UNIVERSITÄT ZU LÜBECK

Module Guide for the Study Path

Master Media Informatics

Version from 4. October 2018

1st semester

2nd semester

3rd semester

4th semester

arbitrary semester

CS4235 - Media and Design Theory (DesignTheo)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 1st semester

Classes and lectures:

- Media and Design Theory (lecture with exercises, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction and Overview
- Marshal McLuhan (media as extensions of the body)
- Willém Flusser (Information, Images, Words, Models)
- Jean Baudrillard (Simulation)
- Paul Virilio (Dromology)
- Manfred Fassler (Post-Geographical Spaces)
- Wolfgang Welsch (Cross-Cultural Society)
- De Kerckhove (Connected Intelligence)
- Pierre Lévy (Collective Intelligence)
- Lev Manovich (The Language of New Media)
- History of Design Theory
- Gerd Selle (Comprehend Interface Design)
- Cordula Meyer (Does design needs a theory?)
- Felicidad Romero-Tejedor (Positions on the Science of Design)
- Design Gives (Objects) Sense
- Summary: The contribution of media- and design theory for media informatics

Qualification-goals/Competencies:

- The students know important representatives of media- and design theory.
- They are able to reflect multi-media and interactive systems with the help of media- and design theory and use this in for analysis and conception of such systems.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Dr. Thomas Winkler

Teacher:

- Institute for Multimedia and Interactive Systems
- Dr. Thomas Winkler

Literature:

- Derrick de Kerckhove, Martina Leeker, Kerstin Schmidt (Hrsg.): McLuhan neu lesen: Kritische Analysen zu Medien und Kultur im 21. Jahrhundert - Transcript, 2008
- Bonsieppe, G.: Interface - Bollmann, 1996

Language:

- offered only in German

CS4260-KP08, CS4260 - Master Project Workplace Systems (MProArbSys)

Duration:	Turnus of offer:	Credit points:
1 Semester	normally each year in the winter semester	8

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 1st semester

Classes and lectures:

- Master Project Workplace Systems (project work, 6 SWS)

Workload:

- 180 Hours group work
- 40 Hours written report
- 20 Hours oral presentation (including preparation)

Contents of teaching:

- Implementation of a Software System
- Project Management and Teamwork
- Analysis, Design, Implementation and Evaluation of Workplace Systems

Qualification-goals/Competencies:

- Students can effectively contribute to teamwork and critically assess their social skills.
- They know the specific requirements of workplace systems and can apply this knowledge in software development.
- They have the methodological competence to analyze complex tasks, divide them into sub-tasks and implement them based on division of labor.

Grading through:

- oral presentation
- Written report
- successful addressing of the project goals

Responsible for this module:

- Prof. Dr.-Ing. Nicole Jochems
- Prof. Dr. rer. nat. Tilo Mentler

Teacher:

- Institute for Multimedia and Interactive Systems

- Prof. Dr.-Ing. Nicole Jochems
- MitarbeiterInnen des Instituts

Literature:

- M. Burhardt: Einführung in das Projektmanagement - Publicis Publ. 2013
- M. B. Rosson & J. M. Carroll: Usability engineering. Scenario-based development of human-computer interaction - Morgan Kaufmann series in interactive technologies, 1st ed. San Fancisco: Academic Press, 2002
- H. Beyer & K. Holtzblatt: Contextual design. Defining customer-centered systems - San Francisco, Calif: Morgan Kaufmann, 1998

Language:

- offered only in German

CS4640 - Hypermediasystems (HyperMeSys)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 1st semester
- Master Computer Science before 2014 (compulsory), specialization field media informatics, 2nd semester

Classes and lectures:

- Hypermediasystems (lecture with exercises, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction and Overview
- History
- Navigation, Orientation and Search
- Semantic Web and Hypermedia Systems
- Applications and Examples
- Adaptability and adaptivity

Qualification-goals/Competencies:

- Students know the definition and the theoretical foundations of hypermedia systems and can explain these.
- They are able to identify and predict the difficulties and potentials of hypermedia systems based on historical and technological considerations.
- They can analyze, design, implement and evaluate hypermedia applications considering users and context.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. rer. nat. Michael Herczeg

Teacher:

- Institute for Multimedia and Interactive Systems

- Prof. Dr. rer. nat. Michael Herczeg
- Prof. Dr.-Ing. Nicole Jochems

Literature:

- J. Nielsen: Multimedia, Hypertext und Internet - Wiesbaden: Vieweg, 1996
- R. Schulmeister: Grundlagen Hypermedialer Lernsysteme: Theorie, Didaktik, Design - München: Oldenbourg-Verlag, 2002

Language:

- offered only in German

PY4210-KP04, PY4210 - Engineering Psychology (IngPsy)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Robotics and Autonomous Systems (optional subject), interdisciplinary competence, 1st or 2nd semester
- Master MES since 2014 (optional subject), no specific field, 1st or 2nd semester
- Bachelor MES since 2014 (optional subject), no specific field, arbitrary semester
- Master Media Informatics (compulsory), psychology, 1st semester

Classes and lectures:

- Engineering Psychology (lecture, 2 SWS)
- Engineering Psychology (seminar, 1 SWS)

Workload:

- 75 Hours in-classroom work
- 45 Hours private studies and exercises

Contents of teaching:

- Overview over the lecture: Special features, psychological basics
- Introduction and overview: definition, brief introduction to philosophy of technics, technology use in everyday life, brief history of engineering psychology
- Man-machine-systems: definition, application, design and evaluation of MMS, age-differentiated design
- Usability: User Experience, Accessibility, Inclusive Design
- Assistance and automation: strategies, consequences, taxonomies
- Human information processing in interaction with technical systems: structure and process, Mental Models and cognitive modelling, strengths and weaknesses, limits, task dependency, complex problem solving, typical errors, heuristics
- Summary

Qualification-goals/Competencies:

- Students understand psychological fundamentals for the design and evaluation of man-machine-systems (MMS).
- Students can integrate their own work on MMS in a historical and sociological perspective.
- They can can plan, coordinate and conduct usability studies and work effectively in interdisciplinary teams with engineering psychologists, ergonomics and usability specialists and designers.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. rer. nat. Thomas Franke

Teacher:

- Institute for Multimedia and Interactive Systems
- Prof. Dr. rer. nat. Thomas Franke

Literature:

- B. Zimolong & U. Konradt: Ingenieurpsychologie, Enzyklopädie der Psychologie, Wirtschafts-, Organisations- und Arbeitspsychologie - Serie 3 / Bd. 2 Ingenieurpsychologie, Hogrefe-Verlag: Göttingen, 1990 / 2006
- W. Hacker: Allgemeine Arbeitspsychologie - Hogrefe Verlag, 2014
- P. Badke-Schaub, G. Hofinger & K. Lauche: Human Factors, Psychologie des sicheren Handelns - Springer, 2008

Language:

- offered only in German

CS4555 - Media Transmission (MediaTrans)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 2nd semester

Classes and lectures:

- Media Transmission (lecture and practical course, 3 SWS)

Workload:

- 45 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation
- 15 Hours group work

Contents of teaching:

- Media Compression (of Real-time Media)
- Multimedia Operating Systems
- Server and Databases for Multimedia
- Media Transmission (Broadcast / Streaming)
- Communication Protocols for Multimedia
- Media Synchronisation and Adaptation
- Quality of Service
- Applications

Qualification-goals/Competencies:

- Students have a profound understanding of the complex challenges of media transmission in distributed systems.
- They are competent in applying appropriate means and technologies for media transport.
- They are able to estimate the quantitative and qualitative effects of individual components, e.g. compressors and protocol.
- They can analyze, design, implement and evaluate media transmission systems.

Grading through:

- Exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr.-Ing. Andreas Schrader

Teacher:

- Institute of Telematics
- Prof. Dr.-Ing. Andreas Schrader

Literature:

- Ralf Steinmetz, Klara Nahrstedt: Multimedia Systems - Springer 2004
- Ralf Schmitz et al.: Kompendium Medieninformatik: Mediennetze - Springer 2006
- Stephen Weinstein: The Multimedia Internet - Springer 2005

Language:

- English, except in case of only German-speaking participants

CS4630-KP08, CS4630 - Master Project Mobile Systems (MProMobSys)

Duration:	Turnus of offer:	Credit points:
1 Semester	normally each year in the summer semester	8

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 2nd semester

Classes and lectures:

- Master Project Mobile Systems (project work, 6 SWS)

Workload:

- 180 Hours group work
- 40 Hours written report
- 20 Hours oral presentation (including preparation)

Contents of teaching:

- Implementation of Mobile Systems
- Analysis, Design, Implementation and Evaluation of Mobile Systems
- Project Management and Teamwork

Qualification-goals/Competencies:

- Students can effectively contribute to teamwork and critically assess their social skills.
- They have the methodological competence to analyze complex tasks, divide them into sub-tasks and implement them based on division of labor.
- They know the specific requirements of mobile systems and can apply this knowledge in software development.

Grading through:

- oral presentation
- Written report
- successful addressing of the project goals

Responsible for this module:

- Prof. Dr.-Ing. Nicole Jochems

Teacher:

- Institute for Multimedia and Interactive Systems
- Prof. Dr.-Ing. Nicole Jochems
- MitarbeiterInnen des Instituts

Literature:

- M. Burhardt: Einführung in das Projektmanagement - Publicis Publ. 2013
- M. B. Rosson & J. M. Carroll: Usability engineering. Scenario-based development of human-computer interaction - Morgan Kaufmann series in interactive technologies, 1st ed. San Fancisco: Academic Press, 2002
- J. Nielsen: Mobile Usability: für iPhone, iPad, Android und Kindle - Heidelberg : mitp, Verl.-Gruppe Hüthig, Jehle, Rehm, 2013

Language:

- offered only in German

CS4670-KP04, CS4670 - Ambient Computing (AmbComp)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester
- Master Media Informatics (compulsory), media informatics, 2nd semester

Classes and lectures:

- Ambient Computing (lecture, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Technical Components of Ambient Systems
- Software Architectures for Ambient Systems
- Context Awareness
- Ambient Spaces
- Ambient Intelligence
- Ambient Interaction
- Ambient Multimedia
- Ambient Computing Applications
- Security / Privacy / Data Protection in Ambient Systems

Qualification-goals/Competencies:

- The students are able to evaluate possibilities, concepts and challenges of Ambient Systems
- They have an overview about current technologies and systems for developing Ambient Systems
- They are able to follow and judge state-of-the-art research in the area of Ambient Computing

Grading through:

- Oral examination

Responsible for this module:

- Prof. Dr.-Ing. Andreas Schrader

Teacher:

- Institute of Telematics
- Prof. Dr.-Ing. Andreas Schrader

Literature:

- John Krumm: Ubiquitous Computing Fundamentals - CRC Press, 2009
- Stefan Poslad: Ubiquitous Computing: Smart Devices, Environments and Interactions - Wiley, 2009
- Uwe Hansman et al: Pervasive Computing - Springer, 2003

Language:

- English, except in case of only German-speaking participants

CS5680 - Master Seminar Media informatics (MSemMedien)

Duration:	Turnus of offer:	Credit points:	Max. group size:
1 Semester	normally each year in the summer semester	4 (Typ B)	15

Course of study, specific field and term:

- Master Media Informatics (compulsory), interdisciplinary competence, 2nd semester
- Master Computer Science before 2014 (optional subject), specialization field media informatics, 2nd or 3rd semester

Classes and lectures:

- Master Seminar Media Informatics (seminar, 2 SWS)

Workload:

- 60 Hours work on an individual topic with written and oral presentation
- 30 Hours in-classroom work
- 30 Hours private studies

Contents of teaching:

- Familiarize with a challenging academic topic of media informatics
- Self dependent work on a scientific problem and its solution methods
- Presentation and discussion of results

Qualification-goals/Competencies:

- Students can work up a scientific topic thoroughly.
- They are capable of presenting the results in a written documentation and an oral presentation.
- They can present and discuss a scientific problem in English.
- They can comment scientific work from a critical point of view.
- They can follow a scientific presentation and question it in an open discussion.

Grading through:

- oral presentation
- term paper

Responsible for this module:

- Prof. Dr.-Ing. Nicole Jochems

Teacher:

- Institute for Multimedia and Interactive Systems
- Prof. Dr. rer. nat. Michael Herczeg
- Prof. Dr.-Ing. Nicole Jochems
- MitarbeiterInnen des Instituts

Literature:

- : is selected individually

Language:

- German and English skills required

PY4710 - Social Psychology and Social Media (SozPsy)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Media Informatics (compulsory), psychology, 2nd semester

Classes and lectures:

- Social Psychology and Social Media (lecture, 2 SWS)
- Social Psychology and Social Media (seminar, 1 SWS)

Workload:

- 75 Hours private studies and exercises
- 45 Hours in-classroom work

Contents of teaching:

- History of social psychology
- Methods in social psychology
- Social perception and attribution
- Socialization and social learning
- Social identity
- Attitude and attitude change
- Social behaviour (prosocial behaviour, affiliation, aggression)
- Interaction in groups and intergroup relations
- Use of social media
- Effects of social media on individuals and society

Qualification-goals/Competencies:

- The students are able to explain and to analyse relations and processes within and between groups with recourse to concepts from social psychology.
- They can determine impression management, social influence and behaviour in social media and can compare media with regard to relevant conditions and affordances.
- The students are able to reflect on their own behaviour and on group processes in interdisciplinary teams and to relate it to concepts from social psychology.
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Grading through:

- written exam

Responsible for this module:

- Prof. Dr. rer. nat. Thomas Franke

Teacher:

- Institute for Multimedia and Interactive Systems
- Prof. Dr. rer. nat. Thomas Franke

Literature:

- K. Jonas, W. Stroebe, M. Hewstone: Sozialpsychologie (6. Auflage) - Heidelberg: Springer, 20014
- W. Herkner: Lehrbuch Sozialpsychologie (2. Auflage) - Bern: Hans Huber, 2008

Language:

- offered only in German

CS4650 - Augmented, Mixed and Virtual Reality (AMVReality)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Media Informatics (compulsory), computer science, 3rd semester
- Master Computer Science before 2014 (compulsory), specialization field media informatics, 3rd semester

Classes and lectures:

- Augmented, Mixed and Virtual Reality (lecture with exercises, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction and Overview
- Historical developments
- Applications of augmented, mixed and virtual reality (AMVR)
- Theoretical principles of AMVR
- Interaction models for AMVR
- Implementation of AMVR systems
- Evaluation of AMVR systems
- Looking into the future of AMVR

Qualification-goals/Competencies:

- The students know the basic principles and system models of augmented, mixed and virtual reality.
- They are able to estimate the effort for the development of these types of systems.
- They understand the positive and negative effects of such systems.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Dr. Thomas Winkler

Teacher:

- Institute for Multimedia and Interactive Systems
- Dr. Thomas Winkler

Literature:

- Dörner; Broll; Grimm; Jung (Hrsg.): Virtual und Augmented Reality (VR / AR): Grundlagen und Methoden der Virtuellen und Augmentierten Realität - Springer Vieweg, 2014

Language:

- offered only in German

CS4660-KP04, CS4660 - Process Control Systems (ProzFueSys)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Robotics and Autonomous Systems (optional subject), computer science, 1st or 2nd semester
- Master psychology (optional subject), interdisciplinary competence, 3rd semester
- Master Media Informatics (compulsory), computer science, 3rd semester
- Master Computer Science before 2014 (optional subject), specialization field robotics and automation, 2nd or 3rd semester
- Master Computer Science before 2014 (compulsory), specialization field media informatics, 2nd semester
- Master Psychology (optional subject), interdisciplinary competence, 3rd semester

Classes and lectures:

- Process Control Systems (lecture with exercises, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction and Overview
- Incidents and Accidents
- Error, Failure and Responsibility
- Human Factors
- Mental, conceptual and technical Models
- Task Analysis and Task Modelling
- Event Analysis and Event Modelling
- Task Allocation
- Situation Awareness
- Diagnoses und Contingency
- Interaction in real-time: Conception and Design
- Risk and Safety
- Development of Process Control Systems
- Operations and Safety

Qualification-goals/Competencies:

- The students know the most important theories, methods and systems for monitoring and controlling processes.
- They know the definitions of the terms risk and security and why they are applied in different ways.
- They can assess what needs to be considered in the development of mission- and safety-critical human-machine systems and how to proceed methodically.

Grading through:

- exercises and project assignments
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. rer. nat. Michael Herczeg

Teacher:

- Institute for Multimedia and Interactive Systems

- Prof. Dr. rer. nat. Michael Herczeg
- Prof. Dr.-Ing. Nicole Jochems
- Prof. Dr. rer. nat. Tilo Mentler

Literature:

- M. Herczeg: Prozessführungssysteme Sicherheitskritische Mensch-Maschine-Systeme und Interaktive Medien zur Überwachung und Steuerung von Prozessen in Echtzeit - München: de Gruyter - Oldenbourg-Verlag, 2014
- M. Herczeg: Software-Ergonomie: Grundlagen der Mensch-Computer-Kommunikation - München: Oldenbourg-Verlag, 2009
- M. Herczeg: Interaktionsdesign - München: Oldenbourg-Verlag, 2006

- J. Reason: Human Error - Boston: Cambridge University Press, 1990
- J. Rasmussen, L. P. Goodstein, A. M. Peijtersen: Cognitive Systems Engineering - New York: Wiley, 1994

Language:

- offered only in German

CS5160-KP08, CS5160 - Master Project Ambient Systems (MProAmbSys)

Duration:	Turnus of offer:	Credit points:
1 Semester	normally each year in the winter semester	8

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 3rd semester

Classes and lectures:

- Master Project Ambient Systems (project work, 6 SWS)

Workload:

- 180 Hours group work
- 40 Hours written report
- 20 Hours oral presentation (including preparation)

Contents of teaching:

- Implementation of Ambient Systems
- Analysis, Design, Implementation and Evaluation of Ambient Systems
- Project Management and Teamwork

Qualification-goals/Competencies:

- Students can effectively contribute to teamwork and critically assess their social skills.
- They have the methodological competence to analyze complex tasks, divide them into sub-tasks and implement them based on division of labor.
- They know the specific requirements of ambient systems and can apply this knowledge in software development.

Grading through:

- oral presentation
- Written report
- successful addressing of the project goals

Responsible for this module:

- Prof. Dr.-Ing. Andreas Schrader

Teacher:

- Institute of Telematics
- MitarbeiterInnen des Instituts
- Prof. Dr.-Ing. Andreas Schrader

Literature:

- M. Burghardt: Einführung in das Projektmanagement - Publicis Publ. 2013
- : Project-specific literature will be announced during the course

Language:

- English, except in case of only German-speaking participants

PY5210-KP04, PY5210 - Motivational and Emotional Psychology (MotivPsy)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Entrepreneurship in Digital Technologies (optional subject), interdisciplinary competence, 1st or 3rd semester
- Master Media Informatics (compulsory), psychology, 3rd semester

Classes and lectures:

- Motivational and Emotional Psychology (lecture, 2 SWS)
- Motivational and Emotional Psychology (seminar, 1 SWS)

Workload:

- 75 Hours private studies and exercises
- 45 Hours in-classroom work

Contents of teaching:

- History of motivation and emotion psychology
- Methods in motivation and emotion psychology
- Implicit and explicit motives
- Approach and avoidance
- Intrinsic motivation
- Goals, volition, and action control
- Classifications of emotions
- Emotion theories
- Development of emotions
- Emotion regulation

Qualification-goals/Competencies:

- The students are able to reproduce the basics of theories about motivational processes and to sketch different emotion theories in comparison.
- They are able to trace the effects and the dynamics of motivation in interacting with technical systems and in using media.
- They can judge and classify emotional processes in the use of technical systems and media and know about methods for measuring emotional reactions.

Grading through:

- written exam

Responsible for this module:

- Prof. Dr. rer. nat. Thomas Franke

Teacher:

- Institute for Multimedia and Interactive Systems
- Prof. Dr. rer. nat. Thomas Franke

Literature:

- V. Brandstätter, J. Schüler, R. M. Puck & L. Lozo: Motivation und Emotion - Heidelberg: Springer, 2013
- K. Rothermund & A. Eder: Motivation und Emotion - Wiesbaden: VS Verlag, 2012

Language:

- offered only in German

CS5992 - Master Thesis Media Informatics (MScMedien)

Duration:	Turnus of offer:	Credit points:
1 Semester	each semester	30

Course of study, specific field and term:

- Master Media Informatics (compulsory), media informatics, 4th semester

Classes and lectures:

- Master Thesis Media Informatics (supervised self studies, 1 SWS)
- Colloquium (presentation (incl. preparation), 1 SWS)

Workload:

- 850 Hours work on an individual topic (research and development) and written elaboration
- 50 Hours oral presentation and discussion (including preparation)

Contents of teaching:

- Further qualifications required are subject to private studies.

Qualification-goals/Competencies:

- The students can solve a complex scientific problem with the means of their profession.
- They elaborate a sophisticated scientific work within a given time.
- They have expertise they can apply to problems.
- They are able to analyze, interpret and critically assess scientific literature.
- They possess the communication skills to write down and present their scientific results in an appropriate way.

Grading through:

- oral presentation
- Written report

Responsible for this module:

- Studiengangsleitung Medieninformatik

Teacher:

- Institute for Multimedia and Interactive Systems
- Institutes of the Department of Computer Science/ Engineering
- Alle prüfungsberechtigten Dozentinnen/Dozenten des Studienganges

Literature:

- :

Language:

- thesis can be written in German or English

Notes:

Precondition: At least 75 ECTS points have been acquired

CS4020-KP06, CS4020SJ14 - Specification and Modelling (SpezMod14)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	6

Course of study, specific field and term:

- Master IT-Security (compulsory), computer science, 1st or 2nd semester
- Master Medical Informatics (basic module), computer science, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Entrepreneurship in Digital Technologies (basic module), technology field computer science, 1st or 2nd semester
- Master Computer Science since 2014 (optional subject), specialization field IT security and safety, 2nd or 3rd semester
- Master Computer Science since 2014 (basic module), theoretical computer science, 1st or 2nd semester

Classes and lectures:

- Specification and Modelling (lecture, 2 SWS)
- Specification and Modelling (exercise, 2 SWS)

Workload:

- 80 Hours private studies and exercises
- 60 Hours in-classroom work
- 20 Hours exam preparation
- 20 Hours work on project

Contents of teaching:

- Introduction to modelling and specification
- Modelling concepts (data, streams, traces, diagrams, tables)
- Modelling software components (state, behaviour, structure, interface)
- Modelling concurrency
- Algebraic specification
- Composing, refining, analysing and transforming specifications and models
- Specification languages and tools for specification and modelling

Qualification-goals/Competencies:

- The students can argue on the importance of specifications and models for software development.
- They can characterize, apply, adapt and extent important specification and modelling techniques.
- They can model and specify simple software/hardware system in an adequate way.
- They can describe a system from different views and on different levels of abstraction.
- They can apply specifications and modelsin software development.
- They can analyse specifications and models.

Grading through:

- Exercises
- Written or oral exam as announced by the examiner
- successful addressing of the project goals

Responsible for this module:

- Prof. Dr. Martin Leucker

Teacher:

- Institute of Software Technology and Programming Languages
- Dr. Annette Stümpel
- Prof. Dr. Martin Leucker

Literature:

- V.S. Alagar, K. Periyasamy: Specification of Software Systems - Springer 2013
- M. Broy, K. Stølen: Specification and Development of Interactive Systems - Springer 2001
- J. Loeckx, H.-D. Ehrich, M. Wolf: Specification of Abstract Data Types - John Wiley & Sons 1997
- D. Bjorner: Software Enginneering 1-3 - Springer 2006
- U. Kastens, H. Kleine Büning: Modellierung - Grundlagen und formale Methoden - Hanser 2005

Language:

- German and English skills required

CS4130-KP06, CS4130 - Web Based Information Systems (WebInfoS)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	6

Course of study, specific field and term:

- Master Robotics and Autonomous Systems (optional subject), computer science, 1st or 2nd semester
- Master IT-Security (basic module), computer science, 1st or 2nd semester
- Master Medical Informatics (basic module), ehealth / infomatics, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Entrepreneurship in Digital Technologies (basic module), technology field computer science, 1st or 2nd semester
- Master Computer Science since 2014 (optional subject), specialization field software systems engineering, 2nd or 3rd semester
- Master Computer Science since 2014 (basic module), systems informatics, 1st or 2nd semester

Classes and lectures:

- Web Based Information Systems (lecture, 2 SWS)
- Web Based Information Systems (exercise, 2 SWS)

Workload:

- 100 Hours private studies
- 60 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Web-technologies and web-engineering
- Client and server technologies
- Cloud Computing
- Architectures und middleware-technologies
- Web protocols
- Document languages
- Semantic Web

Qualification-goals/Competencies:

- Students can analyze problems of websites, evaluate with which web technologies they can be solved and implement the envisioned solution.
- They are able to explain the division of work between servers and clients in the web.
- They can model knowledge bases with the help of Semantic Web technologies.
- They can store, administer and process big data in the cloud.
- They can judge for which problems Semantic Web technologies are promising compared to traditional approaches.

Grading through:

- exercises and project assignments
- Written or oral exam as announced by the examiner

Responsible for this module:

- PD Dr. Sven Groppe

Teacher:

- Institute of Information Systems
- PD Dr. Sven Groppe

Literature:

- R. W. Sebesta: Programming the World Wide Web - Pearson New International Edition - Pearson, 2014
- J. Domingue, D. Fensel, J.A. Hendler (Eds.): Handbook of Semantic Web Technologies - Springer, 2011
- R. Wartala: Hadoop: Zuverlässige, verteilte und skalierbare Big-Data-Anwendungen - Open Source Press, 2012
- S. Groppe: Data Management and Query Processing in Semantic Web Databases - Springer, 2011

Language:

- German and English skills required

CS4139-KP06, CS4139 - Runtime Verification and Testing (RVTesten)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	6

Course of study, specific field and term:

- Master IT-Security (optional subject), IT-Security, 2nd or 3rd semester
- Master MES since 2014 (optional subject), computer science and electrical engineering, arbitrary semester
- Master Medical Informatics (optional subject), computer science, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science since 2014 (optional subject), specialization field IT security and safety, 1st or 2nd semester

Classes and lectures:

- Runtime Verification and Testing (lecture, 3 SWS)
- Runtime Verification and Testing (exercise, 1 SWS)

Workload:

- 100 Hours private studies and exercises
- 60 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Quality aspects of software systems
- Analysis and verification techniques for software systems
- Testing levels
- Testing process
- Kinds of tests
- Test case generation
- Specification of correctness properties
- synthesis of monitors for the observation of software systems
- diagnosis of errors in software systems
- realization of monitoring frameworks

Qualification-goals/Competencies:

- The students can describe and compare analysis and verification techniques.
- They can construct, analyse and evaluate specifications of correctness and safety properties.
- They can illustrate different techniques for testing hardware and software systems and can select and apply suitable techniques.
- They can explain the operation process of test case generation tools and can clasify suitable applications.
- They can describe and apply techniques for the synthesis of monitors.
- With the acquired techniques they can develop software of higher quality.

Grading through:

- Exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. Martin Leucker

Teacher:

- Institute of Software Technology and Programming Languages
- Prof. Dr. Martin Leucker

Literature:

- G.J. Myers: The Art of Software Testing - John Wiley, 1979
- B. Beizer: Software Testing Techniques - Van Nostrand Reinhold, 1999
- M. Broy, B. Jonsson, J.-P. Katoen, M. Leucker, A. Pretschner: Model-Based Testing of Reactive Systems - Springer, 2005
- A. Bauer, M. Leucker, C. Schallhart: Runtime Verification for LTL and TLTL - ACM TOSEM, 2011
- C. Baier, J.-P. Katoen: Principles of Model Checking - MIT Press, 2008
- D. Peled: Software Reliability Methods - Springer, 2001

Language:

- English, except in case of only German-speaking participants

CS4140-KP04, CS4140 - Mobile and Distributed Databases (MVDB)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), advanced curriculum distributed information systems, 3rd semester
- Master Computer Science before 2014 (compulsory), specialization field software systems engineering, 1st semester

Classes and lectures:

- Mobile and Distributed Databases (lecture, 2 SWS)
- Mobile and Distributed Databases (exercise, 1 SWS)

Workload:

- 65 Hours private studies
- 45 Hours in-classroom work
- 10 Hours exam preparation

Contents of teaching:

- The contents of the lecture covers query processing, transactions and replication in
- - centralised database management systems
- - parallel database management systems
- - distributed database management systems
- - mobile database management systems

Qualification-goals/Competencies:

- Students can explain the differences between centralised, parallel, distributed and mobile database management systems.
- They can judge about the practical suitability of different synchronization approaches for distributed and mobile transactions for a given problem.
- They can apply approaches for distributed and mobile query processing.
- They can choose suitable replication approaches for a given application and justify their choices.
- They can recognize and deal with the special difficulties and sources of error in distributed and mobile environments.

Grading through:

- exercises and project assignments
- Written or oral exam as announced by the examiner

Responsible for this module:

- PD Dr. Sven Groppe

Teacher:

- Institute of Information Systems
- PD Dr. Sven Groppe

Literature:

- A. Kemper, A. Eickler: Datenbanksysteme - 2006
- T. Conolly, C. Begg: Database Systems - A Practical Approach to Design, Implementation, and Management - Addison-Wesley 2005
- E. Rahm: Mehrrechner-Datenbanksysteme - Addison-Wesley 1994
- P. Dadam: Verteilte Datenbanken und Client/Server Systeme - Springer 1996
- H. Höpfner, C. Türker, B. König-Ries: Mobile Datenbanken und Informationssysteme - dpunkt.verlag 2005
- B. Mutschler, G. Specht: Mobile Datenbanksysteme - Springer 2004
- V. Kumar: Mobile Database Systems - Wiley-Interscience 2006

Language:

- offered only in German

CS4150-KP06, CS4150SJ14 - Distributed Systems (VertSys14)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	6

Course of study, specific field and term:

- Master Robotics and Autonomous Systems (optional subject), computer science, 1st or 2nd semester
- Master IT-Security (basic module), computer science, 1st or 2nd semester
- Master Medical Informatics (basic module), ehealth / infomatics, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Entrepreneurship in Digital Technologies (basic module), technology field computer science, 1st or 2nd semester
- Master Computer Science since 2014 (optional subject), specialization field software systems engineering, 2nd or 3rd semester
- Master Computer Science since 2014 (basic module), systems informatics, 1st or 2nd semester

Classes and lectures:

- Distributed Systems (lecture, 2 SWS)
- Distributed Systems (exercise, 2 SWS)

Workload:

- 60 Hours private studies
- 60 Hours in-classroom work
- 40 Hours e-learning
- 20 Hours exam preparation

Contents of teaching:

- Introduction and motivation
- Protocols and layered models
- Message representations
- Realization of network services
- Communication mechanisms
- Addresses, names and directory services
- Synchronisation
- Replication and consistency
- Fault tolerance
- Distributed transactions
- Security

Qualification-goals/Competencies:

- The participants will accquire a deep understanding for problems to be solved in distributed systems, such as synchronization, error handling, naming etc.
- They know the most important services in distributed systems such as name service, distributed file systems etc.
- They are able to program simple distributed applications and systems themselves.
- They know the most important algorithms in distributed systems, for instance for time synchronization, for leader election, or for mutual exclsuion.
- They have a good feeling for when it makes sense to use distributed instead of centralized systems.
- They have a good feeling for what kind of solutions could best be used for what kind of problems in distributed Internet applications.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. Stefan Fischer

Teacher:

- Institute of Telematics
- Prof. Dr. Stefan Fischer

Literature:

- A. Tanenbaum, M. van Steen: Distributed Systems: Principles and Paradigms - Prentice Hall 2006
- G. Coulouris, J. Dollimore, T. Kindberg, G. Blair: Distributed Systems - Concepts and Design - Addison Wesley 2012

Language:

- offered only in German

Notes:

Preliminary examination results can be provided at the beginning of each Semester. If preliminary examination results are required, they have to be positively attested.

CS4151-KP04, CS4151 - Architectures for Distributed Applications (SVA)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester
- Master MES since 2014 (optional subject), computer science and electrical engineering, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), advanced curriculum distributed information systems, 2nd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum parallel and distributed system architecutres, 2nd or 3rd semester
- Master Computer Science before 2014 (compulsory), specialization field software systems engineering, 2nd semester
- Master Computer Science before 2014 (compulsory), advanced curriculum enterprise IT, 2nd semester

Classes and lectures:

- Architectures for Distributed Applications (lecture, 2 SWS)
- Architectures for Distributed Applications (exercise, 1 SWS)

Workload:

- 45 Hours in-classroom work
- 45 Hours private studies
- 30 Hours exam preparation

Contents of teaching:

- Motivation
- Software Architectures
- Basics: HTTP, XML & Co
- N-Tier Applications
- Service-Oriented and Event-Driven Architectures (SOA and EDA)
- Web-Oriented Architectures (Web 2.0)
- Overlay Networks
- Peer-to-Peer
- Grid and Cloud Computing
- Internet of Things

Qualification-goals/Competencies:

- The students are able to name the most important archiectures for distributed systems, explain them, and compare them to each other.
- For each architecture, they know the most prominent and important implementation platforms and basically know how to use them.
- For a given problem, they can analyze which architecture is best suited to solve it, and they can design a plan for the solution's realization.

Grading through:

- Oral examination

Responsible for this module:

- Prof. Dr. Stefan Fischer

Teacher:

- Institute of Telematics
- Prof. Dr. Stefan Fischer

Literature:

- J. Dunkel, A. Eberhart, S. Fischer, C. Kleiner, A. Koschel: Systemarchitekturen für verteilte Anwendungen - Hanser-Verlag 2008
- I. Melzer et.al.: Service-Orientierte Architekturen mit Web Services - Spektrum-Verlag 2010

Language:

- offered only in German

CS4160-KP06, CS4160SJ14 - Real-Time Systems (Echtzeit14)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	6

Course of study, specific field and term:

- Master IT-Security (basic module), computer science, 1st or 2nd semester
- Master MES since 2014 (optional subject), computer science and electrical engineering, 1st semester
- Master Medical Informatics (basic module), computer science, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Entrepreneurship in Digital Technologies (basic module), technology field computer science, 1st or 2nd semester
- Master Computer Science since 2014 (basic module), technical computer science, 1st or 2nd semester

Classes and lectures:

- Real-Time Systems (lecture, 2 SWS)
- Real-Time Systems (exercise, 2 SWS)

Workload:

- 100 Hours private studies
- 60 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Real-time processing (definitions, requirements)
- Process automation systems
- Real-time programming
- Process connectivity and networking
- Modelling of discrete event systems (automata, state charts)
- Modelling of continuous systems (differential equations, Laplace transformation)
- Application of design tools (Matlab/Simulink, Stateflow)

Qualification-goals/Competencies:

- The students are able to describe the fundamental problems of real-time processing.
- They are able to explain real-time computer systems for process automation, in particular SPS.
- They are able to program real-time systems in the IEC languages.
- They are able to elucidate process interfaces and real-time bus system.
- They are able to model, analyze and implement event discrete systems, in particular process control systems.
- They are able to model, analyze and implement continuous systems, in particular feedback control systems.
- They are able to make use of design tools for real-time systems.

Grading through:

- Exercises
- continuous, successful participation in practical course
- written exam

Responsible for this module:

- Prof. Dr.-Ing. Mladen Berekovic

Teacher:

- Institute of Computer Engineering
- Prof. Dr.-Ing. Mladen Berekovic

Literature:

- R. C. Dorf, R. H. Bishop: Modern Control Systems - Prentice Hall 2010
- L. Litz: Grundlagen der Automatisierungstechnik - Oldenbourg 2012
- M. Seitz: Speicherprogrammierbare Steuerungen - Fachbuchverlag Leipzig 2012
- H. Wörn, U. Brinkschulte: Echtzeitsysteme - Berlin: Springer 2005
- S. Zacher, M. Reuter: Regelungstechnik für Ingenieure - Springer-Vieweg 2014

Language:

- offered only in German

CS4250-KP04, CS4250 - Computer Vision (CompVision)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Biomedical Engineering (optional subject), advanced curriculum, 2nd semester
- Master CLS starting 2016 (optional subject), computer science, 2nd or 3rd semester
- Master MES since 2014 (optional subject), computer science and electrical engineering, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), advanced curriculum imaging systems, 2nd or 3rd semester
- Master CLS (compulsory), computational life science / imaging, 2nd semester
- Master MES before 2014 (advanced curriculum), imaging systems, signal and image processing, 2nd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum signal and image processing, 2nd or 3rd semester
- Master Computer Science before 2014 (compulsory), specialization field robotics and automation, 2nd semester
- Master Computer Science before 2014 (compulsory), specialization field bioinformatics, 2nd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum intelligent embedded systems, 2nd semester
- Master Biophysics (optional subject), Elective, 2nd semester

Classes and lectures:

- Computer Vision (lecture, 2 SWS)
- Computer Vision (exercise, 1 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction to human and computer vision
- Sensors, cameras, optics and projections
- Image features: edges, intrinsic dimension, Hough transform, Fourier descriptors, snakes
- Range imaging and 3-D cameras
- Motion and optical flow
- Object recognition
- Example applications

Qualification-goals/Competencies:

- Students can understand the basics of computer vision.
- They can explain and perform camera choice and calibration.
- They can explain and apply the basic methods for feature extraction, motion estimation, and object recognition.
- They can indicate appropriate methods for different kinds of computer-vision applications.

Grading through:

- Exercises
- Oral examination

Responsible for this module:

- Prof. Dr.-Ing. Erhardt Barth

Teacher:

- Institute for Neuro- and Bioinformatics
- Prof. Dr.-Ing. Erhardt Barth

Literature:

- Richard Szeliski: Computer Vision: Algorithms and Applications - Springer, Boston, 2011
- David Forsyth and Jean Ponce: Computer Vision: A Modern Approach - Prentice Hall, 2003

Language:

- English, except in case of only German-speaking participants

Notes:

Prerequisites for admission to the examination can be determined at the beginning of the semester. If such prerequisites are defined, they must have been fulfilled prior to the first attempt at the examination and must have been rated as positive.

Prerequisites for admission to the examination:
Successful participation in the exercises,
minimum pass percentage: 70 %

CS4508-KP12, CS4508 - Data management (DatManag)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	12

Course of study, specific field and term:

- Master IT-Security (advanced module), computer science, 2nd or 3rd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Entrepreneurship in Digital Technologies (advanced module), technology field computer science, 2nd or 3rd semester
- Master Computer Science since 2014 (advanced module), advanced curriculum, 2nd or 3rd semester

Classes and lectures:

- CS4140 T: Mobile and distributed information systems (lecture with exercises, 3 SWS)
- CS5140 T: Semantic Web (lecture with exercises, 3 SWS)
- Seminar data management or lab course data management (Seminar or Project, 2 SWS)

Workload:

- 130 Hours private studies
- 120 Hours in-classroom work
- 90 Hours work on an individual topic with written and oral presentation or group work
- 20 Hours exam preparation

Contents of teaching:

- see module parts

Qualification-goals/Competencies:

- see module parts

Grading through:

- Exercises
- presentation
- Oral examination
- successful addressing of the project goals

Responsible for this module:

- PD Dr. Sven Groppe

Teacher:

- Institute of Information Systems
- PD Dr. Sven Groppe

Literature:

- : see module parts

Language:

- German and English skills required

CS4509-KP12, CS4509 - Internet Technologies (Internet)

Duration:	Turnus of offer:	Credit points:
2 Semester	each semester	12

Course of study, specific field and term:

- Master IT-Security (advanced module), computer science, 2nd or 3rd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Entrepreneurship in Digital Technologies (advanced module), technology field computer science, 2nd and 3rd semester
- Master Computer Science since 2014 (advanced module), advanced curriculum, 2nd and 3rd semester

Classes and lectures:

- Architectures for Distributed Applications (lecture, 3 SWS)
- Advanced Internet Technologies (lecture with exercises, 3 SWS)
- Software Architectures (project work, 3 SWS)

Workload:

- 120 Hours in-classroom work
- 105 Hours private studies
- 45 Hours exam preparation
- 45 Hours group work
- 45 Hours work on project

Contents of teaching:

- see module parts

Qualification-goals/Competencies:

- see module parts

Grading through:

- Oral examination

Responsible for this module:

- Prof. Dr. Stefan Fischer

Teacher:

- Institute of Telematics
- Prof. Dr. Stefan Fischer

Literature:

- : see module parts

Language:

- German and English skills required

CS5130-KP04, CS5130 - Foundations of Ontologies and Databases for Information Systems (OntoDB)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master CLS (optional subject), computer science, arbitrary semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester

Classes and lectures:

- Foundations of Ontologies and Databases in Information Systems (lecture, 2 SWS)
- Foundations of Ontologies and Databases in Information Systems (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- Fundamentals of databases, conceptual modeling languages (ontologies), query languages, processes, and agents
- Ontology based data access (OBDA)
- Ontology evolution and ontology integration
- Data exchange and data integration (schema mappings, duplicate detection, inconsistency handling, integration with relational and ontological constraints as well as with incomplete data)
- Data stream processing (e.g., for sensor networks, robotics, web agents) with OBDA and complex event processing (CEP)
- Non-symbolic data and their symbolic annotations (e.g., for applications in bioinformatics/computational biology and for media interpretation), syntax, semantics, hybrid decision and computation problems and their complexity, (analysis of) algorithms
- Data- and ontology-oriented process analysis (e.g., for biological pathways) and process design (e.g., for non-trivial business processes)

Qualification-goals/Competencies:

- Knowledge: The module aims at introducing the students to the formal basics of databases and ontologies, so that they get an overview of concepts, methods, and theories for understanding, analyzing, and designing information systems in open large contexts, such as the web.
- Skills: The students get a basic understanding of logical and formal methods, which allows them to assess the possibilities and limitations of information systems, be it concrete ones or those that still have to be designed. Assessment parameters are correctness and completeness (Does the system produce what is expected? If so, does it produce all results?) as well as expressiveness (Is it possible to formulate all required queries? What are equivalent query languages?) and, last but not least, performance (How long does it take the system to come up with an answer? How much space does it need?). In addition to these analysis skills, students receive logical modeling skills using real application scenarios from industry (business processing, integration of data resources, processing of time-based and event data), and medicine (sensor networks, genomic ontologies, annotation). Based on these, the student not only acquires the ability to assess which logical model is suitable for which application scenario, but also the ability to construct their own logical models where necessary.
- Social Competence und Independent Work: Students work in groups to solve small exercises and project problems and sketch their solutions in short presentations. Independent work is promoted by exercises with practical ontology and database systems.

Grading through:

- exercises and project assignments
- written exam

Is requisite for:

- Web-Mining Agents (CS5131-KP08, CS5131)

Responsible for this module:

- Prof. Dr. rer. nat. habil. Ralf Möller

Teacher:

- Institute of Information Systems
- Prof. Dr. rer. nat. habil. Ralf Möller
- Dr. Özgür Özçep

Literature:

- S. Abiteboul, R. Hull, V. Vianu: Foundations of Databases - Addison-Wesley, 1995
- M. Arenas, P. Barcelo, L. Libkin, and F. Murlak: Foundations of Data Exchange - Cambridge University Press, 2014
- F. Baader, D. Calvanese, D.L. McGuinness, D. Nardi, and P.F. Patel-Schneider (Eds.): The Description Logic Handbook: Theory, Implementation, and Applications - Cambridge University Press, 2010
- S. Chakravarthy, Q. Jiang: Stream Data Processing A Quality of Service Perspective - Springer, 2009
- L. Libkin: Elements Of Finite Model Theory (Texts in Theoretical Computer Science. An Eatcs Series) - SpringerVerlag, 2004

Language:

- offered only in English

Notes:

Prerequisites for this module are:
- Algorithm and Data Structures (CS1001)
- Linear Algebra and Discrete Structures I+II (MA1000, MA1500)
- Databases (CS2700)

Recommended additional modules:
- Logic (CS1002)
- Bachelor Project Computer Science (CS3701), topic: logic programming
- Nonstandard Database Systems (CS3202)

CS5131-KP08, CS5131 - Web-Mining Agents (WebMining)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	8

Course of study, specific field and term:

- Master CLS (optional subject), computer science, arbitrary semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester

Classes and lectures:

- Web-Mining Agents (lecture, 4 SWS)
- Web-Mining Agents (Excercises with project, 2 SWS)

Workload:

- 120 Hours private studies
- 90 Hours in-classroom work
- 30 Hours exam preparation

Contents of teaching:

- Probabilities and generative models for discrete data
- Gaussian models, Bayesian and frequentist statistics, regression,
- Probabilistic graphical models (e.g., Bayesian networks), learning parameters and structures of probabilistic graphical models (BMA, MAP, ML, EM algorithm), probabilistic classification, probabilistic relational models
- Probabilistic reasoning over time (dynamic Bayesian networks, Markov assumption, transition model, sensor model, inference problems: filtering, prediction, smoothing, most-likely explanation, hidden Markov models, Kalman filters, exact inferences and approximations, learning dynamic Bayesian networks)
- Mixture models, latent linear models (LDA, LSI, PCA), sparse linear models,
- Decision tree and version space acquisition from data streams, ensemble learning
- Decision making under uncertainty (utility theory, decision networks, value of information, sequential decision problems, value iteration, policy iteration, MDPs, decision-theoretic agents, POMDPs, reduction to multidimensional continuous MDPs, dynamic decision networks, Reinforcement learning)
- Clustering: distance measures, k-means clustering, nearest neighbor clustering
- Game theory, decisions with multiple agents (Nash equilibrium, Bayes-Nash equilibrium), social choice (voting, preferences, paradoxes, Arrow's Theorem, mechanism design (controlled autonomy), rules of encounter
- Multimedia interpretation for web (re-)search (named entity recognition, duplicate elimination, probabilistic ranking of interpretations, link analysis (e.g., citations), social network analysis)
- Building and exchanging symbolic annotations for web data (Google: from strings to things)
- Information association and retrieval, query answering and recommendation

Qualification-goals/Competencies:

- Knowledge: Students can explain the agent abstraction, define web mining of rational behavior, and give details about the design of mining agents (goals, utilities, environments). The notion of adversarial agent cooperation can be discussed in terms of decision problems and algorithms for solving these problems. For dealing with uncertainty in real-world scenarios, students can summarize how Bayesian networks can be employed as a knowledge representation and reasoning formalism in static and dynamic settings. In addition, students can define decision making procedures in simple and sequential settings, with and without complete access to the state of the environment. In this context, students can describe techniques for solving (partially observable) Markov decision problems, and they can recall techniques for measuring the value of information. Students can explain coordination problems and decision making in a multi-agent setting in terms of different types of equilibria, social choice functions, voting protocol, and mechanism design techniques. Students can explain the difference between instance-based and model-based learning approaches for data analysis, and they can enumerate basic machine learning technique for each of the two basic approaches, either on the basis of static data, or on the basis of incrementally incoming data. For dealing with uncertainty, students can describe suitable representation formalisms, and they explain how axioms, features, parameters, or structures used in these formalisms can be learned automatically with different algorithms (deep learning for data analysis). Students are also able to sketch different clustering techniques. They depict how the performance of learned classifiers can be improved by ensemble learning, and they can summarize how this influences computational learning theory. Algorithms for reinforcement learning can also be explained by students.
- Skills: Students can select an appropriate agent architecture for concrete agent data analysis application scenarios. For simplified data analysis applications, such as information retrieval, students can derive decision trees and apply basic optimization techniques. For those applications they can also create Bayesian networks/dynamic Bayesian networks and apply bayesian reasoning for simple queries. Students can also apply different sampling techniques for simplified agent scenarios. For simple and complex decision making students can compute the best action or policies for concrete settings. In multi-agent situations students are able to apply techniques for finding different equilibria states, e.g., Nash equilibria. For multi-agent decision making students will apply different voting protocols and compare and explain the results.Students derive decision trees and, in turn, propositional rule sets from static data as

well and temporal or streaming data. Students present and apply the basic idea of first-order inductive leaning. They apply the BMA, MAP, ML, and EM algorithms for learning parameters of Bayesian networks and compare the different algorithms. They are also able to carry out Gaussian mixture learning. Students can describe basic clustering techniques and explain the basic components of those techniques. Students compare related machine learning techniques, e.g., k-means clustering and nearest neighbor classification. They can distinguish various ensemble learning techniques and compare the different goals of those techniques.

- Social skills (social competence, self dependence): Students practice peer programming. They explain problems and solutions to their peer. They communicate in English. Using on-line quizzes and accompanying material for self study, students can assess their competence level continuously and adjust it appropriately. Working on exercise problems, they receive additional feedback.

Grading through:

- exercises and project assignments
- written exam

Responsible for this module:

- Prof. Dr. rer. nat. habil. Ralf Möller

Teacher:

- Institute of Information Systems
- Prof. Dr. rer. nat. habil. Ralf Möller

Literature:

- M. Hall, I. Witten and E. Frank: Data Mining: Practical Machine Learning Tools and Techniques - Morgan Kaufmann, 2011
- D. Koller, N. Friedman: Probabilistic Graphical Models: Principles and Techniques - MIT Press, 2009
- K. Murphy: Machine Learning: A Probabilistic Perspective - MIT Press, 2012
- S. Russel, P. Norvig: Artificial Intelligence: A Modern Approach - Pearson Education, 2010
- Y. Shoham, K. Leyton-Brown: Multiagent-Systems: Algorithmic, Game-Theoretic, and Logical Foundations - Cambridge University Press, 2009

Language:

- offered only in English

Notes:

Prerequisites for this module are:
- Algorithm and Data Structures (CS1001)
- Linear Algebra and Discrete Structures I+II (MA1000, MA1500)
- Databases (CS2700)
- Stochastics (MA2510) or Statistics (PY1800)

Recommended additional modules:
- Logic (CS1002)
- Artificial Intelligence (CS3204)
- Bachelor Project Computer Science (CS3701), topic: logic programming
- Foundations of Ontologies and Databases for Information Systems (SC5130)
- Web-based Information Systems (CS4130)

CS5140-KO04, CS5140 - Semantic Web (SemWeb)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), advanced curriculum distributed information systems, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), specialization field software systems engineering, 2nd or 3rd semester

Classes and lectures:

- Semantic Web (lecture, 2 SWS)
- Semantic Web (exercise, 1 SWS)

Workload:

- 65 Hours private studies
- 45 Hours in-classroom work
- 10 Hours exam preparation

Contents of teaching:

- Introduction with overview of the W3C Semantic Web family of languages
- Data management for Semantic Web data, in particular indexing approaches
- Query processing for Semantic Web queries (central, parallel, and distributed, in particular in the cloud)
- Processing strategies for Semantic Web rules and ontologies

Qualification-goals/Competencies:

- Students can judge about the possibilities and limits of the Semantic Web.
- They can evaluate the consequences of the Semantic Web approach for data modelling, adminstration and processing, and finally for applications.
- They can develop Semantic Web applications.
- They can explain and apply specialized approaches for Semantic Web databases.
- They can discuss about open research questions in the area of the Semantic Web.

Grading through:

- Exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- PD Dr. Sven Groppe

Teacher:

- Institute of Information Systems
- PD Dr. Sven Groppe

Literature:

- P. Hitzler, M. Krötzsch, S. Rudolph: Foundations of Semantic Web Technologies - Chapman & Hall / CRC, 2009
- T. Segaran, J. Taylor, C. Evans: Programming the Semantic Web - O'Reilly, 2009
- F. Bry, J. Maluszynski: Semantic Techniques for the Web - Springer, 2009
- J. T. Pollock: Semantic Web for Dummies - Wiley, 2009
- J. Hebeler, M. Fisher, R. Blace, A. Perez-Lopez, M. Dean: Semantic Web Programming - Wiley, 2009
- G. Antoniou, F. van Harmelen: A Semantic Web Primer - MIT Press, 2008
- V. Kashyap, C. Bussler, M. Moran: The Semantic Web - Springer, 2008
- S. Groppe: Data Management and Query Processing in Semantic Web Databases - Springer, 2011

Language:

- offered only in German

CS5156-KP04, CS5156 - System Architectures for Multimeda (SysArchMM)

Duration:	Turnus of offer:	Credit points:
1 Semester	normally each year in the summer semester	4

Course of study, specific field and term:

- Master Medical Informatics (optional subject), computer science, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), advanced curriculum signal and image processing, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), specialization field software systems engineering, 3rd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum parallel and distributed system architecutres, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), specialization field media informatics, 2nd or 3rd semester

Classes and lectures:

- System Architectures for Multimedia (lecture, 2 SWS)
- System Architectures for Multimedia (exercise, 1 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Performance requirements of multimedia systems on computer and systems
- Instruction set extensions for x86 processors
- System architecture of game consoles and multimedia systems
- Hardware structures for the realization of basic image and video processing operations
- System integration of hardware accelerators
- Programming of multimedia applications with OpenGL
- Protection and authentication of multimedia data

Qualification-goals/Competencies:

- Students are able to categorize instruction set extensions of processors for multimedia applications.
- They are able to discuss the characteristics of the system structure of game consoles and multimedia systems.
- They are able to implement image and video processing algorithms in software by making best use of instruction set extensions.
- They are able to evaluate the usefulness of specific processor architectures and system structures for the realization of multimedia systems.
- They are able to determine appropriate hardware structures for the implementation of image and video processing algorithms.
- They are able to write simple graphic applications with OpenGL.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr.-Ing. Thilo Pionteck (Nachfolger NN)

Teacher:

- Institute of Computer Engineering
- Prof. Dr.-Ing. Thilo Pionteck (Nachfolger NN)

Literature:

- P. A. Henning: Taschenbuch Multimedia - München: Fachbuchverlag Leipzig 2007
- A. S. Tanenbaum: Moderne Betriebssysteme - München: Pearson 2009
- D. G. Bailey: Design for Embedded Image Processing on FPGAs - Wiley & Sons 2011
- D. Kusswurm: Modern x86 Assembly Language Programming - Apress 2015
- A. Nischwitz, M. Fischer, P. Haberäcker, G. Socher: Computergrafik und Bildverarbeitung - Vieweg + Teubner, 2011

Language:

- offered only in German

CS5158-KP04, CS5158 - Advanced Internet Technologies (AdInternet)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Medical Informatics (optional subject), ehealth / infomatics, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), advanced curriculum enterprise IT, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), specialization field software systems engineering, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum distributed information systems, 2nd or 3rd semester

Classes and lectures:

- Advanced Internet Technologies (lecture, 2 SWS)
- Advanced Internet Technologies (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- Introduction and fundamentals
- Fundamental Internet design principles
- Problems of today's Internet architecture
- Backbone Technologies
- Mobile Internet
- IPv6 und related topics
- Delay Tolerant Networks (DTN)
- Internet of Services / Internet of Things
- Peer-To-Peer networks
- Big Data
- Goals, architectures, algorithms, and protocols for the future Internet

Qualification-goals/Competencies:

- Understand the fundamental design decisions that have led to today's Internet architecture
- Understand the original design goals of the Internet and realize the implications that the emphasis on certain of them has on today's networks
- Learn about essential, universally valid criteria for the design of networks and applications (e.g., end-to-end argument, fate sharing, etc.)
- Know technological as well as societal developments that have led to massive changes in the Internet's infrastructure (growth, innovations, mobile communications,)
- Identify problems of the Internet's architecture and understand potential solutions by comparing different approaches
- Become acquainted with the Future Internet research field and learn about novel approaches to research and shape the Internet of the future

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. Stefan Fischer

Teacher:

- Institute of Telematics
- Prof. Dr. Stefan Fischer

Literature:

- Olivier Hersent, David Boswarthick, Omar Elloumi: The Internet of Things: Key Applications and Protocols - Wiley, 2012
- Athanasios V. Vasilakos, Yan Zhang, Thrasyvoulos Spyropoulos: Delay Tolerant Networks: Protocols and Applications - CRC Press, 2012
- E. Pacitti, R. Akbarinia, M. El-Dick: P2P Techniques for Decentralized Applications - Morgan & Claypool Publishers

Language:

- German and English skills required

CS5170-KP04, CS5170 - Hardware/Software Co-Design (HWSWCod)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Robotics and Autonomous Systems (optional subject), computer science, 1st or 2nd semester
- Master Computer Science since 2014 (compulsory), specialization field software systems engineering, 1st or 2nd semester
- Master MES before 2014 (advanced curriculum), imaging systems, signal and image processing, 1st or 3rd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), specialization field robotics and automation, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum parallel and distributed system architecutres, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), advanced curriculum intelligent embedded systems, 2nd or 3rd semester
- Master Computer Science before 2014 (compulsory), specialization field software systems engineering, 2nd semester

Classes and lectures:

- Hardware/Software Co-Design (lecture, 2 SWS)
- Hardware/Software Co-Design (exercise, 1 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- System design flow
- Basic architectures for HW/SW systems
- System design and modelling
- System synthesis
- Algorithms for scheduling
- System partitioning
- Algorithms for system partitioning
- Design systems
- Performance analysis
- System design and specification with SystemC
- Application examples

Qualification-goals/Competencies:

- Students are able to determine a suitable hardware/software architecture for a given system description
- They are able to determine and describe the pros and cons of implementation alternatives
- They are able to apply methods for system partitioning
- They are able to translate non-formal system descriptions into formal models
- They are able to explain the different steps in system synthesis
- They are able to estimate the quality of system designs
- They are able to create system descriptions in SystemC

Grading through:

- Exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr.-Ing. Thilo Pionteck (Nachfolger NN)

Teacher:

- Institute of Computer Engineering
- Prof. Dr.-Ing. Thilo Pionteck (Nachfolger NN)

Literature:

- F. Kesel: Modellierung von digitalen Systemen mit SystemC - Oldenbourg Verlag 2012
- Teich, J., Haubelt, C.: Digital Hardware/Software-Systeme. Synthese und Optimierung - Berlin: Springer 2007

Language:

- offered only in German

CS5210 - Electronic Business Processes (EGeschProz)

Duration:	Turnus of offer:	Credit points:
1 Semester	not available anymore	4

Course of study, specific field and term:

- Master Media Informatics (optional subject), computer science, arbitrary semester
- Master Computer Science before 2014 (optional subject), specialization field media informatics, 2nd or 3rd semester

Classes and lectures:

- Electronic Business Processes (lecture, 2 SWS)
- Electronic Business Processes (practical course, 1 SWS)

Workload:

- 60 Hours private studies
- 30 Hours in-classroom work
- 15 Hours exam preparation
- 15 Hours group work

Contents of teaching:

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Qualification-goals/Competencies:

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Grading through:

- programming project
- Oral examination

Responsible for this module:

- Prof. Dr. Stefan Fischer

Teacher:

- Institute of Telematics
- Prof. Dr. Stefan Fischer

Language:

- offered only in German

CS5260-KP04, CS5260SJ14 - Speech and Audio Signal Processing (SprachAu14)

Duration:	Turnus of offer:	Credit points:
1 Semester	every second semester	4

Course of study, specific field and term:

- Master Auditory Technology (optional subject), Auditory Technology, 1st or 2nd semester
- Master MES since 2014 (optional subject), Medical Engineering Science, arbitrary semester
- Master CLS (optional suject), computer science, arbitrary semester
- Master Medical Informatics (optional subject), computer science, 1st or 2nd semester
- Master Media Informatics (optional subject), computer science, arbitrary semester

Classes and lectures:

- Speech and Audio Signal Processing (lecture, 2 SWS)
- Speech and Audio Signal Processing (exercise, 1 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Speech production and human hearing
- Physical models of the auditory System
- Dynamic compression
- Spectral analysis: Spectrum and cepstrum
- Spectral perception and masking
- Vocal tract models
- Linear prediction
- Coding in time and frequency domains
- Speech synthesis
- Noise reduction and echo compensation
- Source localization and spatial reproduction
- Basics of automatic speech recognition

Qualification-goals/Competencies:

- Students are able to describe the basics of human speech production and the corresponding mathematical models.
- They are able to describe the process of human auditory perception and the corresponding signal processing tools for mimicing auditory perception.
- They are able to present basic knowledge of statistical speech modeling and automatic speech recognition.
- They can describe and use signal processing methods for source separation and room-acoustic measurements.

Grading through:

- Exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr.-Ing. Alfred Mertins

Teacher:

- Institute for Signal Processing
- Prof. Dr.-Ing. Alfred Mertins

Literature:

- L. Rabiner, B.-H. Juang: Fundamentals of Speech Recognition - Upper Saddle River: Prentice Hall 1993
- J. O. Heller, J. L. Hansen, J. G. Proakis: Discrete-Time Processing of Speech Signals - IEEE Press

Language:

- offered only in German

Notes:

Prerequisites are exercises. These must have been done and graded before the first exam.

Mentioned in SGO MML under CS5260 (without SJ14).

CS5640 - Sociology of Media Networks (SozioNMed)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Media Informatics (optional subject), media informatics, arbitrary semester
- Master Computer Science before 2014 (optional subject), specialization field media informatics, 2nd or 3rd semester

Classes and lectures:

- Sociology of Media Networks (lecture with exercises, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction and Overview
- Sociology and Computer Science
- Social structures in network societies
- Society in media networks
- Sociological basics of the network society
- Ethics in media networks

Qualification-goals/Competencies:

- The students can use the sociological basics, theories and statistics for orientation in the informational network society.
- They are able to understand and predict moral conflicts arising due to technological developments and can explain the resulting advantages and disadvantages concerning society.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. rer. nat. Michael Herczeg

Teacher:

- Institute for Multimedia and Interactive Systems
- Prof. Dr. rer. nat. Michael Herczeg
- Prof. Dr.-Ing. Nicole Jochems

Literature:

- :
- :
- :

Language:

- offered only in German

CS5650 - Computer and Media Art (CMKunst)

Duration:	Turnus of offer:	Credit points:
1 Semester	each summer semester	4

Course of study, specific field and term:

- Master Media Informatics (optional subject), media informatics, arbitrary semester
- Master Computer Science before 2014 (optional subject), specialization field media informatics, 2nd or 3rd semester

Classes and lectures:

- Computer- und Media-Art (lecture with exercises, 3 SWS)

Workload:

- 55 Hours private studies
- 45 Hours in-classroom work
- 20 Hours exam preparation

Contents of teaching:

- Introduction and Overview
- History of Technology and Art
- Digital Technology as a Tool of Art
- Digital Technology as a Medium of Art
- Topics of Digital Art
- Summary and Outlook

Qualification-goals/Competencies:

- The students know the importance of computers and interactive media for the arts.
- hey are able to understand and judge media art technologically and artistically in the cultural context.
- They understand the mutual importance of technology and art in a historical reflection.

Grading through:

- Written or oral exam as announced by the examiner

Responsible for this module:

- Dr. Thomas Winkler

Teacher:

- Institute for Multimedia and Interactive Systems
- Dr. Thomas Winkler

Literature:

- Sönke Dinkla, Hrsg: Pioniere Interaktiver Kunst von 1970 bis heute - Edition ZKM : Cranz Verlag, 1997.

Language:

- offered only in German

EC4001-KP04, EC4001 - General Business Administration, esp. Personnel Management (ABWL)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Psychology (optional subject), interdisciplinary competence, arbitrary semester
- Master Interdisciplinary Courses (optional subject), Interdisciplinary modules, arbitrary semester
- Master psychology (optional subject), interdisciplinary competence, arbitrary semester
- Master Media Informatics (optional subject), interdisciplinary competence, arbitrary semester
- Master Computer Science since 2014 (optional subject), interdisciplinary competence, arbitrary semester

Classes and lectures:

- General Business Administration (lecture, 2 SWS)
- General Business Administration (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- Theories in business administration
- Organisational forms
- Legal forms
- Accounting basics
- Theories on leaderhip and motivation

Qualification-goals/Competencies:

- The students get an important and in-depth overview of the single parts of business administration. Within this lecture, the students are empowered to identify and classify the different theoretical areas of business administration. Furthermore, students will be able to evaluate the different approaches and apply them to specific situations.

Grading through:

- written exam

Responsible for this module:

- Prof. Dr. Christian Scheiner

Teacher:

- Institute for Entrepreneurship and Business Development
- M.Sc. Sandra van der Hulst

Literature:

- Wöhe: Einführung in die Allgemeine Betriebswirtschaftslehre - Vahlen-Verlag, 24. Auflage, 2010
- Hungenberg, Wulf: Grundlagen der Unternehmensführung - Gabler-Verlag, 4. Auflage, 2011

Language:

- offered only in German

Notes:

Computer science students get a B certificate.

EC4002 - E-Business (EBusiness)

Duration:	Turnus of offer:	Credit points:
1 Semester	not available anymore	4

Course of study, specific field and term:

- Master Media Informatics (optional subject), interdisciplinary competence, arbitrary semester

Classes and lectures:

- E-Business (lecture, 2 SWS)
- E-Business (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- Foundations and development trends of e-business technologies and processes in electronic commerce, information economy - trends and target groups, management and implementation of e-business models

Qualification-goals/Competencies:

- The students will be able to understand and assess the importance of e-business for companies in the context of overall economic and social developments, to understand the electronic value chain and how additional value can be created by the use of information and communication technologies (ICT) and how to use it conceptually.
- They are taught to know the basic technologies (hardware, software and networks) that are needed to build an e-business infrastructure, to understand their functioning and to assess their potential.
- In addition, they are capable of knowing and explaining trends in the Internet, especially the web 2.0, to understand and utilize the role of users in Web 2.0, to develop social media strategies in planned manner, to penetrate and understand the emergence of e-business projects and the associated change processes and challenges and also the role of IT, to understand and competently apply the analysis and selection process of e-business systems.

Grading through:

- attendance at exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. Christian Scheiner

Teacher:

- Institute for Entrepreneurship and Business Development
- Prof. André Köhler

Literature:

- T. Kollmann: E-Business: Grundlagen elektronischer Geschäftsprozese in der Net Economy - 4. Ausgabe, Verlag Springer, 2010
- T. Kollmann: Online Marketing: Grundlagen der Absatzpolitik in der Net Economy - 2. Auflage, Stuttgart, 2013
- Bernd W. Wirtz: Medien- und Internetmanagement - Gabler Verlag, 7. Auflage, 2011
- Christian Maaß: E-Business Management-Gestaltung von Geschäftsmodellen in der digitalen Wirtschaft - UTB Stuttgart, 2008

Language:

- offered only in German

EC4003 - Start-Up Management (GruendMan)

Duration:	Turnus of offer:	Credit points:
1 Semester	not available anymore	4

Course of study, specific field and term:

- Master Media Informatics (optional subject), interdisciplinary competence, arbitrary semester

Classes and lectures:

- Start-Up Management (lecture, 2 SWS)
- Start-Up Management (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- Introduction founding management (definition, need, functions and objectives) and start-up process:
- From idea to concept
- Businessplan
- Production and / or the Service preparation, growth and internationalization strategies for start-ups, financing strategies
- Reasons for financing and shapes
- Analysis of the effects of financing

Qualification-goals/Competencies:

- Through this lecture, students will gain a basic understanding of the formation process and are also in a position to make a selection decision for a specific application based on different growth and internationalization strategies.
- They can meter the time factor an appropriate importance in the context of market entry decisions, to make the right decision respective to the situation and to deal critically with with the topic
- With regard to the topic complex financing strategies, students can outline the key funding sources and occasions, identify financing effects of venture capital under application of an analytical instrument and independently make an informed selection decision, based on a holistic evaluation approach of financing alternatives.

Grading through:

- attendance at exercises
- Written or oral exam as announced by the examiner

Responsible for this module:

- Prof. Dr. Christian Scheiner

Teacher:

- Institute for Entrepreneurship and Business Development
- Hagen Goldbeck

Literature:

- M. Dowling: Gründungsmanagement. Vom erfolgreichen Unternehmensstart zu dauerhaftem Wachstum - Verlag Springer, Berlin, Heidelberg, 2003
- T.L. Koch, C. Zacharias: Gründungsmanagement. Mit Aufgaben und Lösungen - Verlag Oldenbourg, München, 2001
- U. Fueglistaller, C. Müller, T. Volery: Entrepreneurship. Modelle - Umsetzung - Perspektiven - Gabler Verlag, Wiesbaden, 2004

Language:

- offered only in German

EC4008-KP04 - Entrepreneurship & Innovation (EI)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Media Informatics (optional subject), Interdisciplinary modules, arbitrary semester
- Master Medical Informatics (optional subject), interdisciplinary competence, 1st or 2nd semester
- Master Interdisciplinary Courses (optional subject), Interdisciplinary modules, arbitrary semester
- Master Computer Science since 2014 (optional subject), interdisciplinary competence, arbitrary semester

Classes and lectures:

- Entrepreneurship and Innovation (lecture, 2 SWS)
- Entrepreneurship and Innovation (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- This course deals with fundamental theories, concepts and tools for the entrepreneurship and innovation management.
- The content is also linked to practical and current topics thus covering relevant applications.
- Individual aspects of the event will be studied on selected case studies.

Qualification-goals/Competencies:

- Students are able to master and apply scientific foundations and develop predominantly fundamental expertise in entrepreneurship and innovation.
- Students are able to structure and solve problems in innovation and technology management predominantly in a familiar be to some extent also even in a new, unfamiliar and multidisciplinary context.
- Students are able to define goals for their own development and reflect their own strengths and weaknesses, plan their own development and reflect the societal impact.
- Students can work cooperatively and responsibly in groups and reflect and enhance their own cooperative behavior in groups critical.

Grading through:

- portfolio exam

Responsible for this module:

- Prof. Dr. Christian Scheiner

Teacher:

- Institute for Entrepreneurship and Business Development

- Prof. Dr. Christian Scheiner
- Dr. Christoph Strumann

Literature:

- Nichols: Social Entrepreneurship - Oxford University Press 1. Auflage 2008
- Bessant & Tidd: Innovation and Entrepreneurship - Wiley-Verlag 2. Auflage 2013
- Fisch & Roß: Fallstudien zum Innovationsmanagement - Gabler-Verlag 1. Auflage 2009
- Bessant & Tidd: Managing Innovation: Integrating Technological, Market and Organizational Change - Wiley-Verlag: 5. Auflage 2013

Language:

- German and English skills required

Notes:

Part of Module EC4000-KP12
Part of Module EW3560-KP11
Is equal to EC4006 T

Replaces StartUp and New Business / PS5830

Prerequisites for admission to the (written) examination may be scheduled at the beginning of the semester. When prerequisites are

defined, they should be completed and positively evaluated before the initial (written) examination.

EC5010-KP04, EC5010 - Entrepreneurship in the digital economy (EEntre)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Master Interdisciplinary Courses (optional subject), Interdisciplinary modules, arbitrary semester
- Master Robotics and Autonomous Systems (optional subject), interdisciplinary competence, 1st or 2nd semester
- Master Entrepreneurship in Digital Technologies (compulsory), entrepreneurship, 3rd semester
- Master Media Informatics (optional subject), Interdisciplinary modules, arbitrary semester

Classes and lectures:

- Entrepreneurship in the digital economy (lecture, 2 SWS)
- Entrepreneurship in the digital economy (exercise, 1 SWS)

Workload:

- 60 Hours private studies
- 45 Hours in-classroom work
- 15 Hours exam preparation

Contents of teaching:

- In this class students obtain a key insight into the entrepreneurial processes, the identification of business opportunities as well as the shaping and changing of young companies. In addition, students are able to understand business models on a basic level. At the same time, this class will include strategy development, fundamental aspects of corporate marketing, growth forms and strategies, entrepreneurship in the context of established enterprises and social entrepreneurship.
- Special emphasize will be on start-ups in the digital economy.

Qualification-goals/Competencies:

- Students are able to identify the central issues in the process of founding a new company and have a broad Knowledge including the scientific basis as well as the practical application of the importance of entrepreneurship in economic and in a business context. Students are able to apply this knowledge to their own examples and in a changing context.
- Students are able to develop features and factors of successful start-upsand independently develop, visualize and submit business concepts based oncriteria and methods acquired. This knowledge is also linked to practicaland current topics and representable applications.
- Individual aspects of the event will be studied on selected case studies.
- Students master the scientific foundations and have specialized and in-depth expertise in innovation and technology management.
- Students know how to structure and solve problems even in new, unfamiliarand multidisciplinary contexts of innovation and technology management.
- Students are able to define goals for their own development and canreflect their own strengths and weaknesses, plan their individualdevelopment and reflect the societal impact.
- Students can work cooperatively and responsibly in groups and reflect and enhance their own cooperative behavior in groups critical.

Grading through:

- attendance at exercises
- portfolio exam
- written exam, oral exam and/or presentation as announced by the examiner

Responsible for this module:

- Prof. Dr. Christian Scheiner

Teacher:

- Institute for Entrepreneurship and Business Development
- Prof. Dr. Christian Scheiner

Literature:

- Bygrave & Zacharakis: The Portable MBA in Entrepreneurship - Wiley-Verlag: 2010
- Bygrave & Zacharakis: Entrepreneurship - Wiley-Verlag: 3. Auflage 2013
- Hisrich, Peters & Shepherd: Entrepreneurship - McGraw-Hill: International Edition 2010

Language:

- English, except in case of only German-speaking participants

Notes:

(Formerly EC5010)

PS5810-KP04, PS5810 - Scientific Teaching and Tutoring (WLehrKP04)

Duration:	Turnus of offer:	Credit points:
1 Semester	each semester	4 (Typ B)

Course of study, specific field and term:

- Master Interdisciplinary Courses (optional subject), Interdisciplinary modules, arbitrary semester
- Bachelor Interdisciplinary Courses (optional subject), Interdisciplinary modules, arbitrary semester
- Master CLS starting 2016 (optional subject), Interdisciplinary modules, 3rd semester
- Master Robotics and Autonomous Systems (optional subject), interdisciplinary competence, 1st or 2nd semester
- Master Entrepreneurship in Digital Technologies (optional subject), interdisciplinary competence, arbitrary semester
- Master Media Informatics (optional subject), interdisciplinary competence, arbitrary semester
- Master MES since 2014 (optional subject), no specific field, 1st or 2nd semester
- Bachelor MES since 2014 (optional subject), no specific field, arbitrary semester
- Master Computer Science since 2014 (optional subject), interdisciplinary competence, arbitrary semester
- Master CLS (optional suject), interdisciplinary competence, 3rd semester
- Master Computer Science before 2014 (optional subject), interdisciplinary competence, arbitrary semester

Classes and lectures:

- Theory and Practice of Good Teaching (seminar, 1 SWS)
- Work as a tutor in a lecture (practical course, 2 SWS)

Workload:

- 60 Hours private studies and exercises
- 45 Hours oral presentation (including preparation)
- 15 Hours in-classroom work

Contents of teaching:

- Organizing and running a scientific lecture
- Basic didactics of scientific teaching
- Practical work in tutorials

Qualification-goals/Competencies:

- Ability to run a tutorial and to explain topics of the relevant subfield of informatics.
- Basic pedagogical and didactical skills

Grading through:

- continuous participation in all courses of the module

Responsible for this module:

- Prof. Dr. rer. nat. Jürgen Prestin

Teacher:

- Institute for Mathematics
- Dr. Jörn Schnieder

Language:

- depends on the chosen courses

PS5830-KP04, PS5830 - Start-up and New Business (StartUp)

Duration:	Turnus of offer:	Credit points:
1 Semester	not available anymore	4 (Typ B)

Course of study, specific field and term:

- Master Media Informatics (optional subject), Interdisciplinary modules, arbitrary semester
- Bachelor Robotics and Autonomous Systems (optional subject), interdisciplinary competence, 5th or 6th semester
- Master Medical Informatics (optional subject), interdisciplinary competence, 1st or 2nd semester
- Master MES since 2014 (optional subject), no specific field, 1st or 2nd semester
- Bachelor MES since 2014 (optional subject), no specific field, arbitrary semester
- Master Computer Science since 2014 (optional subject), interdisciplinary competence, arbitrary semester
- Bachelor MES before 2014 (optional subject), interdisciplinary competence, arbitrary semester
- Bachelor Computer Science 2014 and 2015 (optional subject), central topics of computer science, 5th or 6th semester
- Master CLS (optional suject), interdisciplinary competence, 2nd or 3rd semester
- Master Computer Science before 2014 (optional subject), interdisciplinary competence, 2nd or 3rd semester

Classes and lectures:

- Start-up and New Business (seminar, 1 SWS)
- Start-up and New Business (practical course, 1 SWS)

Workload:

- 45 Hours private studies
- 30 Hours in-classroom work
- 30 Hours written report
- 15 Hours oral presentation (including preparation)

Contents of teaching:

- Entre-/ Intrapreneurship
- Business Modelling
- Technology product, value propositions, and customer benefit
- Target groups, customer segments, and customer relations
- Sales channels, marketing and sources of income
- Key ressources / activities / partners
- costs and financing, including funding programs
- special subjects: quality, acceptance for trading, legal form of organization, a.o.

Qualification-goals/Competencies:

- The students have gained basic insights in the field of Start-up, new product development and new business development.
- They have acquired a sound knowledge of business modelling and planing.
- They are able to develop a business plan based on a particular project.
- They are able to assess the chances and risks of a start-up and new product / new business development.

Grading through:

- oral presentation
- Written report
- continuous, successful participation in course
- successful addressing of the project goals
- contributions to the discussion

Responsible for this module:

- Prof. Dr. Martin Leucker

Teacher:

- Institute of Software Technology and Programming Languages
- Dr. Raimund Mildner

Literature:

- Aktuelle Forschungsartikel werden in der Veranstaltung bekanntgegeben.:

Language:

- offered only in German

PY1100-KP07 - Developmental Psychology (EP)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	7

Course of study, specific field and term:

- Master Media Informatics (optional subject), psychology, arbitrary semester
- Bachelor Psychology since 2016 (compulsory), psychology, 1st semester
- Bachelor Occupational Therapy (optional subject), psychology, 3rd or 5th semester
- Bachelor Speech and Language Therapy (optional subject), psychology, 3rd or 5th semester

Classes and lectures:

- lecture in Developmental Psychology (lecture, 2 SWS)
- course in Developmental Psychology (seminar, 2 SWS)

Workload:

- 150 Hours private studies and exercises
- 60 Hours in-classroom work

Contents of teaching:

- Core concepts, theories and methods in developmental psychology
- Physical development, cognitive development, Piaget, information processing theory, attachment theories, psychosocial development, moral
- Basic scientific approaches and empirical findings on selected aspects of lifespan development and contextual factors
- Prenatal development
- Infancy and toddlerhood
- Early and middle childhood
- Adolescence
- Early and middle adulthood
- Old age and death

Qualification-goals/Competencies:

- Students will know how to explain and interpret findings in developmental psychology on the basis of different theoretical views
- Students will be able to infer expert knowledge to specific developmental issues
- Students will be able to generate hypotheses in order to explain and predict research questions in developmental psychology
- Students will learn how to assess the validity of empirical studies concerning a variety of problems in developmental psychology

Grading through:

- written exam

Responsible for this module:

- Prof. Dr. rer. nat. Nico Bunzeck

Teacher:

- Institute for Psychology I

- Prof. Dr. rer. nat. Nico Bunzeck
- Dr. rer. biol.hum. Tineke Steiger
- Davina Biel
- M.Sc. Catherine-Noémie Alexandrina Guran

Literature:

- Berk: Entwicklungspsychologie - Pearson Studium, 2011
- Pinquart, Schwarzer, Zimmermann: Entwicklungspsychologie - Kindes- und Jugendalter - Hogrefe, 2011

Language:

- offered only in German

Notes:

The module examination is considered passing if it was graded as at least sufficient.

PY2300-KP06 - Basics in statistics 2 (Statistik2)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	6

Course of study, specific field and term:

- Master Media Informatics (optional subject), mathematics, arbitrary semester
- Bachelor Psychology since 2016 (compulsory), psychology, 3rd semester

Classes and lectures:

- Basics of statistics 2 (lecture, 2 SWS)
- Basics of statistics 2 (seminar, 2 SWS)

Workload:

- 110 Hours private studies and exercises
- 70 Hours in-classroom work

Contents of teaching:

- Analysis of Variance (ANOVA)
- General linear model, incl.simple and multiple regression, outlier testing
- Relationship of ANOVA and Regression
- Robust testing
- Basics of non-parametric testing

Qualification-goals/Competencies:

- Mastering and judging basic concepts and techniques in analysis of variance and regression
- Applying this new knowledge in solving statistical problems and in interpreting statistical results
- Experience in working with statistical software packages

Grading through:

- written exam

Is requisite for:

- Experimental Psychology (PY2800-KP06)

Requires:

- Statistics 1 (PY1800-KP06)

Responsible for this module:

- Prof. Dr. rer. nat. Jonas Obleser

Teacher:

- Institute for Psychology I
- Prof. Dr. rer. nat. Jonas Obleser
- Dr. phil. Sarah Tune

- Dr. rer. nat. Malte Wöstmann

Literature:

- Eid, M., Gollwitzer, M. & Schmitt, M.: Statistik und Forschungsmethoden - Beltz. 1. Auflage, 2010
- Wirtz, M., Nachtigall, C.: Wahrscheinlichkeitsrechnung und Inferenzstatistik. Statistische Methoden für Psychologen Teil 2 - Beltz Juventa. 6. Auflage, 2012

Language:

- offered only in German

Notes:

The module examination is considered passing if it was graded as at least sufficient.

PY2905-KP04, PY2905 - Emotion Regulation (Emreg)

Duration:	Turnus of offer:	Credit points:
1 Semester	each winter semester	4

Course of study, specific field and term:

- Bachelor Psychology since 2016 (optional subject), psychology
- Master Media Informatics (optional subject), psychology, arbitrary semester

Classes and lectures:

- course in emotion regulation (seminar, 2 SWS)

Workload:

- 90 Hours private studies and exercises
- 30 Hours in-classroom work

Contents of teaching:

- Emotion regulation: Basics and theoretical models
- Clinical diagnostics of skills for regulating emotions
- Stress management and emotion regulation
- Comparison of different strategies for regulating emotions
- Relevance of emotion regulation for various mental disorders
- Therapeutic interventions to enhance the levels of adaptive emotion regulation skills

Qualification-goals/Competencies:

- Students are able to define basic concepts of emotion regulation.
- They are able to explain current theoretical models of emotion regulation.
- They are able to compare different strategies of emotion regulation.
- They are able to transfer research findings in the field of emotion regulation to clinical and therapeutic practice.
- They are able to judge original research papers on emotion regulation
- They are able to create a poster for a written and an oral presentation of clinical research findings.

Grading through:

- leading discussions
- participation in discussions
- active participation in the exercises
- Group work
- Poster
- presentation

Responsible for this module:

- Prof. Dr. phil. Dipl.-Psych. Michael Hüppe

Teacher:

- Clinic of Psychiatry and Psychotherapy
- Dr. Charlotte Auer

Literature:

- Gross, J.J. (Hrsg.). (2013): Handbook of emotion regulation. New York - The Guilford Press

Language:

- offered only in German

Notes:

A successful participation requires the student s performance to be judged at least