LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

UNIVERSITÄT MÜNCHEN
INSTITUT FÜR INFORMATIK

Course Catalogue

Bachelor Programme in Media Informatics (MINF-B-180)

180 credit points

According to the Examination Regulations from 25.08.2010

Version(2014/12/18)

About the Programme of Studies

The Bachelor Programme in Media Informatics prepares students for the professional practice in the field of Media Informatics in application, manufacturing, research and teaching-related activities. Media Informatics is a form of applied Computer Science focussing on computer systems used for human communication. Graduates in Media Informatics are sought by a broad spectrum of business branches, from media-related businesses like Web agencies over consulting companies and software houses to classical manufacturing industry (for example automotive industry). The goal of the training is to develop the fundamentals of the subject in theoretical and practical aspects.

The ability is to be developed to independently recognize and solve a variety of problems in technologically supported communication, using automated information processing. Students acquire sufficient knowledge and methods in the central areas of Computer Science, however the programme is decidedly application-oriented. Upon completion of the training the students should have knowledge about information processing as well about structure and modes of action of information processing systems. They must be able to analyze in cooperation with customers and users complex interaction sequences between man and machine as well as between humans mediated by machines, and to find user-adequate solutions for such situations. Of particular importance is the ability to work together with groups of users, to evaluate systematically alternative solution approaches and to participate actively in the rapid change of underlying technologies and their application potential.

The Bachelor programme consists of four parts: About 45% cover Core Computer Science topics. About 10% comprise basic mathematical courses, namely analysis and linear algebra. 25% of the programme are devoted to topics of multimedia technology (including computer graphics and man-machine interaction). The remaining 20% are filled by an integration application subject from a discipline related to media. Options for this application subject are: Communication Science (media usage and media impact), Business Administration (media economy), media design (only for students having passed a special entrance test), human-machine interaction (comprising topics from psychology nad statistics).

All in all the Bachelor programme lasts six semesters and requires the students to acquire 180 ECTS credit points.

The core Computer Science part of the programme covers the main topics in this field, programming (Java and SML) together with Software Engineering, basics of Theoretical Computer Science, algorithms and data structures, Database Technology (relational databases, index structures, data mining), Computer Architecture, Operating System, Computer Networks and Mobile Systems, Web Technology. A significant part of the basic courses is a practical training where small teams of students have to implement a complex piece of software.

Most modules are compulsory. However, there are two so-called "special topics" modules. In the two with 6 ECTS-points assessed modules, students can choose from a wide range of in-depth courses in Computer Science, Media Informatics and Bioinformatics. The concrete contents of the courses may vary from semester to semester. They are usually determined by the current research of teaching staff and thus serve the implementation of the principle of research orientation in teaching: By taking courses in the field of in-depth topics, students are introduced to current research questions and gain insight into the development of the research area. In order to promote excellent students, students in the Bachelor programme are already offered the possibility to visit courses that are especially designed for master students (- the descriptions of these modules contain information about the prerequisits for visiting them as a Bachelor student). The achievable level of competence includes the ability to collaborate with the Master students and thereby to be able to make the first valuable contributions.

Nine further credits have to be acquired from an offer of soft skill modules, (ethics, legislation, personal and social competence, IT-competence, tutoring jobs etc.). The Bachelor thesis in the last semester earns 12 credits plus 3 credits for the final presentation. The final mark is

obtained separately from the ECTS-weighted marks in the major subject (Computer Science and Mathematics) and from the ECTS-weighted marks in the minor sub- ject. Modules with 24 credits in total where the student got the worst marks are ignored when computing the final grade.

Start of studies: WiSe, SoSe.

Contents

1 Explanations

CP	Credit Points
ECTS	European Credit Transfer and Accumulation System
h	hours
SoSe	summer semester
WiSe	winter semester
SWS	credit hours
GOP	Qualifying Examination (Grundlagen- und Ortientierungsprüfung)

1. Please note: The course catalogue serves as an orientation only for your course of study. For binding regulations please consult the official examination regulations. These can be found at www.lmu.de/studienangebot for the respective programmes of study.

2. Modules whose identifier starts with P are mandatory modules.
   Modules whose identifier starts with WP are elective modules.
   Modules whose identifier starts with VT are additional offerings not listed in the examination regulations.

3. One of the GOP-marked (Grundlagen- und Ortientierungsprüfung) examinations must be passed by the 3rd semester.

2 Regular Modules

The subsequent list of modules corresponds to modules in the examination regulations. If in the list of required or elective modules individual numbers are missing, these are placeholders for Special Topics modules.

2.1 P 1: Introduction to Programming (INF-EiP)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Introduction to Programming	WiSe	60 h (4 SWS)	120 h	6 CP
exercise	Exercises: Introduction to Programming	WiSe	30 h (2 SWS)	60 h	3 CP

9 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 270 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-LRS: Teaching Realschule - INF-NF-15: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	1. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: once, next chance, Admission Requirements: none Qualifying Examination (Grundlagen und Orientierungsprüfung), also for INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, INF-NF-15

Responsible for Module	Prof. Dr. Hans Jürgen Ohlbach
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

This module provides an introduction to the imperative, object-oriented and concurrent programming using a high level language, e.g. Java. In addition to the knowledge of general programming principles, concepts, methods and techniques for displaying, structuring and processing of data and the development of algorithms are discussed. Particular emphasis is set on conceptual clarity and precise mathematical foundation with formal methods.

The main topics of the course are as follows:

- basic concepts about programs and their implementation;
- syntax of programming languages and their description;
- basic data types and imperative control structures;
- complexity and correctness of imperative programs;
- recursion;
- simple sorting methods;
- introduction to the object-oriented program design;
- classes, interfaces and packages;
- inheritance, and exception handling;
- object-oriented implementation of lists and tree structures;
- basic concepts of concurrent programming: threads, synchronization and deadlock,
- Introduction to UML-Diagrams,
- Programming with an Integrated Development Environment (currently Eclipse).

Recommended Literature

There is a multitude of introductory books about Computer Science and Java in particular.

A comprehensive Java book, which is also online available, is:

- Java ist auch eine Insel, von Christian Ullenboom, Gilileo Computing, ISBN = 978-3-8362-1802-3

An easier introductory book is

- Java kompakt, von Hözl, Read und Wirsing, Springer Vieweg, ISBN 978-3-642-28503-5

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The students will be able to implement solutions for small and manageable problems algorithmically and to realize them with a high level programming language as executable programs. Using an IDE like Eclipse facilitates the professionalisation. Furthermore, students develop an understanding of the general principles of programming and programming languages. This lays the foundation to ensure that the students (after further experiences in the course of study) may become familiar quickly and accurately with any programming language.

2.2 P 2: Programming and Modeling (INF-ProMo)

Remarks

The previous study of the module *Introduction to Programming* is useful but not strictly necessary.Anfang

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Programming and Modeling	SoSe	30 h (2 SWS)	30 h	2 CP
exercise	Exercises: Programming and Modeling	SoSe	45 h (3 SWS)	75 h	4 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, INF-LGY, MINF-B-180), elective module with compulsory module components (INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	2. Semester
Duration	The module comprises 1 semester.
Grading	marked

Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: once, next chance, Admission Requirements: none Qualifying Examination (Grundlagen und Orientierungsprüfung), also for INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, INF-NF-30, INF-NF-60
Responsible for Module	Prof. PhD Martin Hofmann
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

This module introduces students to basic principles of programming and data modelling with a functional programming language (currently Haskell). Emphasis is placed on conceptual clarity and precise mathematical foundation with formal methods.

The main topics of the course are as follows:

- the notion of a function and the basic data types,
- recursion and termination,
- user defined data types,
- polymorphism, type classes and modules,
- higher-order function and currying,
- types, type checking, and type inference,
- pattern matching
- lazy evaluation, strictness,
- input and output and other side effects.

Recommended Literature

- Miran Lipovača, "Learn You a Haskell for Great Good!", No Starch Press, 2011, ISBN 1-59327-283-9, online-version free of charge,
- Graham Hutton, "Programming in Haskell", Cambridge University Press, 2007, ISBN 0-52169269-5,
- Bryan O'Sullivan, Don Stewart, John Goerzen, "Real World Haskell", O'Reilly, November 2008, ISBN: 0-59651498-0, online-version free of charge,
- Simon Thompson, "Haskell: The Craft of Functional Programming", Second Edition, Addison-Wesley, 1999. ISBN 0-201-34275-8,
- Paul Hudak, John Peterson, Joseph Fasel, "A Gentle Introduction To Haskell", 2000, online Tutorial, free of charge.

The module consists of lectures and exercises in small groups. The concepts introduced in the lectures are practiced in the exercise class with concrete examples.

Qualifikation Aims

The module aims at providing the following:

- mastery of basic concepts of (general and declarative) programming;
- the ability to program small algorithms in functional style and to evaluate and compare with the imperative style;
- preparation for the future development of programming languages.

Remarks

The previous study of the module *Introduction to Programming* is useful but not strictly necessary.

2.3 P 3: Algorithms and Data Structures (INF-AlDs)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Algorithms and Datastructures	SoSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Algorithms and Datastructures	SoSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, INF-LGY, INF-LRS, MINF-B-180), elective module with compulsory module components (INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-LRS: Teaching Realschule - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	2. Semester (INF-B-120, INF-NF-60, INF-LRS, INF-B-150, INF-B-180-CL, MINF-B-180), 4. Semester (INF-B-180-STAT, INF-LGY, INF-NF-30, INF-B-180-MA)
Duration	The module comprises 1 semester.
Grading	marked

Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none Qualifying Examination (Grundlagen und Orientierungsprüfung), also for INF-B-120, INF-NF-60
Responsible for Module	Dr. Matthias Schubert
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

The module gives an introduction to the development of efficient algorithm as well as the interaction between algorithms and data structures.

Basic Principles of Algorithms and Runtime Analysis

- Different types of runtime approximations (best-case, worst-case, expected runtime)
- Asymptotic analysis of upper and expected complexity bounds
- Big O notation (Definition and computation)
- Important complexity classes(constant, logarithmic, linear, quadratic, and exponential)
- Methods for empirical performanz evaluation
- Time and space trade-off.

Optinal Topics:

- Little o, big omega and big theta notation
- Recurrence relations
- Analysis of iterativ and rekursiv algorithms
- Some version of a Master Theorem.

Basic Data Structures and Algorithms

- Elementary data types (integer, float, strings etc.)
- Records, objects and arrays
- dynamic data structurs (singly and doubly linked lists, stacks, queues, trees)
- Implementations of dynamic data structures
- simple numerical algorithms (e.g. computing the average, maximum, or mininum of a list Liste or an array approximative computation of the square root, computing the greatest common divisor)
- sequential and binary search in arrays.

Data Structures and Algorithms for Key-Searching

- Connection between search, insertion and delete times and memory requirements.
- Balanced search trees (principles and analysis, example structures e.g. AVL-trees, red-black trees)
- Search trees for the secondary storages (basic setting, B-trees)
- Principles of hashing (simple hashing functions, basic collision strategies)
- Dynamic hashing methods (e.g. linear hashing).

Optional Topics:

- Advanced algorithmens for key search in main memory (e.g. optimal binary search trees, splay trees, treaps)
- Advanced index structures for key search in the secondory storage (e.g. B*-trees)
- Advanced hashing methods (e.g. linear hashing with partiell extensions).

Sorting Methods

- Basice sorting algorithms (counting sort, insertion sort, selection sort, bubble sort)
- Advanced sorting algorithms (heapsort, quicksort)
- Sorting algorithms for the secondary storage (merge sort)
- Lower bounds for sorting based on key comparisons
- Key based sorting (bucket sort).

Optional Topics

- Advanced methods for sorting large key sets (button-up heapsort, clever wuicksort)
- Advanced key-based sorting methods (radix-sort)
- Priority queues (heaps, Fibonacci heaps).

Graph Algorithms

- Basic characteristics of graphs
- Graph representations (Adjanzenzmatrix, Adjanzenzlisten)
- Graphd traversals(breadth first, depth first)
- Shortest path computation (Dijkstra's and Floyd's algorithms)
- Minimal spanning trees(Prim's and Kruskal's algorithm).

Optional Topics:

- Network flows (e.g. maximal flow, max-flow–min-cut theorem, maximal bipartite matching)
- further graph problems(e.g. topological sorting, finding strongly connected components, graph matching).

Algorithmic Strategies

- Exhaustive search
- Greedy algorithms
- Divide-and-conquer
- Recursive backtracking
- Branch-and-bound.

Optinal Topics

- reduction: Transform-and-Conquer.

Optional Chapters

- Linear programming (duality, simplex algorithms, interior point methods)
- Pattern matching and string/text algorithms (e.g. substring matching, regular expressions, longest common subsequence)
- string based data structures and algorithms (e.g. suffix arrays, suffix trees, tries)
- advance numerical algorithms (e.g. primality tests, integer factorization)
- geometric data structures and algorithms (e.g., points, line segments, polygons,finding convex hull, spatial decomposition, collision detection, geometric search/proximity).

Literature

- R. Sedgewick: Algorithmen in Java, 2. edition, Pearson
- T. Ottmann, P. Widmayer: Algorithmen und Datenstrukturen, 4. edition, Spektrum Akademischer Verlag, 2002
- T. H. Cormen, C. Leiserson, R. Rivest, C. Stein: Algorithmen - Eine Einführung,4. Auflage Oldenbourg, 2013

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

With completing this modul participants should be familiar with the following topics:

- Basic characteristics and development method for algorithms
- Efficient algorithms and data structures for basic problems
- Important complexity classes for the analysis of runtime and memory complexity.

Participants of the module should be able to:

- Analyze the run time and memory requirements for a given algorithm.
- Formally model and described algorithic problem settings
- Adapt the introduce data structures and algorithms to modified problem settings.

Based on the learned knowledge and abilities the participants obtain the skill to:

- Develop and implement programs based on the introduced algorithmic techniques in a programming language
- Evaluate different solution approaches for a given problem based on formal analysis.

2.4 P 4: Computer Architecture (INF-RA)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Computer Architecture	SoSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Computer Architecture	SoSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, INF-LGY, INF-LRS, MINF-B-180), elective module with compulsory module components (INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-LRS: Teaching Realschule - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	2. Semester (INF-B-180-STAT, INF-LGY, INF-NF-30, INF-NF-60, INF-LRS, INF-B-150, INF-B-180-CL, MINF-B-180), 4. Semester (INF-B-180-MA)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none Qualifying Examination (Grundlagen und Orientierungsprüfung), also for INF-NF-30, INF-NF-60

Responsible for Module	Prof. Dr. Claudia Linnhoff-Popien
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

This module provides an overview of the binary representation of information on computers and on the architecture and operation of modern von Neumann computers. The traditional components of a computer are introduced. Their interaction is first theoretically and then practically illustrated with a machine language and an assembly language. It is shown how to use the Boolean Algebra for designing simple circuits as well as more complex components of a processor and memory, and how to optimize them systematically.

The main topics of the course are as follows:

- the binary representation of information in the computer;
- the realisation of computer memory by electronic circuits and by optical and magnetic media;
- Boolean Algebra for the design of electronic circuits;
- design and optimisation of simple logic circuits in processors;
- components of the von Neumann architecture and its optimization;
- a machine-level assembly language;
- the interaction between the lower level components of a computer, as well as
- parallelization and multi-processor systems.

Recommended Literature:

- Andrew S. Tanenbaum, Todd Austin, Rechnerarchitektur: Von der digitalen Logik zum Parallelrechner, 6. Auflage, ISBN-13: 978-3-86894-238-5,
- William Stallings, Computer Organization and Architecture: Designing for Performance, Pearson Education, 8th Edition, ISBN-13: 978-0135064177,
- David A. Patterson and John L. Hennessy, Morgan Kaufmann, Computer Organization and Design: The Hardware/Software Interface, 4th Edition, ISBN-13: 978-0123744937.

The module consists of a lecture and exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The students will develop a basic understanding of the design and architecture of modern computers. They are introduced into the relationship between high-level languages and the processing of individual commands on the machine level. In particular, they should develop a sense of the consequences the machine architecture has for the execution of programs, written in high level languages.

Students learn to rapidly become acquainted with complex systems and interrelations.

2.5 P 5: Operating Systems (INF-BS)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Operating Systems	WiSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Operating Systems	WiSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, MINF-B-180), elective module with compulsory module components (INF-LRS, INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LRS: Teaching Realschule - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	3. Semester (INF-B-180-STAT, INF-NF-30, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180), 5. Semester (INF-B-120, INF-NF-60), 7. Semester (INF-LRS)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. Claudia Linnhoff-Popien
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

This module provides an introduction to the relevant components of modern operating systems and the needed foundations of computer architecture. It begins by outlining methods for process management and process control, especially concurrent processes. In particular, methods for detection and avoidance of conflicts (deadlocks and race conditions) are treated with concurrent access to shared resources.

The main topics of the course are as follows:

- the history of operating systems;
- the interaction between the lower level components of a computer;
- technical foundations of machine programs, subprograms, procedures and recursive procedure calls;
- strategies for process management in operating systems;
- the support of the operating system for parallelizing programs;
- strategies for Resource Management and coordination of processes;
- techniques for memory management and control of input and output channels;
- local and distributed inter-process communication.

Recomended Literature:

- William Stallings, Operating Systems: Internals and Design Principles, Prentice Hall, 7th Edition, 2011, ISBN-13 978-0132309981
- A.S. Tanenbaum, Modern Operating Systems, Prentice Hall, 3rd Edition, 2007, ISBN-13 978-0136006633
- A. Silberschatz, P. Galvin, J. Peteron, Operating System Concepts, John Wiley and Sons, 8th Edition, 2011, ISBN-13 978-1118112731

The module consists of a lecture and exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples. In addition, the students do exercises, which deepen the application of theoretical concepts in high-level languages.

Qualifikation Aims

This module provides students with the necessary basic knowledge for the specific use of the special structure and properties of modern operating systems. It lays the foundations for the development of optimized and scalable computer programs for modern operating systems.

2.6 P 6: Computer Networks and Distributed Systems (INF-RVS)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Computer Networks and Distributed Systems	SoSe	30 h (2 SWS)	60 h	3 CP
exercise	Exercises: Computer Networks and Distributed Systems	SoSe	45 h (3 SWS)	45 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, MINF-B-180), elective module with compulsory module components (INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	4. Semester (INF-B-180-STAT, INF-NF-30, INF-NF-60, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180), 6. Semester (INF-B-120)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. Dieter Kranzlmüller
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Communication Systems and System Programming Group
Teaching Lang.	German

Contents

The module provides classification, structure and function of networks with a focus on communication protocols and integrates basic components of distributed systems. For this it uses the popular layered models and architectures. Concepts and procedures independent of the layers are addressed separately, in order to specialise them by examples of communication protocols in all major layers of the model. These include the physical layer, the data link layer including multiple access, the network layer, the transport layer, and also the Internet Service Protocols. The presentation and the communication layers are introduced with concepts from the communication middleware for distributed systems. As an outlook for the operation of distributed systems, the module treats summarily the basics of Internet management.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The qualification aims are:

- Understanding of the methods and techniques in computer networks and distributed systems;
- Ability of classification and evaluation of new protocols;
- Understanding of distributed applications and their relation to the properties of the underlying network.

2.7 P 7: Software Engineering (INF-SWT)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Software Engineering	WiSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Software Engineering	WiSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, MINF-B-180), elective module with compulsory module components (INF-LGY, INF-LRS, INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-LRS: Teaching Realschule - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	3. Semester (INF-B-180-STAT, INF-B-120, INF-NF-30, INF-B-150, INF-B-180-CL), 5. Semester (INF-LGY, INF-NF-60, INF-B-180-MA, MINF-B-180), 7. Semester (INF-LRS)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. Rolf Hennicker
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Programming and Software Engineering Group
Teaching Lang.	German, English

Contents

This module introduces the fundamental principles of software engineering. The entire software development process is presented, starting with requirements analysis, system design, to implementation and testing. As a graphical modeling language, the Unified Modeling Language (UML) is used in all phases of the development process. The implementation language is Java.

The main topics of the module are as follows:

- software development processes;
- requirements analysis with use cases;
- design of static system structures with class diagrams;
- modelling behavior with state machines, sequence, and activity diagrams
- architecture of complex software systems;
- design and architectural patterns;
- relationship between models and implementations in object-oriented languages;
- software testing.

The module consists of a lecture and of additional exercises in groups. The concepts introduced in the lecture are practiced in the exercise class with concrete application examples.

Qualifikation Aims

The students will acquire a general understanding of the major aspects of modern software engineering using notions and tools that are currently researched in academia and employed in industry. They will be able to model static and dynamic properties of complex systems and to transfer the models into software.

2.8 P 8: Digital Media (MINF-DM)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Digital Media	WiSe	45 h (3 SWS)	75 h	4 CP
exercise	Exercises: Digital Media	WiSe	30 h (2 SWS)	30 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - MINF-B-180: Bachelor Programme in Media Informatics - MINF-NF-60: Media Informatics as Minor for Bachelor and Master Programmes.
Entry Requ.	none
Time during the study	1. Semester
Duration	The module comprises 1 semester.
Grading	unmarked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics
Teaching Lang.	German

Contents

The module introduces basic notions for digital media, digitization of analog signals, basics of signal processing, loss-free compression, physical and physiological foundations for the media types picture, sound, and moving picture, lossy compression, media document formats. The following topics are covered on an iontroductory level: Clarification of terms Media Informatics and Digital Media, Digitization (Discretisation, Quantisation, Nyquist Sampling Theorem), representation of signals in function space (Fourier transformation, Discrete Cosinus Transformation), universal lossless compression (Huffman Coding, Arithmetic Coding, Run Length Encoding, LZW-type methods), Basics of Gestalt Theory, character encoding and fonts, basics of typography, basics of acoustic media (physics, physiology), lossy ausion compression (in particular MPEG Audio), methods of sound synthesis, basics of visual media Medien (physics, physiology), lossy image compression (in particular JPEG), lossy compression of moving pictures (in particular MPEG video), markup languages for the Web (HTML and CSS), Web-oriented script languages (in particular JavaScript), Web docuemnt languages (XML and Schema Definitions), vector graphics with SVG.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

A basic understanding of the various multimedia file formats and their advantages and disadvantages shall be obtained. The students should be able to practically work with compression algorithms and media document formats shall be achieved.

2.9 P 9: Media Technology (MINF-MT)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Media Technology	WiSe	30 h (2 SWS)	60 h	3 CP
practical training	Practical Course: Media Technology	WiSe	45 h (3 SWS)	45 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - MINF-B-180: Bachelor Programme in Media Informatics - MINF-NF-60: Media Informatics as Minor for Bachelor and Master Programmes.
Entry Requ.	none
Time during the study	2. Semester
Duration	The module comprises 1 semester.
Grading	unmarked
Type of Examination	Portfolio: 30 Stunden bzw. 10-20 Minuten Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics
Teaching Lang.	German

Contents

Basic knowledge of special hardware systems for recording, production and output of digital media as well as basic knowledge on software-based processing of digital media are taught. The main topics are: Technical and algorithmical principles foundations for recording, reproduction and processing of audiovisual media in digital form. This comprises technological principles of devices as well as basic algorithms contained in media processing software. Moreover, an overview on storage media technologies for digital media content is given. These topics are covered for the media types photography, audio and video. In practical exercises, software tools for media editing are introduced, and elementary principles of media design are discussed.

The module consists of a lecture and practical exercises. In practical team work a portfolio of example products shall be produced, which serve to experiment with technical and design issues of media technology.

Qualifikation Aims

The following qualifications are to be achieved:

- knowledge of the basic operation of hardware systems to capture media, media production and media playback;
- practical basic skill with digital photography and videography, as well as simple digital audio technology;
- practical basic skill in the operation of classical systems for image editing, sound editing, video editing and video effects;
- basic experience in the aesthetic design of digital media.

2.10 P 10: Database Systems I (INF-DBSI)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Database Systems I	WiSe	30 h (2 SWS)	60 h	3 CP
exercise	Exercises: Database Systems I	WiSe	30-45 h (2-3 SWS)	45 h - 60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, INF-LGY, INF-LRS, MINF-B-180), elective module with compulsory module components (INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-LRS: Teaching Realschule - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	5. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. Christian Böhm
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Database Systems Group
Teaching Lang.	German

Contents

The course provides an introduction to the field of database systems from a user's perspective. It focuses on the theoretical aspects of the relational database design using the relational data model, relational algebra and the relational calculus. There is a detailed treatment of the SQL query language, which is implemented in most relational systems. Further topics are formalisms, algorithms and a theory of relational design theory, as well as newer applications in the area of databases.

The main topics of the course are as follows:

- relational and object-relational data as well as other models;
- Relational Algebra;
- tuple calculus and domain calculus;
- SQL;
- database design for the E/R model;
- normalforms;
- transactions including synchronization and recovery techniques;
- physical database design (index structures and query optimization);
- integration of database operations in application programs.

The module consists of a lecture and exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The students are able to apply database systems professionally as user, as application programmer and as system designer. They are taught the skills to do focused research in large databases using complex queries, to develop database schemes avoiding redundancy problems and taking into account efficiency aspects, and to implement efficient database applications.

2.11 P 11: Web Information Systems (INF-WIS)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Web Information Systems	WiSe	45 h (3 SWS)	75 h	4 CP
exercise	Exercises: Web Information Systems	WiSe	30 h (2 SWS)	30 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components (INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, MINF-B-180), elective module with compulsory module components (INF-LRS, INF-NF-30, INF-NF-60)
Usability	This module is offered in the following programmes - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LRS: Teaching Realschule - INF-NF-30: Minor Subject: Computer Science for Bachelor Programmes - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	5. Semester (INF-B-180-STAT, INF-NF-30, INF-NF-60, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180), 7. Semester (INF-LRS)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. François Bry
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Programming and Modelling Languages Group
Teaching Lang.	German

Contents

This module introduces the techniques of web-based information systems.
The main topics of the course are as follows:

- Unstructured data or the Document-Web: HTML and basics of information retrieval, search engines and the basics of network analysis, languages, data structures for the web and data parallelism.
- Semi-structured data, or the Data-Web: XML, data models, data schemas, languages and the basics of evaluating web queries;
- Semantic data or the Metadata-Web: RDF/S, social semantic web systems, languages.

The module consists of a lecture and exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The module aims at providing the following:

- appropriate use of basic web standards such as HTML, XML and RDF/S and prepare for the future development of the imported web standards;
- mastery of basic web applications such as search engines, Semantic Web systems and social media;
- use of Web query languages;
- introduction to basic techniques of information retrieval, data storage and data parallelism.

2.12 P 12: Computer Graphics I (MINF-CG1)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Computer Graphics I	SoSe	30 h (2 SWS)	60 h	3 CP
exercise	Exercises: Computer Graphics I	SoSe	45 h (3 SWS)	45 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Entry Requ.	none
Time during the study	4. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Butz
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics
Teaching Lang.	English, if required, otherwise German

Contents

This module introduces the basic concepts of classical (polygon-based) 3D computer graphics. All essential steps of the 3D rendering pipeline are considered:

- coordinate systems, points, lines, transformations;

- scene graph hierarchy and transformation;
- geometric primitives, polygon models, free-form surfaces;
- camera models;
- optimisations(clipping and culling);
- lighting, materials, surface descriptions;
- rasterization and shading (local illumination);
- rendering (global illumination);
- animation and interaction.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Prior Knowledge

Successful participation in the lecture and the exercises requires knowledge from linear algebra and programming skills.

Qualifikation Aims

The students develop an understanding of the basic principles of 3D computer graphics. This understanding allows them to rapidly become familiar with various graphics packages and to professionally use their functions in their own programs and.

2.13 P 14/I: Linear Algebra for Computer Scientists (MA-LinAlgICS)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Linear Algebra for Computer Scientists	WiSe	45 h (3 SWS)	75 h	4 CP
exercise	Exercises: Linear Algebra for Computer Scientists	WiSe	30 h (2 SWS)	30 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	1. Semester (INF-B-180-STAT, INF-B-150, INF-B-180-CL), 3. Semester (MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-45 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Rosenschon
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Department of Mathematics
Teaching Lang.	German

Contents

The module gives a hands-on introduction to the methods of linear algebra, their applications, and the development of basic algebraic notions. It introduces vectors, real matrices and linear algebra in the R^n, abstract linear algebra, determinants, eigenvalues and eigenvectors.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The basics of Linear Algebra as well as general mathematical ways of thinking are to be understood and practically applicable.

2.14 P 14/II: Theoretical Computer Science for Media Informatics (MINF-TGMI)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
exercise	Theoretical Computer Science for Media Informatics	SoSe	45 h (3 SWS)	45 h	3 CP
seminar	Seminar on Selected Topics on Computer Science	SoSe	45 h (3 SWS)	45 h	3 CP

6 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Entry Requ.	none
Time during the study	4. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-120 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Dr. Jan Johannsen
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

The module gives an introduction to the key concepts and results in theoretical computer science, with application examples. The following topics are covered in depth:

- Automata and Formal Languages: Deterministic and non-deterministic finite automata, regular expressions, grammars, context-free languages, pushdown automata;
- Computability: Turing machines, Church's thesis, undecidability, the halting problem, reduction;
- Complexity: The classes P and NP, NP-complete problems.

The module consists of a lecture and blackboard exercises.

Qualifikation Aims

Knowledge of central notions and relationships from Theoretical Computer Science shall be developed, as well as the ability to apply them to typical questions from the area of media informatics.

2.15 P 15: Multidisciplinary Skills (MINF-FK)

Part of: Bachelor Programme in Media Informatics (180 CP)

Remarks

This module consists of the following sub-modules: *Personal and Social Skills* (INF-PSK), *Ethics and Law in Computer Science* (INF-ER) and in addition the practical course *Project Competence Multimedia*. The documentation at hands only covers *Project Competence Multiemedia*. The other sub-modules are identical to the Bachelor program Informatik.
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
practical training	Project Competence Multimedia	WiSe	45 h (3 SWS)	45 h	3 CP

9 credit points are awarded for this module. The attendance time is 7 hours a week. Including self-study, there are about 270 hours to be spent.

Type	compulsory module with compulsory module components
Time during the study	5. Semester (MINF-B-180), 6. Semester (MINF-B-180)
Duration	The module comprises 1 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Project Competence Multimedia: Hausarbeit () Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich
Teaching Lang.	German

Contents

In the practical course *Project Competence Multimedia* practical work is done on real problems in the development of media systems and media design. The course consists of practical project

work in small groups. By individual arrangement there is also the possibility to acknowledge external internships and practical operational activities for this module.

Qualifikation Aims

In the practical course *Project Competence Multimedia* an understanding for the constraints and problems of practical project work shall be developed. Besides that, the ability shall be developed to quickly get familiar with practically relevant current technologies of media informatics beyond those taught in the curriculum.

2.16 P 16: Analysis for Computer Scientists and Statisticians (MA-AnIS)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Analysis for Computer Scientists and Statisticians	WiSe	60 h (4 SWS)	120 h	6 CP
exercise	Exercises: Analysis for Computer Scientists and Statisticians	WiSe	30 h (2 SWS)	60 h	3 CP

9 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 270 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	1. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-45 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinz Siedentop
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Department of Mathematics
Teaching Lang.	German

Contents

The module gives a hands-on introduction into analysis and its applications. The main focus is on the development of mathematical methods and insights. It introduces sets, relations, mappings, induction, recursive definitions, real numbers, sequences and series, power series, continuous and differentiable functions in one and many variables, complex numbers, norms, and metrics.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The basic parts of Analysis are to be understood. Mathematical methods and ways of thinking are to be adopted.

2.17 P 17: Special Topics for Bachelor I (INF-B-VT1)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Special Topics for Bachelor I	WiSe, SoSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Special Topics for Bachelor I	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	4. Semester (INF-B-120), 5. Semester (INF-B-180-STAT, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)

Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science
Teaching Lang.	German

Contents

This is the first of two so-called "abstract" modules in the Bachelor programme. In both with 6 ECTS credits rated modules, students can choose from a wide range of in-depth courses in Infomratics, Mediainformatics and Bioinformatics. The concrete contents of the courses can vary from semester to semester. They are usually inspired by the teaching staff's research and thus serve the principle of research orientation in teaching: By visiting in-depth modules, students will be introduced to current issues in research and gain insight into the development of the field. In order to promote excellent bachelor students they are already opened the possibility to visit master level modules (- appropriate characterization is done in the module descriptions, in particular whether it is necessary to have already provided excellent achievements in previous studies). The achievable level of competence is the proven ability to work together in dialogue with master level students and thereby to be able to bring in first valuable contributions.

Qualifikation Aims

By visiting special topics modules, students acquire the basic ability to understand university research: The introduction to current research projects of teachers, in particular, makes the students aware of how to deal with scientific issues and enables them for developing first own ideas for advanced learning processes.

2.18 P 18: Special Topics for Bachelor II (INF-B-VT2)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Special Topics for Bachelor II	WiSe, SoSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Special Topics for Bachelor II	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	5. Semester (INF-B-180-STAT, INF-B-120, INF-B-180-MA, INF-B-150, INF-B-180-CL), 6. Semester (MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)

Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science
Teaching Lang.	German

Contents

This is the second of two so-called "abstract" modules in the Bachelor programme. In both with 6 ECTS credits rated modules, students can choose from a wide range of in-depth courses in Infomratics, Mediainformatics and Bioinformatics. The concrete contents of the courses can vary from semester to semester. They are usually inspired by the teaching staff's research and thus serve the principle of research orientation in teaching: By visiting in-depth modules, students will be introduced to current issues in research and gain insight into the development of the field. In order to promote excellent bachelor students they are already opened the possibility to visit master level modules (- appropriate characterization is done in the module descriptions, in particular whether it is necessary to have already provided excellent achievements in previous studies). The achievable level of competence is the proven ability to work together in dialogue with master level students and thereby to be able to bring in first valuable contributions.

Qualifikation Aims

By visiting special topics modules, students acquire the basic ability to understand university research: The introduction to current research projects of teachers, in particular, makes the students aware of how to deal with scientific issues and enables them for developing first own ideas for advanced learning processes.

2.19 P 19: Bachelor Thesis and Examination (MINF-BA)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
	Bachelor Thesis	WiSe, SoSe			12 CP
	Bachelor Examination	WiSe, SoSe			3 CP

15 credit points are awarded for this module. The attendance time is 0 hours a week. Including self-study, there are about 450 hours to be spent.

Type	compulsory module with compulsory module components
Entry Requ.	none
Time during the study	6. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Bachelorarbeit (10 Wochen) und mündlich (20-45 Minute) Repeatability: once, next chance, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science
Teaching Lang.	German, English

Contents

This module comprises the Bachelor thesis and the final examination.

The students solve a nontrivial problem with scientific methods and document the solution within 10 weeks time. The examination consists of a presentation of the bachelor thesis (about

20 min.), followed by maximally 20 minutes discussion about the bachelor thesis and related topics.

Qualifikation Aims

The students learn to solve a nontrivial problem with scientific methods and document the solution in a given time.

2.20 WP 1: Practical Course in Software Development (INF-SEP)

Remarks

For the successful completion of the practical course basic knowledge of the Java programming language is essential.Anfang
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
tutorial	Aspects of Software Development	WiSe	30 h (2 SWS)	60 h	3 CP
practical training	Software Development Projekt	WiSe	135 h (9 SWS)	135 h	9 CP

12 credit points are awarded for this module. The attendance time is 11 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT, MINF-B-180), compulsory module with compulsory module components (INF-LGY, INF-LRS, INF-NF-60, MINF-NF-60)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-LRS: Teaching Realschule - INF-NF-60: Minor Subject: Computer Science for Bachelor Programmes - MINF-B-180: Bachelor Programme in Media Informatics - MINF-NF-60: Media Informatics as Minor for Bachelor and Master Programmes.
Entry Requ.	none
Time during the study	3. Semester
Duration	The module comprises 1 semester.
Grading	marked

Type of Examination	mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

The module consists of an introductory phase where the basic programming techniques that are needed for the later work, are introduced. In the second phase a complex software development project will be implemented in teams of three to six students. The main focus of the module is to get experience in team-oriented software development using generally available tools and methods.

The practical work is accompanied by a plenary session, in which the software development techniques necessary for the project are discussed. This typically includes programming with programming libraries, graphics programming, aspects of object-oriented analysis, introduction to client-server programming and the use of software management tools. In addition actual problems which showed up in the current phase of the project are discussed.

The students work independently in small teams. Each team is assigned an adviser who helps the team in the upcoming tasks.

Qualifikation Aims

The software development internship provides practical experience in team-based development of a larger and complex software system using commonly available tools and methods. The goal is to develop the ability to develop in a small team a major software project. Upon successfully completing the software development internship, the participants should dare to take a student job in the IT industry.

Remarks

For the successful completion of the practical course basic knowledge of the Java programming language is essential.

2.21 WP 2: Practical Training in Operating System Development (INF-SysP)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
tutorial	Aspects of Operating System	WiSe	30 h (2 SWS)	60 h	3 CP
practical training	Operating System Development Projekt	WiSe	135 h (9 SWS)	135 h	9 CP

12 credit points are awarded for this module. The attendance time is 11 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LRS: Teaching Realschule - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	3. Semester (INF-B-180-STAT, INF-B-120, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180), 7. Semester (INF-LRS)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Dieter Kranzlmüller

Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Communication Systems and System Programming Group
Teaching Lang.	German

Contents

This practical training in system development covers selected problems and challenges in the area of system programming. Basic knowledge in a programming language is no prerequisite. An accompanying lecture gives an overview about the necessary basics using C. In any case, it is reasonable to have basic knowledge in an imperative programming language such as e.g. C/C++, Pascal or Java and the use of text editors at hand.

Qualifikation Aims

It is the goal to learn system programming using C. The topics and exercises cover for example interface specifications, modular software development, formatted I/O, parsers and parsing, CPU scheduling, processes and their management, inter-process communication and process synchronization, signaling, pipes, sockets, communication protocols, the TCP/IP protocol family as well as the client/server programming model.

2.22 WP 3: Introduction to Communication Science (KW-EKW)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Fundamentals of Communication Science	WiSe	30 h (2 SWS)	60 h	3 CP
exercise	Introduction to Scientific Working	WiSe	45 h (3 SWS)	45 h	3 CP
exercise	Seminar Media Science	WiSe	30 h (2 SWS)	60 h	3 CP
exercise	Seminar Communication Theory	SoSe	30 h (2 SWS)	60 h	3 CP

12 credit points are awarded for this module. The attendance time is 9 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	1. Semester (MINF-B-180), 3. Semester (MINF-B-180)
Duration	The module comprises 3 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Fundamentals of Communication Science: mündlich (15-30 Minute) oder Klausur (60-90 Minute) Repeatability: arbitrary, Admission Requirements: none Introduction to Scientific Working: Übungsblätter (10000 Zeichen) und Referat (20 Minute) und Klausur (60 Minute) Repeatability: arbitrary, Admission Requirements: none Seminar Media Science: Präsentation (20 Minute) und Klausur (60 Minute) und Hausarbeit (20000 Zeichen) Repeatability: arbitrary, Admission Requirements: none Seminar Communication Theory: Präsentation (20 Minute) und Klausur (30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann

Provider	Ludwig-Maximilians-University Munich Faculty of Social Sciences Department of Communication Science and Media Research
Teaching Lang.	German

Contents

Students will get a general orientation on the discipline and its central subjects. The lecture will provide students with a broad overview of the teaching and research fields of communication studies. Focus will be on phenomena of mass communication and of journalism, besides pre- and post-embedded instances such as public relations and advertisement. The proseminar Communication Theory provides a survey of the most important communication and mass communication models as well as the various theoretic approaches of the discipline. Focus will be on the development of particular research areas (research on communicator, media reception and media effects) as much as the critical evaluation of empirical application and fruitfulness of these various approaches. Central terms relevant for the scientific understanding of communication studies will be examined. The proseminar Media Science provides a basic survey of the media system of the Federal Republic of Germany, particularly as to daily papers, broadcasting and online media. Starting from its historic genesis and the social function of media legal frameworks, organisation and structure will be dealt with. Exemplarily current problems of media development and media policy will be looked at, evaluated from the perspective of communication studies and related internationally. The seminar Introduction to Scientific Working teaches the following skills: handling of relevant data bases, research methods and information about crucial sources of the field of study, current evidence procedures and citation rules, exercises in bibliography. Furthermore, theoretic scientific principles are dealt with.

Qualifikation Aims

The basic concern of the module is to transmit an overall knowledge on the essential fields of communication studies. Important (basic) concepts are to be clarified and central research topics to be prepared, in order to get overview knowledge to relevant knowledge ranges of the subject. During the proseminar Communication Theory students should learn how to research knowledge and information and how to evaluate, intensify and structure their findings, in order to be able to draw their own conclusions. Essential learning target of the proseminar Media Science is to enable the students to critically reflect upon the areas of media structure, media development and media policy. Key qualifications such as communication skills, presentation techniques and communicative abilities as well as organisation and transfer abilities will be trained in the Introduction to Scientific Working course. Students will learn scientific key qualifications such as research techniques, transfer of knowledge, handling of information, media skills, capacity for teamwork and communicative skills.

2.23 WP 4: Empirical Social Research (KW-ESF)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Empirical Methods	WiSe	30 h (2 SWS)	60 h	3 CP
exercise	Communication Research	WiSe	45 h (3 SWS)	45 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Successful Completion of the module *Introduction to Communication Studies*
Time during the study	2. Semester
Duration	The module comprises 1 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Empirical Methods: Klausur (75 Minute) Repeatability: arbitrary, Admission Requirements: none Communication Research: Übungsblätter (20000 Zeichen) und Klausur (30-120 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of Social Sciences Department of Communication Science and Media Research
Teaching Lang.	German

Contents

The focus will be on quantifying methods and scientific approaches. Central is the survey of quantifying methods in the field of data collection, general methodology and research design. The seminar creates a basic understanding for the research approach of communication studies and sensitises for the possibilities and limitations of quantifying methods used in the field of study. A survey on the research process in communication studies will be given. Practical transfer of the lecture material will be focused (application of content analysis, observation and interrogation).

Qualifikation Aims

The module forms the basis of comprehending the methodical approach to questions of communication studies. The essential aim is to sensitize to the possibilities and limits of quantifying methods of the field of study and to obtain a basic understanding for empirical work. In the end, participants should critically appraise the utility of central methods of communication studies questions and be able to apply them. The abilities to organise and transfer will be encouraged in the seminar in particular.

2.24 WP 5: Special Topics of Communication Science (KW-VT)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Communication Studies: Seminar	WiSe, SoSe	30 h (2 SWS)	210 h	8 CP
exercise	Communication Studies: Excercise Class	WiSe, SoSe	30 h (2 SWS)	90 h	4 CP

12 credit points are awarded for this module. The attendance time is 4 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Successful completion of the module *Introduction to Communication Studies*
Time during the study	4. Semester
Duration	The module comprises 1 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Communication Studies: Seminar: Seminar (20000 Zeichen) oder Klausur (60 Minute) Repeatability: arbitrary, Admission Requirements: none Communication Studies: Excercise Class: Seminar (10000 Zeichen) oder Übungsblätter (20000 Zeichen) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of Social Sciences Department of Communication Science and Media Research
Teaching Lang.	German

Contents

This module deals with a research problem related to one of the following areas:

- *Theory and history of communication*: Topics range from the late 15th century (Gutenberg) to the present, from traditional means of communication such as flyers to online-communication and from the "newspaper debate" of the late 17th century to post-modern theories of communication and media. This compulsory elective module is also about the history of communication studies as an academic discipline.
- *Journalism Research*: This area offers insights to concrete research projects in the fields of communicator and media content research (including theoretic problems related to these areas). The theoretic foundation of the seminar takes place in the advanced seminar.
- *Media Systems and Communication Policy*: The actual topics of courses offered within this area refer to facts or developments in media systems of various countries that are relevant from the perspective of communication policy and that are subject to national or international political activities concerning communication. Examples are: digital broadcasting, internet regulation, public media sponsorships and gratuitous newspapers.
- *Media Economics, Marketing and Public Relations*: This area centres on media economy, marketing, public relations, communicator research, media content or media effects research as evaluation research. Students should comprehend the practical relevance of research in communication studies and of practically orientated work for the application fields "media economics, marketing and public relations".
- *Media Effects and Media Use*: Courses in this area enables participants to assess the relevance of media usage and media effects and to classify central findings of relevant research projects in the field of communication studies.

Qualifikation Aims

The main aim is to teach key qualifications, particularly the abilities of researching knowledge and information, evaluation, densification and structuring as well as networked thinking, organisation and transfer, capacity for team work and the use of presentation techniques. Moreover, students gain insights to how research projects are developed, as well as the ability to work independently on a concrete research topic, development and implementation of ideas.

2.25 WP 6: Fundamentals of Business Administration as a Minor (BWL-GdBWL)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Foundations of Business Administration for Minor Students, Part 1 (Lecture)	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP
exercise	Foundations of Business Administration for Minor Students, Part 1 (Excercises)	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP
lecture	Methods of Business Accounting	WiSe	30 h (2 SWS)	60 h	3 CP
lecture	Foundations of Business Administration for Minor Students, Part 2 (Lecture)	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP
exercise	Foundations of Business Administration for Minor Students, Part 2 (Excercises)	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP

15 credit points are awarded for this module. The attendance time is 10 hours a week. Including self-study, there are about 450 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	1. Semester (MINF-B-180), 2. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	

Type of Examination	The module examination consists of the course examinations. Foundations of Business Administration for Minor Students, Part 1 (Lecture): Klausur (120 Minute) Repeatability: arbitrary, Admission Requirements: none Methods of Business Accounting: Klausur (60 Minute) Repeatability: arbitrary, Admission Requirements: none Foundations of Business Administration for Minor Students, Part 2 (Lecture): Klausur (120 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of Business Administration
Teaching Lang.	German

Contents

In this module, the students receive an overview of key topics in business administration. They are introduced to different approaches to the theoretical discussion of these topics. Special attention is given to the different business functions (marketing, organization, management, investment, finance, and internal and external accounting).

Qualifikation Aims

The aim of this module is to familiarize the students with the basic problems and approaches in business administration trusts.

2.26 WP 7: Digital Media Business (BWL-GNM)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Introductory Lecture on New Media	WiSe	30 h (2 SWS)	60 h	3 CP
exercise	Basic Training on New Media	WiSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 4 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Successful Completion of *Fundamentals of Business Administration*
Time during the study	3. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (120 Minute) oder mündlich (15-45 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of Business Administration
Teaching Lang.	German

Contents

In this module economic foundations of the media industry (eg, revenue models and value chains) and industry-specific technologies are introduced (eg. content management systems and networked households) and typical business models are presented. Practitioner presentations will be integrated.

The module consists of lectures and exercises. The exercises draw on topics from the lectures and deepens them with concrete tasks.

Qualifikation Aims

The participants will learn the basic concepts of the media industry, categorize, critically analyze and apply them to specific questions.

2.27 WP 8: Specific Questions of the Media Industry (BWL-SFMW)

Part of: Bachelor Programme in Media Informatics (180 CP)

Remarks

You may choose one 6-ECTS Seminar and one 3-ECTS Seminar.Anfang
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Theoretical Homework Seminar to New Media	SoSe	60 h (4 SWS)	120 h	6 CP
seminar	Empirical Homework Seminar to Business Informatics and New Media	SoSe	60 h (4 SWS)	120 h	6 CP
seminar	Introductory Seminar Course New Media	SoSe	30 h (2 SWS)	60 h	3 CP
seminar	Business Planning for New Media	SoSe	30 h (2 SWS)	60 h	3 CP
lecture	Digital Business	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP

9 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 270 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Successful Completion of *Digital Media Business*
Time during the study	4. Semester
Duration	The module comprises 1 semester.
Grading	

Type of Examination	The module examination consists of the course examinations. Theoretical Homework Seminar to New Media: (Hausarbeit (ca. 20000 Zeichen) und Referat (ca. 20 Minuten)) oder (Fallstudie (ca. 20.000 Zeichen) und Referat (ca. 20 Minuten)) oder (Hausarbeit (ca. 20.000 Zeichen) und (Fallstudie (ca. 20.000 Zeichen)) Repeatability: arbitrary, Admission Requirements: none Empirical Homework Seminar to Business Informatics and New Media: (Hausarbeit (ca. 20000 Zeichen) und Referat (ca. 20 Minuten)) oder (Fallstudie (ca. 20.000 Zeichen) und Referat (ca. 20 Minuten)) oder (Hausarbeit (ca. 20.000 Zeichen) und (Fallstudie (ca. 20.000 Zeichen)) Repeatability: arbitrary, Admission Requirements: none Introductory Seminar Course New Media: Hausarbeit (20000 Zeichen) und Referat (20 Minute) Repeatability: arbitrary, Admission Requirements: none Business Planning for New Media: (Hausarbeit (ca. 20000 Zeichen) und Referat (ca. 20 Minuten)) oder (Fallstudie (ca. 20.000 Zeichen) und Referat (ca. 20 Minuten)) oder (Hausarbeit (ca. 20.000 Zeichen) und (Fallstudie (ca. 20.000 Zeichen)) Repeatability: arbitrary, Admission Requirements: none Digital Business: Klausur (60 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of Business Administration Institute for Information Systems and New Media
Teaching Lang.	German

Contents

In this module, specific research and practical problems of the media industry will be deepened. Addressed are a theoretical and empirical scientific analysis of current topics in the field of new media, as well as the conceptual discussion about, and practical application of new technologies.

Qualifikation Aims

The participants should firstly learn the theory-based and empirical scientific working. Secondly, they can apply the concepts discussed to concrete, practice-relevant tasks.

Remarks

You may choose one 6-ECTS Seminar and one 3-ECTS Seminar.

2.28 WP 9: Foundations of Media Design (IKP-GMG)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Foundations of Color Design on the Surface I	WiSe	45 h (3 SWS)	45 h	3 CP
seminar	Foundations of Graphic Design on the Surface I	WiSe	30 h (2 SWS)	60 h	3 CP
seminar	Methods of Art and Media Viewing	SoSe	45 h (3 SWS)	135 h	6 CP

12 credit points are awarded for this module. The attendance time is 8 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	1. Semester (MINF-B-180), 2. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Foundations of Color Design on the Surface I: Portfolio (15 Stunden) und Präsentation (10 Minute) Repeatability: arbitrary, Admission Requirements: none Foundations of Graphic Design on the Surface I: Portfolio (30 Stunden) und Präsentation (20 Minute) Repeatability: arbitrary, Admission Requirements: none Methods of Art and Media Viewing: Klausur (45 Minute) oder (Referat (30 min) und Hausarbeit (7.200 Zeichen)) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of History and the Arts Institute of Art Education

Teaching Lang.	German

Contents

The students are made familiar with the various fields of two-dimensional artistic work in theory and practise. As a result they acquire basic skills at traditional artistic and medial working techniques and its aesthetical application. In the theoretical part works of art and works of medial art are analysed from an artistic point of view.

The seminar *Basics of two-dimensional Artwork with Colours I* concentrates on work with colours. The students are introduced to the techniques of painting and two-dimensional work with colours. By presenting works of art various methods of image producing and its effects are discussed.

In the seminar *Basics of two-dimensional Graphic Design I* students are familiarized with various techniques of graphic art. By presenting examples from the field of fine arts and applied arts diverse methods of graphic design and its effects are discussed.

In the seminar *Methods of Analysing Art/ Media* group work and seminar discussions are used to familiarize the students with various techniques of graphic art. By presenting examples from the field of fine arts and applied arts diverse methods of graphic design and its effects are discussed.

Qualifikation Aims

- Insight into the diverse spheres of creative work;
- Basic understanding of image production and communication with images;
- Development of artistic skills in working with colours and in graphics design with regard to aesthetics, techniques and material;
- Insight into different methods of analysing art;
- Basic knowledge of didactical principles.

2.29 WP 10: Foundations of Art/Media Practice (IKP-GKMP)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Foundations of Multi Media Design at the Computer I	WiSe	45 h (3 SWS)	135 h	6 CP
seminar	Explanatory Drawing I	SoSe	45 h (3 SWS)	45 h	3 CP

9 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 270 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Successful completion of *Foundations of Media Design*
Time during the study	3. Semester (MINF-B-180), 4. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Foundations of Multi Media Design at the Computer I: Portfolio (45 Stunden) und Präsentation (20 Minute) Repeatability: arbitrary, Admission Requirements: Successful Participation at "Foundations of Media Design". Explanatory Drawing I: Portfolio (15 Stunden) und Präsentation (10 Minute) Repeatability: arbitrary, Admission Requirements: Successful Participation at "Foundations of Media Design".
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of History and the Arts Institute of Art Education
Teaching Lang.	German

Contents

Having become familiar with the visual techniques of Module IKP-GMG, this module concentrates on presenting the students additional fields of two-dimensional artistic work and dealing with it from an expert point of view..

In the seminar *Basics of computer-aided Multimedia Design I* focuses attention on teaching basic skills at digital image producing. These skills are acquired in theory and practise. The main emphasis is laid on aesthetic and technical aspects of the digital image.

In the Seminar *Detailed Drawing I* The students are introduced to the techniques of detailed Drawing.

Qualifikation Aims

- Overview knowledge of techniques used in two-dimensional artistic work;
- Familiarity with the instruments of digital image producing and ability to perceive their aesthetic potential;
- Ability, to show and explain subjects by drawing.

2.30 WP 11: Advanced Art/Media Practice (IKP-VKMP)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Foundations of Design on the Surface I	WiSe	45 h (3 SWS)	45 h	3 CP
seminar	Foundations of Multi Media Design at the Computer II	WiSe	45 h (3 SWS)	135 h	6 CP

9 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 270 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Successful completion of *Foundations of Media Design*
Time during the study	4. Semester (MINF-B-180), 5. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Foundations of Design on the Surface I: Portfolio (30 Stunden) und Präsentation (20 Minute) Repeatability: arbitrary, Admission Requirements: Successful Participation at "Foundations of Media Design". Foundations of Multi Media Design at the Computer II: Portfolio (45 Stunden) und Präsentation (20 Minute) Repeatability: arbitrary, Admission Requirements: Successful Participation at "Foundations of Media Design".
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty of History and the Arts Institute of Art Education
Teaching Lang.	German

Contents

This module concentrates on gaining in-depth practical and theoretical experience in two-dimensional artistic working. An intensive discussion of contemporary art takes place.

The seminar *Basics of two-dimensional Artwork I* The students are introduced to the techniques of two-dimensional creative work with colours and graphic arts. By presenting examples from the field of fine arts and applied arts diverse methods of structuring a painting and methods of graphic design and its effect are discussed.

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In the seminar *Basics of computer-aided Multimedia Design II*, based on the knowledge and skills acquired in the basic module IKP-GKMP, a broader spectrum of digital art is presented and tested by putting projects into practise.

Qualifikation Aims

- Gaining artistic skills at work with colours and graphic arts regarding aesthetics, techniques and materials;
- familiarity with additional instruments of digital image processing and their aesthetic potential, in particular higher flexibility in dealing with various programmes.

2.31 WP 12: Human-Computer Interaction I (MINF-MMI1)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Human-Machine Interaction	SoSe	45 h (3 SWS)	75 h	4 CP
exercise	Exercises: Human-Machine Interaction	SoSe	30 h (2 SWS)	30 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	compulsory module with compulsory module components
Usability	This module is offered in the following programmes - MINF-B-180: Bachelor Programme in Media Informatics - MINF-NF-60: Media Informatics as Minor for Bachelor and Master Programmes.
Entry Requ.	none
Time during the study	4. Semester (MINF-B-180), 6. Semester (MINF-NF-60)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Butz
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics Human Machine Interaction Group
Teaching Lang.	German

Contents

The module Human-Computer Interaction 1 discusses basic aspects of the interaction between humans and computers. Students will learn how they can develop user interfaces in such a way, that users can work efficiently and comfortably.

The topics include:

- human information processing (models, physiologic an psychological foundations, human senses, processes)
- basics and methods of design
- in- and output devices for computers, embedded and mobile systems
- principles, guidelines and standards for designing user interfaces
- methods for modeling user interfaces (abstract descriptions and how they can be embedded into the requirements elicitation and engineering process)
- evaluation of interactive systems (tools, methods, performance metrics, check lists)

The module is based on (as of 2014) the book by A. Butz, A. Krüger: "Mensch-Maschine-Interaktion" (De Gruyter, 2014)

The module consists of a lecture and an addition exercise class. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Prior Knowledge

none

Qualifikation Aims

Knowledge of the fundamental problems and the known solution approaches for human-oriented interface design shall be obtained. Practical skills in creation of prototypes and interface concepts shall be developed. Experience in evaluating software/hardware systems for usability shall be obtained.

2.32 WP 13: Foundations of Psychology (PSY-GdP)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Foundations of Psychology 1	WiSe	30 h (2 SWS)	60 h	3 CP
lecture	Lecture: Foundations of Psychology 2	SoSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 4 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	1. Semester (MINF-B-180), 2. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-45 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Butz
Provider	Ludwig-Maximilians-University Munich Faculty of Psychology and Educational Sciences Department of Psychology
Teaching Lang.	German

Contents

Psychology can be defined as a science that deals with the description and explanation of human behavior and mental processes, i.e. with those systems of the brain that control behavior; subject matters of the lectures are especially history of psychology, Experimental Psychology, and basic

results of Developmental and Social Psychology and Personality including some applications in Clinical and Educational Psychology and Human Factors.

This module consists of the following parts:

Foundations of Psychology 1: The lecture Foundations of Psychology 1 teaches the basics of Experimental Psychology and Biological Psychology. Students acquire knowledge on the biological, perceptual, and attentional determinants of behavior control as well as on memory, learning, motivation and emotion.

Foundations of Psychology 2: The lecture Foundations of Psychology 2 teaches the basics of Developmental Psychology, Personality, and Social Psychology. Students learn how developmental processes, personality and the social contexts determine human behavior; in addition they are introduced to some applications in Clinical Psychology, Educational Psychology and Cognitive Ergonomics.

Qualifikation Aims

Students acquire a profound knowledge on the processes and structures that control human behavior and about the biological basis of these processes as well as knowledge on how to use scientific findings to solve individual problems as well as problems in our society.

2.33 WP 14: Human Factors in Engineering (PSY-HFE)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Human Factors in Engineering I	WiSe	30 h (2 SWS)	60 h	3 CP
lecture	Lecture: Human Factors in Engineering II	SoSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 4 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	3. Semester (MINF-B-180), 4. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-45 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Butz
Provider	Ludwig-Maximilians-University Munich Faculty of Psychology and Educational Sciences Department of Psychology
Teaching Lang.	German

Contents

Human Factors is a field of application in Psychology that mainly applies the results of Experimental Psychology to design the physical conditions of work, in particular the design of tools and apparatuses in order to optimize sensory processing, the psychomotorical aspects of perfor-

mance, taking into account limited learning and memory capabilities intending to avoid physical and cognitive overload and to guarantee utmost safety and accuracy of work results. The basic module consists of two lectures that give an up-to-date overview on research in human factors in man-machine-interaction. The two lectures give an overview on the numerous applications, starting with the sensory, attentional and cognitive conditions that must be met to guarantee freedom from errors (visual and auditory information processing, attention and working memory) to the analysis of frequent types of errors and how to avoid them. Finally, the rules are explicitly described that must be followed in order to produce an user oriented design. These principles are used for instance in designing everyday things (i.e., in the design of switches, handles and knobs, DVD recorders etc.), particularly in the design of devices relevant for the safety of cars and airplanes and in the design of control rooms of large factories and power plants.

This module consists of the following parts:

Foundations I of Human Factors in Engineering: The two lectures give an overview on the numerous applications, starting with the sensory, attentional and cognitive conditions that must be met to guarantee freedom from errors (visual and auditory information processing, attention and working memory) to the analysis of frequent types of errors and how to avoid them. Finally, the rules are explicitly described that must be followed in order to produce an user oriented design. These principles are used for instance in designing everyday things (i.e., in the design of switches, handles and knobs, DVD recorders etc.), particularly in the design of devices relevant for the safety of cars and airplanes and in the design of control rooms of large factories and power plants.

Foundations II of Human Factors in Engineering: The second part of the lecture continues part one. They learn to apply their basic knowledge in Experimental Psychology to the solution of problems of interaction in man-machine systems.

Qualifikation Aims

The students acquire the fundamental knowledge needed to detect and correct potential causes for action errors while controlling technical devices in cooperation with engineers. They learn to apply their basic knowledge in Experimental Psychology to the solution of problems of interaction in man-machine systems.

2.34 WP 15: Statistics I for Media Informatics (STAT-StIMI)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	lecture: Statistics I für Media Informatics	WiSe, SoSe	45 h (3 SWS)	75 h	4 CP
exercise	exercises: Statistics I für Media Informatics	WiSe, SoSe	30 h (2 SWS)	30 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	3. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-45 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Thomas Augustin
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Department of Statistics
Teaching Lang.	German

Contents

The module introduces to basic methods of descriptive statistics. It starts with the description of univariate data und explains measures of location, scale and concentration. After that methods

for the analysis of association and correlation are discussed. Finally descriptive aspects of linear regression are introduced.

The lecture develops central concepts and methods of descriptive Statistics. Important properties of the main techniques are formulated and illustrated via selected examples. A particular focus is laid on the correct application of the methods and their adaquate interpretation.

The exercise classes deepen the contents of the lecture by applying it to exercises and small projects. A further focus is laid on the handling of software for statistical gaphics.

Qualifikation Aims

The students shall be enabled to apply fundamental methods of descriptive statistics in an adequate manner and to interpret the results correctly. During their study the students shall also develop a critical understanding of the power and limitations of statistical methodology.

2.35 WP 16: Interaction Design and Concept Development (MINF-IDCD)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Interaction Design	SoSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Interaction Design	SoSe	30 h (2 SWS)	60 h	3 CP
all-day practical training	Concept Development	WiSe	90 h (6 SWS)	90 h	6 CP

12 credit points are awarded for this module. The attendance time is 11 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	4. Semester (MINF-B-180), 5. Semester (MINF-B-180)
Duration	The module comprises 2 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: once, next chance, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Butz
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics Applied Informatics and Media Informatics Group
Teaching Lang.	English

Contents

The lecture on interaction design imparts knowledge to understand the iterative, user-centered design process of interactive systems. One of the key elements of the lecture focuses on the users' experiences with new technological systems (User Experience, UX). Furthermore, the context of developing new forms of interfaces within an interdisciplinary environment will be discussed with the help of various examples form the industry.

In the practical course Concept Development students will design an innovative interaction concept and implement it as a prototype. In teams, they will apply the various phases of an iterative design process, and thereby strengthen their theoretical knowledge. A final evaluation will give first insights, whether the concept in question has any potential for further development. The knowledge obtained in the interaction design class will form the basis for passing this course.

The Interaction Design part consists of a lecture and an exercise. The concepts introduced in the lecture are practiced in the exercise with small sample projects. Particular emphasis is put on the practical construction of prototypes and evaluation of systems.

Concept Development is a practical course with group work in small, possibly interdisciplinary, groups.

Prior Knowledge

none

Qualifikation Aims

The students will learn to apply established design methods to the development of interactive systems. They gain practical experience in designing and prototyping novel interaction concepts.

2.36 WP 18: Practical Skills (MINF-PSk)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
practical training	Drawing and Sketching of Scenarios	WiSe	45 h (3 SWS)	45 h	3 CP
practical training	Participation on 3 User Studies	WiSe, SoSe	45 h (3 SWS)	45 h	3 CP

6 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	none
Time during the study	1. Semester (MINF-B-180), 2. Semester (MINF-B-180)
Duration	The module comprises 1 semester.
Grading	
Type of Examination	The module examination consists of the course examinations. Drawing and Sketching of Scenarios: Portfolio (45 Stunden) Repeatability: arbitrary, Admission Requirements: Regular Participation at the Course. Participation on 3 User Studies: Teilnahme (3-9 Stunden) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Andreas Butz
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics Applied Informatics and Media Informatics Group
Teaching Lang.	German

Contents

In this Drawing Course students learn to draw people and objects in various room situations when executing varying activities. Students will be enabled to describe usage scenarios for interactive systems in the form of pen-and-paper sketches in an aesthetically pleasing and efficient way. The course usually will be held by knowledgeable external teachers.

practical course

Prior Knowledge

none

Qualifikation Aims

The module provides:

- Basic knowledge of techniques for graphical sketching;
- Practical ability to produce simple sketches of usage scenarios.

3 Component Modules

The following modules are not mentioned explicitely in the examination regulations, but implicitely as courses in other modules.

3.1 CM 1: Social and Personal Competence (INF-PSK)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Seminar: Social and Personal Competence	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP

3 credit points are awarded for this module. The attendance time is 2 hours a week. Including self-study, there are about 90 hours to be spent.

Type	elective module with compulsory module components (INF-LRS, MINF-B-180), compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LRS: Teaching Realschule - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	3. Semester (INF-B-180-MA), 6. Semester (INF-B-180-STAT, INF-B-120, INF-B-150, INF-B-180-CL), 7. Semester (INF-LRS)
Duration	The module comprises 1 semester.
Grading	unmarked
Type of Examination	Klausur (45-90 Minute) oder mündlich (15-30 Minute) oder Hausarbeit (7000-14000 Zeichen) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)

Provider	Ludwig-Maximilians-University Munich
Teaching Lang.	German

Contents

The seminar focuses on social authority and self authority. Social authorities are in particular communicative authority, authority for the technology of communication, authority to handling partners, authority for the conflict recognition and conflict management, authority for the dissolution of conflict situations, intercultural authority, social project management/team ability, authority for the controlling of the interior relations, authority for the support of the external relations. Self authorities are in particular reflection/criticism ability, flexibility, motivation, learning and readiness to perform, perseverance and reliability, ethics and responsibility.

Qualifikation Aims

The students learn, to present their ideas and proposals convincingly in written and oral form, to recognise different positions and opinions of their partners and to integrate them in appropriate solutions, even if their partners are not familiar with the way computer scientists talk and think. In addition skills in conflict management are necessary to argue goal oriented in controversy discussions and to accept critics in a positive way. The ability to recognise and resolve misunderstandings early. Furthermore, the ability to recognise the impact of informatics on the social, economical, psychological, legal aspects as well as aspects pertaining to labour law of the society will be developed.

3.2 CM 2: Ethics and Law in Computer Science (INF-ER)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
seminar	Seminar Ethics and Law in Computer Science	WiSe, SoSe	30 h (2 SWS)	60 h	3 CP

3 credit points are awarded for this module. The attendance time is 2 hours a week. Including self-study, there are about 90 hours to be spent.

Type	elective module with compulsory module components (INF-LRS, MINF-B-180), compulsory module with compulsory module components (INF-B-120, INF-B-150, INF-B-180-CL, INF-B-180-MA, INF-B-180-STAT)
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LRS: Teaching Realschule - MINF-B-180: Bachelor Programme in Media Informatics
Entry Requ.	none
Time during the study	4. Semester (INF-B-180-MA), 6. Semester (INF-B-180-STAT, INF-B-120, INF-B-150, INF-B-180-CL), 7. Semester (INF-LRS)
Duration	The module comprises 1 semester.
Grading	unmarked
Type of Examination	Klausur (45-90 Minute) oder mündlich (15-30 Minute) oder Hausarbeit (7000-14000 Zeichen) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)

Provider	Ludwig-Maximilians-University Munich
Teaching Lang.	German

Contents

The seminar addresses among others the ethical norms for the open source community, ethical norms for general science and ethical questions in the information society. Legal questions to be addressed are: mental property and copyright, software laws, data security, legal problems with open source software.

Qualifikation Aims

The students should become aware of ethical and legal questions in computer science.

4 Special Topics

The subsequent list of modules are a selection of modules which can be acknowledged as Special Topics modules. These modules are serve the broardening and deepening of the knowledge and abilities. Several of them are based on the current focus in the research of the teaching staff and thus serve the consequent implementation of the principle of research orientation in teaching. By visiting these modules students are already introduced to current issues in research early on and gain insight into the further development of the subject. Modules from the Master Programmes can be recommended only for those students who have shown so far excellent results in their studies.

4.1 VT 1: Parallel Computing: Foundations and Applications (INF-PCGA)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Parallel Computing: Foundations and Applications	WiSe	45 h (3 SWS)	45 h	3 CP
exercise	Exercises: Parallel Computing: Foundations and Applications	WiSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-M-120: Masters Programme Computer Science - MINF-B-180: Bachelor Programme in Media Informatics - MINF-M-120-KW: Masters Programme Media Informatics with Communication Science - MINF-M-120-MCI: Masters Programme Human-Computer Interaction - MINF-M-120-MG: Masters Programme Media Informatics with Media Design
Entry Requ.	none
Time during the study	1. Semester (MINF-M-120-KW, MINF-M-120-MCI, MINF-M-120-MG), 3. Semester (INF-M-120), 5. Semester (INF-B-180-STAT, INF-B-120, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked

Type of Examination	mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. Dieter Kranzlmüller
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Communication Systems and System Programming Group
Teaching Lang.	German

Contents

Parallel computing encompasses the concurrent use of multiple cores to solve a given problem. Historically parallel computing has its roots in the area of scientific and high-performance computing (HPC), where today's Supercomputers are composed of a million computing cores and more. In recent years parallel computing has expanded its reach into almost all areas of the computing industry. Universally, servers, desktops, and notebooks are today equipped with multicore CPUs, a trend that is recently also expanding into the area of smartphones and tablets. In all cases the only way to make efficient use of the available hardware resources is the explicit parallel programming and parallel computing is thus increasingly becoming a "must have skill" for IT professionals.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples.

Qualifikation Aims

The lecture is composed of three interwoven topical areas: parallel architectures, parallel algorithms and parallel programming. The successful participants will be able to identify independent parallel tasks in a variety of settings and create efficient realizations of algorithms on computing platforms that range from smartphones over accelerators to supercomputers such as SuperMUC at the Leibniz Supercomputing Centre.

4.2 VT 2: IT-Security (INF-ITS)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: IT-Security	WiSe	45 h (3 SWS)	75 h	4 CP
exercise	Exercises: IT-Security	WiSe	30 h (2 SWS)	60 h	3 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-M-120: Masters Programme Computer Science - MINF-B-180: Bachelor Programme in Media Informatics - MINF-M-120: Masters Programme Media Informatics - MINF-M-120-KW: Masters Programme Media Informatics with Communication Science - MINF-M-120-MCI: Masters Programme Human-Computer Interaction - MINF-M-120-MG: Masters Programme Media Informatics with Media Design - MINF-M-120-MW: Masters Programme Media Informatics with Media Economy
Entry Requ.	none
Time during the study	1. Semester (MINF-M-120-KW, MINF-M-120, INF-M-120, MINF-M-120-MCI, MINF-M-120-MG, MINF-M-120-MW), 3. Semester (INF-M-120), 5. Semester (INF-B-120, MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Dieter Kranzlmüller

Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Communication Systems and System Programming Group
Teaching Lang.	German

Contents

This module addresses particular security requirements and mechanisms as well as their realisation in distributed systems. It addresses the theoretical foundations and concepts of IT- and network security. These are in particular questions from areas like security engineering, threats and hazards, cryptography as well as different kinds of security mechanisms and their realisation.

The module consists of a lecture and in addition exercises in small groups. The concepts introduced in the lecture are practiced in the exercise class with concrete examples, for example, firewall configuration or cryptography. The students get practical experience in installation and maintenance of security relevant systems, applications and components.

Qualifikation Aims

The students develop a general understanding of the different kinds of security threats in distributed systems and they learn about the technical possibilities to counteract these threats.

4.3 VT 3: Methods of Software Engineering (INF-MSE)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Methods of Software Engineering	WiSe	45 h (3 SWS)	75 h	4 CP
exercise	Exercises: Methods of Software Engineering	WiSe	30 h (2 SWS)	30 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-M-120: Masters Programme Computer Science - MINF-B-180: Bachelor Programme in Media Informatics - MINF-M-120: Masters Programme Media Informatics - MINF-M-120-KW: Masters Programme Media Informatics with Communication Science - MINF-M-120-MCI: Masters Programme Human-Computer Interaction - MINF-M-120-MG: Masters Programme Media Informatics with Media Design - MINF-M-120-MW: Masters Programme Media Informatics with Media Economy
Entry Requ.	none
Time during the study	1. Semester (MINF-M-120-KW, MINF-M-120, INF-M-120, MINF-M-120-MCI, MINF-M-120-MG, MINF-M-120-MW), 3. Semester (INF-M-120), 5. Semester (INF-B-180-STAT, INF-B-120, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180)
Duration	The module comprises 1 semester.

Grading	marked
Type of Examination	Klausur (90-180 Minute) oder mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Programme Coordinator(MINF-B-180)
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science
Teaching Lang.	German

Contents

Software engineering is the discipline of engineering large software systems. This comprises the provisioning and use of methods, procedures and tools for developing, running and maintaining software systems.

The topic of this module is the entire process of software development. It ranges from the requirement specifications over the software architecture up to the verification, validation and test. Further topics are formal methods, software process and a particular application domain. The UML-notion is the golden thread in the lecture. The lecture connects practical topics with the theoretical basis of software development.

The module consists of a lecture and of additional exercises in groups. The concepts introduced in the lecture are trained in the exercises by means of practical applications. Particular software development tasks are solved with systematic methods.

Qualifikation Aims

The students shall get an overview of the most important procedures, methods and techniques for the systematic development of software systems. They should be able to propose approaches for solving practical software development problems and to implement them in a systematic way.

4.4 VT 4: Multimedia Programming (MINF-MMP)

Part of: Bachelor Programme in Media Informatics (180 CP)

Remarks

The lecture is available as an ausio/video recording. Only occasionally theis recording is actualized by a new presence lecture. IN most cases, just tutorials are offered which refer to the recorded ldcture contents.
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Lecture: Multimedia Programming	SoSe	30 h (2 SWS)	90 h	4 CP
exercise	Exercises: Multimedia Programming	SoSe	45 h (3 SWS)	15 h	2 CP

6 credit points are awarded for this module. The attendance time is 5 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Formally none. For detailed understanding, good knowledge of Java programming is required.
Time during the study	6. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Klausur (90-180 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics
Teaching Lang.	German

Contents

The module presents elementary techniques and programming interfaces for the development of multimedia applications. It covers programming interfaces for graphics, sound and multimedia including animation interfaces. Special emphasis is put on platform independent concepts and design patterns. The lecture discusses systematically the most important programming techniques for the mentioned media types and compares different platforms for the realisation of the same task. Moreover, models of an interdisciplinary development process for multimedia applications are discussed in detail. The practical exercises use a variety of different frameworks and languages, among them for example Python, JavaScript and Java FX.

Qualifikation Aims

The module provides:

- Knowledge of basic design principles for multimedia applications;
- Practical ability to develop simple multimedia applications using at least one tool (framework, language, software system) dedicated for this purpose.

4.5 VP 1: Practical Course Computer Networks (INF-PRN)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
practical training	Practical Course Computer Networks	WiSe	90 h (6 SWS)	270 h	12 CP

12 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-M-120: Masters Programme Computer Science - MINF-B-180: Bachelor Programme in Media Informatics - MINF-M-120-KW: Masters Programme Media Informatics with Communication Science - MINF-M-120-MCI: Masters Programme Human-Computer Interaction - MINF-M-120-MG: Masters Programme Media Informatics with Media Design - MINF-M-120-MW: Masters Programme Media Informatics with Media Economy
Entry Requ.	none
Time during the study	2. Semester (MINF-M-120-KW, MINF-M-120-MCI, MINF-M-120-MG, MINF-M-120-MW), 3. Semester (INF-M-120), 5. Semester (INF-B-180-STAT, INF-B-120, INF-B-180-MA, INF-B-150, INF-B-180-CL, MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked

Type of Examination	mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Dieter Kranzlmüller
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Communication Systems and System Programming Group
Teaching Lang.	German

Contents

The computer networks lab course provides insights around the technical details of computer networks and network management. The module course 'Computer networks and distributed systems' is the theoretical prerequisite for this lab course.

The topics and exercises are organised in accordance with the ISO/OSI reference model and encompass:

- optical communication;
- virtual local area nets (VLANs);
- configuration of IPv4 and IPv6 networks;
- routing within and between autonomous systems;
- auxiliary and configuration protocols;
- application layer protocols;
- network management.

Qualifikation Aims

The students learn:

- administration of network components: switches, routers, wavelength division multiplexers, etc.;
- construction and configuration of networks and associations of networks;
- proficient use of tools for networks analysis and configuration;
- use of software packages for Internet services and network management.

4.6 VP 2: IT Operations Lab (INF-RBP)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
practical training	IT Operations Lab	WiSe	90 h (6 SWS)	270 h	12 CP

12 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 360 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-M-120: Masters Programme Computer Science - MINF-B-180: Bachelor Programme in Media Informatics - MINF-M-120-KW: Masters Programme Media Informatics with Communication Science - MINF-M-120-MCI: Masters Programme Human-Computer Interaction - MINF-M-120-MG: Masters Programme Media Informatics with Media Design - MINF-M-120-MW: Masters Programme Media Informatics with Media Economy
Entry Requ.	none
Time during the study	3. Semester (MINF-M-120-KW, INF-M-120, MINF-M-120-MCI, MINF-M-120-MG, MINF-M-120-MW), 5. Semester (MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	mündlich (15-30 Minute) oder Klausur (60-120 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Dieter Kranzlmüller
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Communication Systems and System Programming Group

Teaching Lang.	German

Contents

IT system administration lab covers topics in administration of computer systems, infrastructures and operating systems. The main objective of the lab is to provide a comprehensive introduction to administration of IT systems by working with a Unix-like OS. In addition to explaining the essentials the lab presents best practices and recommendations in the area of information and communication technology.

The lab is complemented by talks, presentations and guided tours that offer insight into operation of IT infrastructures and introduce daily activities and projects carried out at Leibniz Supercomputing Centre.

Hands-on exercises designed for the Linux OS address the following topics:

- OS startup and shutdown, shell programming and cron job scheduler;
- User administration and access control;
- Lightweight Directory Access Protocol (LDAP);
- Pluggable Authentication Modules (PAM);
- Network File System (NFS), Automounter;
- Data backup and archiving;
- Installation of public domain software, such as network tools;
- Network debugging;
- Security;
- Internet.

The students form teams consisting of two to four people. Members of each team work together to resolve exercises that introduce various services, e.g. LDAP or NFS, or topics, such as security. Exercises are provided to students on weekly basis. Each week one team is responsible for preparing a solution for the particular exercise and sharing it with other lab participants.

In addition to the exercises students attend talks given by industry and academic experts on the overall topic “Operation of medium- and large-scale IT infrastructures.

Qualifikation Aims

IT system administration lab conveys core knowledge and expertise required for administration of Unix or Linux systems. Moreover the lab motivates students to develop skills essential for successful operation of IT infrastructure:

- Definition of objectives and processes;
- Systematic problem analysis and resolution;
- Research skills;
- Efficient teamwork;
- Documentation of planned or performed activities.

4.7 VP 3: Practical Course on Innovative Mobile Business Applications (INF-MBA)

Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
practical training	Practical Course on Mobile Business Applications	WiSe, SoSe	90 h (6 SWS)	90 h	6 CP

6 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Usability	This module is offered in the following programmes - INF-B-120: Bachelor Programme in Computer Science with 60-CP Minor Subject - INF-B-150: Bachelor Programme in Computer Science with 30-CP Minor Subject - INF-B-180-CL: Bachelor Programme in Computer Science plus Computer Linguistics - INF-B-180-MA: Bachelor Programme in Computer Science plus Mathematics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-B-180-STAT: Bachelor Programme in Computer Science plus Statistics - INF-LGY: Teaching Gymnasium - INF-M-120: Masters Programme Computer Science - MINF-B-180: Bachelor Programme in Media Informatics - MINF-M-120: Masters Programme Media Informatics
Entry Requ.	none
Time during the study	3. Semester (MINF-M-120, INF-M-120), 4. Semester (INF-B-180-STAT, INF-B-120, INF-B-180-MA, INF-B-150, INF-B-180-CL), 6. Semester (MINF-B-180)
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Praxisleistung () und mündlich (15-30 Minute) Repeatability: arbitrary, Admission Requirements: none

Responsible for Module	Prof. Dr. Claudia Linnhoff-Popien
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Core Computer Science Mobile and Distributed Systems Group
Teaching Lang.	German

Contents

The course takes places in cooperation with an industry partner and consists of two stages. The first stage is made up of three theoretical sessions during lecture period, which are used for presenting the ongoing topics to the students and for the formation of working groups. The participants then have the possibility to discuss the topics as well as to introduce their own ideas and proposals. Eventually, tasks will be assigned to the working groups in order to create conceptual designs for each topic.

In the second stage the participants will practically implement the developed concepts. Over the time of two weeks the students will work in groups on the system's implementation (if possible at the industry partner's site). The practical course concludes with a presentation of the results on behalf of the participants.

Typically, this course involves the following aspects:

- mobile application development (e.g., for iOS or Android),
- delevopment of corresponding databases and backend systems (usually Java-based),
- realization of hardware-based functionalities using specialized platforms, such as RaspberryPi or Arduino boards.

Participants are working autonomously in teams of usually about four to six persons, while intensively being supported by staff from the Lehrstuhl and the industry partner.

Prior Knowledge

Profound knowledge of object-oriented software development and distributed systems

Qualifikation Aims

The practical course offers its participants the possibility to design and implement innovative solutions for current topics in cooperation with a partner from industry. Participants will gain practical experience concerning the realization of innovative IT projects. This provides challenges for the students on different levels: (unforeseeable) technical difficulties have to be overcome, working groups must organize themselves and act as a team even under pressure. Participants will learn to put their existing knowledge to good use as well as to quickly and autonomously acquire new knowledge.

Apart from challenges such as solving unknown problems and understanding new technologies, non-technical tasks such as project management, communication with real customers and presentation of results have to be accomplished.

4.8 VP 4: Practical Course Multimedia Programming (MINF-PMMP)

Part of: Bachelor Programme in Media Informatics (180 CP)
Associated Module Components:

Teaching	Component	Rota	Attendance	Selfstudy	ECTS
lecture	Practical Course Multimedia Programming	SoSe	90 h (6 SWS)	90 h	6 CP

6 credit points are awarded for this module. The attendance time is 6 hours a week. Including self-study, there are about 180 hours to be spent.

Type	elective module with compulsory module components
Entry Requ.	Formally none, for successful participation good programming knowledge (e.g. in JavaScript) and/or good graphical/sound design skills are necessary
Time during the study	6. Semester
Duration	The module comprises 1 semester.
Grading	marked
Type of Examination	Präsentation (10-20 Minute) Repeatability: arbitrary, Admission Requirements: none
Responsible for Module	Prof. Dr. Heinrich Hußmann
Provider	Ludwig-Maximilians-University Munich Faculty for Mathematics, Computer Science and Statistics Institute for Computer Science Media Informatics
Teaching Lang.	German

Contents

In this practical course, usually carried out as a block course between teaching periods, a multimedia programming project is realized in team work. Very often the project is a game to be executed in a Web browser.

The first part of the course introduces a suitable programming environment (for instance HTML5/JavaScript and selcted programming libraries for this platform). In the second part of the course small teams of approx. 6 persons develop a product of medium size in independent team work. For team coordination a suitable, given software development process is used. Elements of agile software development are explored during this project.

Intense block tutorial in team work, full time.

Qualifikation Aims

The module provides:

- Practical ability to develop medium-sized interactive multimedia applications;
- Ability to combine visual design and technical realization harmoniously;
- Social competence in team work;
- Independence in finding problem solutions.

5 Curricula

The subsequent sections contain concrete curricula for the Bachelor Programme with focus on media design, media impact, media, economy and human-machine interaction. It should be emphasized that these are merely suggestions. Every student is free to follow another curriculum which is compatible with the examination regulations.

1. Semester (WiSe)

Shortname	Component	CP
INF-EiP	Introduction to Programming	9
MA-AnIS	Analysis for Computer Scientists and Statisticians	9
MINF-DM	Digital Media	6
IKP-GMG	Foundations of Color Design on the Surface I	3
IKP-GMG	Foundations of Graphic Design on the Surface I	3
		30

2. Semester (SoSe)

Shortname	Component	CP
INF-ProMo	Programming and Modeling	6
INF-AlDs	Algorithms and Data Structures	6
INF-RA	Computer Architecture	6
MINF-MT	Media Technology	6
IKP-GMG	Methods of Art and Media Viewing	6
		30

3. Semester (WiSe)

Shortname	Component	CP
INF-BS	Operating Systems	6
MA-LinAlgICS	Linear Algebra for Computer Scientists	6
IKP-GKMP	Foundations of Multi Media Design at the Computer I	6
You can choose one module from the following list:		
INF-SEP	Practical Course in Software Development	12
INF-SysP	Practical Training in Operating System Development	12
		30

4. Semester (SoSe)

Shortname	Component	CP
MINF-CG1	Computer Graphics I	6
INF-RVS	Computer Networks and Distributed Systems	6
MINF-MMI1	Human-Computer Interaction I	6
MINF-TGMI	Theoretical Computer Science for Media Informatics	3
MINF-TGMI	Seminar on Selected Topics on Computer Science	3
IKP-GKMP	Explanatory Drawing I	3
IKP-VKMP	Foundations of Design on the Surface I	3
		30

5. Semester (WiSe)

Shortname	Component	CP
INF-SWT	Software Engineering	6
INF-WIS	Web Information Systems	6
INF-DBSI	Database Systems I	6
IKP-VKMP	Foundations of Multi Media Design at the Computer II	6
	1 advanced module	6
		30

6. Semester (SoSe)

Shortname	Component	CP
INF-PSK	Social and Personal Competence	3
INF-ER	Ethics and Law in Computer Science	3
MINF-FK	Project Competence Multimedia	3
	1 advanced module	6
MINF-BA	Bachelor Thesis and Examination	15
		30

1. Semester (WiSe)

Shortname	Component	CP
INF-EiP	Introduction to Programming	9
MA-AnIS	Analysis for Computer Scientists and Statisticians	9
MINF-DM	Digital Media	6
KW-EKW	Fundamentals of Communication Science	3
KW-EKW	Introduction to Scientific Working	3
		30

2. Semester (SoSe)

Shortname	Component	CP
INF-ProMo	Programming and Modeling	6
INF-AlDs	Algorithms and Data Structures	6
INF-RA	Computer Architecture	6
MINF-MT	Media Technology	6
KW-ESF	Empirical Methods	3
KW-ESF	Communication Research	3
		30

3. Semester (WiSe)

Shortname	Component	CP
INF-BS	Operating Systems	6
MA-LinAlgICS	Linear Algebra for Computer Scientists	6
KW-EKW	Seminar Communication Theory	3
KW-EKW	Seminar Media Science	3
You can choose one module from the following list:		
INF-SEP	Practical Course in Software Development	12
INF-SysP	Practical Training in Operating System Development	12
		30

4. Semester (SoSe)

Shortname	Component	CP
MINF-CG1	Computer Graphics I	6
INF-RVS	Computer Networks and Distributed Systems	6
MINF-MMI1	Human-Computer Interaction I	6
MINF-TGMI	Theoretical Computer Science for Media Informatics	3
MINF-TGMI	Seminar on Selected Topics on Computer Science	3
	1 advanced module	6
		30

5. Semester (WiSe)

Shortname	Component	CP
INF-SWT	Software Engineering	6
INF-WIS	Web Information Systems	6
INF-DBSI	Database Systems I	6
KW-VT	Special Topics of Communication Science	12
		30

6. Semester (SoSe)

Shortname	Component	CP
INF-PSK	Social and Personal Competence	3
INF-ER	Ethics and Law in Computer Science	3
MINF-FK	Project Competence Multimedia	3
	1 advanced module	6
MINF-BA	Bachelor Thesis and Examination	15
		30

1. Semester (WiSe)

Shortname	Component	CP
INF-EiP	Introduction to Programming	9
MA-AnIS	Analysis for Computer Scientists and Statisticians	9
MINF-DM	Digital Media	6
BWL-GdBWL	Foundations of Business Administration for Minor Students, Part 1 (Lecture)	3
BWL-GdBWL	Foundations of Business Administration for Minor Students, Part 1 (Exercises)	3
BWL-GdBWL	Methods of Business Accounting	3
		33

2. Semester (SoSe)

Shortname	Component	CP
INF-ProMo	Programming and Modeling	6
INF-AlDs	Algorithms and Data Structures	6
INF-RA	Computer Architecture	6
MINF-MT	Media Technology	6
BWL-GdBWL	Foundations of Business Administration for Minor Students, Part 2 (Lecture)	3
BWL-GdBWL	Foundations of Business Administration for Minor Students, Part 2 (Excercises)	3
		30

3. Semester (WiSe)

Shortname	Component	CP
INF-BS	Operating Systems	6
MA-LinAlgICS	Linear Algebra for Computer Scientists	6
BWL-GNM	Digital Media Business	6
You can choose one module from the following list:		
INF-SEP	Practical Course in Software Development	12
INF-SysP	Practical Training in Operating System Development	12
		30

4. Semester (SoSe)

Shortname	Component	CP
MINF-CG1	Computer Graphics I	6
INF-RVS	Computer Networks and Distributed Systems	6
MINF-MMI1	Human-Computer Interaction I	6
MINF-TGMI	Theoretical Computer Science for Media Informatics	3
MINF-TGMI	Seminar on Selected Topics on Computer Science	3
BWL-SFMW	Introductory Seminar Course New Media	3
BWL-SFMW	Theoretical Homework Seminar to New Media	6
		33

5. Semester (WiSe)

Shortname	Component	CP
INF-PSK	Social and Personal Competence	3
INF-SWT	Software Engineering	6
INF-WIS	Web Information Systems	6
INF-DBSI	Database Systems I	6
	1 advanced module	6
		27

6. Semester (SoSe)

Shortname	Component	CP
INF-ER	Ethics and Law in Computer Science	3
MINF-FK	Project Competence Multimedia	3
	1 advanced module	6
MINF-BA	Bachelor Thesis and Examination	15
		27

1. Semester (WiSe)

Shortname	Component	CP
INF-EiP	Introduction to Programming	9
MA-AnIS	Analysis for Computer Scientists and Statisticians	9
MINF-DM	Digital Media	6
PSY-GdP	Lecture: Foundations of Psychology 1	3
MINF-PSk	Drawing and Sketching of Scenarios	3
		30

2. Semester (SoSe)

Shortname	Component	CP
INF-ProMo	Programming and Modeling	6
INF-AlDs	Algorithms and Data Structures	6
INF-RA	Computer Architecture	6
MINF-MT	Media Technology	6
PSY-GdP	Lecture: Foundations of Psychology 2	3
MINF-PSk	Participation on 3 User Studies	3
		30

3. Semester (WiSe)

Shortname	Component	CP
INF-BS	Operating Systems	6
MA-LinAlgICS	Linear Algebra for Computer Scientists	6
PSY-HFE	Lecture: Human Factors in Engineering I	3
STAT-StIMI	Statistics I for Media Informatics	6
You can choose one module from the following list:		
INF-SEP	Practical Course in Software Development	12
INF-SysP	Practical Training in Operating System Development	12
		33

4. Semester (SoSe)

Shortname	Component	CP
MINF-CG1	Computer Graphics I	6
INF-RVS	Computer Networks and Distributed Systems	6
MINF-TGMI	Theoretical Computer Science for Media Informatics	3
MINF-TGMI	Seminar on Selected Topics on Computer Science	3
PSY-HFE	Lecture: Human Factors in Engineering II	3
MINF-IDCD	Lecture: Interaction Design	3
MINF-IDCD	Exercises: Interaction Design	3
		27

5. Semester (WiSe)

Shortname	Component	CP
INF-PSK	Social and Personal Competence	3
INF-SWT	Software Engineering	6
INF-WIS	Web Information Systems	6
INF-DBSI	Database Systems I	6
MINF-IDCD	Concept Development	6
	1 advanced module	6
		33

6. Semester (SoSe)

Shortname	Component	CP
INF-ER	Ethics and Law in Computer Science	3
MINF-FK	Project Competence Multimedia	3
	1 advanced module	6
MINF-BA	Bachelor Thesis and Examination	15
		27