneke |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Project Lecture |
| Language of instruction | German |
| Content | The lecture focuses mainly on practice oriented project management and new procedure models like Scrum. - Introduction to IT project management - Procedure models in IT project management - Defining a project - The project plan: the heart of the project - Getting started: Initialisation of the project - Project controlling - The final words: how to complete a project |

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| Recommended reading | |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | |
| Lecture External selected chapter 1 | |
| Internal number | I W600 |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | This course is a placeholder for an external, graded course from another faculty or university. You must have the external subject approved before attending it. |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W600.a |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | |
| Lecture External selected chapter 2 | |
| Internal number | I W700 |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | This course is a placeholder for an external, graded course from another faculty or university. You must have the external subject approved before attending it. |
| Recommended reading | |
| Exams | Written Exam 90 Min. (not graded) |
| Comments | |
| Lecture Softwareengineering Special Chapters | |
| Internal number | I W701 |
| Lecturer | Prof. Dr. Peter Henning |

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| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Seminar |
| Language of instruction | German |
| Content | The course focuses on fundamental object-oriented design methods with an emphasis on design patterns and model driven concepts. The students learn to recognize, to know when to use, and to apply design patterns in varying situations in the context of an evolutionary development process. Furthermore the ability of an axiomatic rule base application of patterns, within a model driven approach, are discussed. |
| Recommended reading | Slides, textbooks, and other literature: Folien-Skript, Lehrbücher: - Gamma, Erich et. al. Entwurfsmuster: Elemente wiederverwendbarer objektorientierter Software - München : Addison-Wesley, 2001. - Buschmann, Frank. A system of patterns (Pattern-Oriented Software Architecture Volume 1) - John Wiley & Sons. 1996. - Schmidt, Douglas C. Patterns for concurrent and networked objects (Pattern-Oriented Software Architecture Volume 2) - John Wiley & Sons. 2000. - Michael Kircher, Prashant Jain. Patterns for Resource Management (Pattern-Oriented Software Architecture Volume 3) - John Wiley & Sons. 2004. - Frank Buschmann, Kevlin Henney, Douglas C. Schmidt. A Pattern Language for Distributed Computing (Pattern-Oriented Software Architecture Volume 4) - John Wiley & Sons. 2007. - Frank Buschmann, Kevlin Henney, Douglas C. Schmidt. On Patterns and Pattern Languages (Pattern-Oriented Software Architecture Volume 5) - John Wiley & Sons. 2007. - Fowler, Martin. Analysemuster: wiederverwendbare Objektmodelle: Ein Pattern-Katalog für Business-Anwendungen - Addison-Wesley-Longman. 1999. - OMG Object Management Group. Meta Object Facility (MOF) Specification - Version 2.4.1: OMG, 2011. |
| Exams | Presentation 20 Min. (graded) |
| Comments | The lecture will take the form of seminars with exercises. |
| Lecture Teamteaching | |
| Internal number | I W730 |
| Lecturers | Prof. Dr.-Ing. Holger Vogelsang Alle Dozenten |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Project Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (graded) |
| Comments | - Preparation of a tutorial, support of student groups - Organisation of events |

| Lecture Multimedia (Blended Learning) | |
|--|---|
| Internal number | I W774 |
| Lecturer | Prof. Dr. Peter Henning |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Project Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | Book: Henning, Taschenbuch Multimedia. |
| Exams | Online Test 4 Parts (graded) |
| Comments | |
| Lecture Reinforcement Learning | |
| Internal number | I W775 |
| Lecturer | Prof. Dr. Patrick Baier |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture Social commitment | |
| Internal number | I W776 |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |

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| Content | <p>This course enables students to obtain ECTS credits for social work done at Karlsruhe University of Applied Sciences. The activity must be closely coordinated with a professor of the faculty. This can be, for example, support for the O-Phase or support for visually impaired students. In the case of the O-Phase, you will usually have to work on two semesters in order to achieve the required minimum number of hours.</p> <p>If you are interested, you can also obtain the "Certificate of International and Intercultural Competence (CIIC)". It certifies the intercultural competences and foreign language skills acquired during the degree programme, provides evidence of study-related experiences abroad and lists the framework in which the participants have been involved in intercultural activities. To earn the CIIC, you must cover three of four subject areas. The main component in subject area 1 is the voluntary commitment of at least 50 hours (about 2 hours per week in one semester), which can be completed in institutions or projects with an international and/or intercultural connection. In addition to the commitment, you will attend an introductory event as well as a reflection workshop and prepare an experience report, which is necessary to pass the subject area. If you have any questions about the certificate, please contact the Center of Competence: https://www.h-ka.de/ciic</p> <p>Through the Center of Competence, it is also possible to obtain the "Certificate for Social Engagement (ZGE)". It takes into account an even wider range of opportunities to get involved. Find your suitable area, whether it is community, social, cultural or ecological engagement. Your social engagement should comprise at least 100 time hours and last for at least one year. In addition to your commitment, you will attend various seminars from the Studium Generale (a total of 8 ECTS) to link your practical experience with theoretical knowledge. This certificate cannot be recognised as an elective subject. You can find more information here: https://www.h-ka.de/zge</p> <p>At regular intervals, the Center of Competence offers introductory events and reflection workshops for HKA students who are involved in voluntary work outside of their studies. This gives them the opportunity to exchange their experiences as volunteers with other participants and learn to reflect on and classify the insights they have gained. The next dates can be found on the CIIC website.</p> |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (not graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W777 |
| Lecturer | B.Sc. Tim Hänlein |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |

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| Content | |
| Recommended reading | |
| Exams | Hands-on Work 1 Semester (graded) |
| Comments | |
| Lecture Seminar Digital Twin | |
| Internal number | I W778 |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 4 ECTS points, 4 Contact hours |
| Type/mode | Seminar |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written Exam 60 Min. (graded) |
| Comments | |
| Lecture High Performance Computing | |
| Internal number | I W909 |
| Lecturer | Prof. Dr. Britta Nestler |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Written/verbal Exam 90/20 Min. (graded) |
| Comments | |
| Lecture ABAP Programming | |
| Internal number | I W918 |
| Lecturers | Prof. Dr. rer. pol. Mathias Philipp B.Sc. Soeren Schlegel |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | German |
| Content | Einführung in die Programmiersprache ABAP mit praktischen Übungen im SAP NetWeaver Application Server ABAP. Die Studenten sollen Sprachelemente, Workbench, Datenbank, Selektionsbilder, Funktionsbausteine und ABAP OO kennen lernen und eigenständig auf neue Fragestellungen anwenden können. |
| Recommended reading | Vorlesungsmaterial vollständig in PowerPoint-Folien, Tafelaufschrieb bei interaktiver Erarbeitung von Kernproblemstellungen, Übungsblätter und selbständige praktische Übungen am SAP System. |
| Exams | Module exam |

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| Comments | Seminaristischer Unterricht mit hohem Laboranteil |
| Lecture Game AI | |
| Internal number | I W923 |
| Lecturers | Prof. Dr.-Ing. Astrid Laubenheimer Dr. Patrick Glauner |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Lecture |
| Language of instruction | English |
| Content | |
| Recommended reading | |
| Exams | Written Exam 90 Min. (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I W936 |
| Lecturer | Prof. Dr.-Ing. Holger Vogelsang |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Hands-on Work 1 Semester (graded) |
| Comments | |
| Lecture New Lecture | |
| Internal number | I Wxx2 |
| Lecturer | Prof. Dr. Peter Henning |
| Scope | 2 ECTS points, 2 Contact hours |
| Type/mode | Laboratory Course |
| Language of instruction | German |
| Content | |
| Recommended reading | |
| Exams | Exercise 1 Semester (graded) |
| Comments | |

| Module Scientific Working | |
|---|---|
| Internal number | MKIB7203 |
| Coordinator | Prof. Dr. Heiko Körner |
| Scope | 5 ECTS points, 2 Contact hours |
| Placement | 7th Semester |
| Pre-requisites with regard to content | Projektarbeit, Schlüsselkompetenzen |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | |
| Exams | Exercise 1 Semester (not graded) |
| Lecture Scientific Working | |
| Internal number | MKIB7213 |
| Lecturer | Alle Dozenten |
| Scope | 5 ECTS points, 2 Contact hours |
| Type/mode | Hands-on Experience |
| Language of instruction | German |
| Content | Methods of scientific work in computer science, usage of academic literature (investigation, evaluation, citation), writing a scientific thesis (formulation of the subject, way of looking at a problem, structuring, quality assurance) |
| Recommended reading | Documentation for structuring the thesis and citations Literature: - "Informatik-Handbuch" von Peter Rechenberg, Gustav Pomberger, Hanser Fachbuch, 2006, ISBN: 3446218424 - "Die schriftliche Arbeit - kurz gefasst" von Jürg Niederhauser, Bibliographisches Institut, Mannheim, 2006, ISBN: 3411042346 |
| Exams | Module exam |
| Comments | Self-dependent introduction into the subject, structuring the work and discussion with a lecturer |

| Module Thesis | |
|---|---|
| Internal number | MKIB7303 |
| Coordinator | Prof. Dr. Heiko Körner |
| Scope | 12 ECTS points, 0 Contact hours |
| Placement | 7th Semester |
| Pre-requisites with regard to content | Betriebssysteme, Betriebswirtschaftslehre und Service-Management, Computergrafik und Computer Vision, Datenbanken und Kommunikationsnetze 1, Datenbanken und Kommunikationsnetze 2, Embedded Software, Informatik 1, Informatik 2, Kommunikationskompetenz, Mathematik 1, Mathematik 2, Mediengestaltung, Medienprojekt, Mensch-Maschine-Kommunikation 1, Mensch-Maschine-Kommunikation 2, Praxistätigkeit, Praxisvor- und -nachbereitung, Projektarbeit, Schlüsselkompetenzen, Softwareengineering und Verteilte Systeme, Softwareprojekt, Sprachkompetenz, Technische Informatik, Technologien des Internets, Theoretische Informatik, Wahlpflichtfächer 3, Wissenschaftliches Arbeiten |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | During the thesis phase the individual will demonstrate that s/he has the basic knowledge and ability to solve a complex practical problem or work on a research project in a specific timeframe using the scientific method, research in the specific field of interest. The student will be required to structure the problem, conduct the research, and develop a solution using PERT principles. The student will be required to orally present and defend the results. |
| Exams | Individual exams |
| Lecture Thesis | |
| Internal number | MKIB7313 |
| Lecturer | Alle Professoren |
| Scope | 12 ECTS points, 0 Contact hours |
| Type/mode | Thesis |
| Language of instruction | German |
| Content | The thesis may address any subject within the field of computer science and will be defined by the subject agreed upon by the student and the advisor. |
| Recommended reading | |
| Exams | Bachelor Thesis 4 Months (graded) |
| Comments | All work will be individual work and will include basic literature research, system analysis, coding, documentation, and oral presentation. |

| Module Final examination | |
|---|---|
| Internal number | MKIB7403 |
| Coordinator | Prof. Dr. Heiko Körner |
| Scope | 3 ECTS points, 0 Contact hours |
| Placement | 7th Semester |
| Pre-requisites with regard to content | Abschlussarbeit, Betriebssysteme, Betriebswirtschaftslehre und Service-Management, Computergrafik und Computer Vision, Datenbanken und Kommunikationsnetze 1, Datenbanken und Kommunikationsnetze 2, Embedded Software, Informatik 1, Informatik 2, Kommunikationskompetenz, Mathematik 1, Mathematik 2, Mediengestaltung, Medienprojekt, Mensch-Maschine-Kommunikation 1, Mensch-Maschine-Kommunikation 2, Praxistätigkeit, Praxisvor- und -nachbereitung, Projektarbeit, Schlüsselkompetenzen, Softwareengineering und Verteilte Systeme, Softwareprojekt, Sprachkompetenz, Technische Informatik, Technologien des Internets, Theoretische Informatik, Wissenschaftliches Arbeiten |
| Pre-requisites according to the examination regulations | Modul Internship |
| Competences | The students are able to present their work and the results gained in front of a skilled audience. The students show students their abilities to apply interdisciplinary knowledge to a given problem. |
| Exams | Individual exams |
| Lecture Final examination | |
| Internal number | MKIB7413 |
| Lecturer | Alle Professoren |
| Scope | 3 ECTS points, 0 Contact hours |
| Type/mode | Colloquium |
| Language of instruction | German |
| Content | The student has to apply different fields of computer science to find a solution for a given problem. |
| Recommended reading | |
| Exams | Verbal Exam 20 Min. (not graded) |
| Comments | |