COURSE DESCRIPTIONS

EEE DEPARTMENT SECOND CYCLE COURSE DESCRIPTIONS

First year

Compulsory courses

All Courses are elective

Second year

Compulsory courses

CEN 597. Master's Thesis
Hours (Theoretical-Practical): 0 (0-0) **ECTS: 30**

The master thesis prepares students for developing their own master thesis. The students will receive counseling in how to formulate a research question and develop a project description for their master thesis. They will receive insights in the basic requirements and genre conventions for master theses in media studies. Part of the course will be based on work in groups, where the students are trained in assessing academic texts using the conventions that are current in this field. Furthermore, the student will present and comment each other's project descriptions, revise these with regards to the feedback from fellow students and teacher, before it is submitted for final approval. An approved project description is the main goal of the course.

CEN 596. Master's Thesis
Hours (Theoretical-Practical): 0 (0-0) **ECTS: 30**

The master thesis prepares students for developing their own master thesis. The students will receive counseling in how to formulate a research question and develop a project description for their master thesis. They will receive insights in the basic requirements and genre conventions for master theses in media studies. Part of the course will be based on work in groups, where the students are trained in assessing academic texts using the conventions that are current in this field. Furthermore, the student will present and comment each other's project descriptions, revise these with regards to the feedback from fellow students and teacher, before it is submitted for final approval. An approved project description is the main goal of the course.

CEN 599. Graduate Seminar
Hours (Theoretical-Practical): 0 (0-0) **ECTS: 0**

The master seminar prepares students for presenting their own master thesis and improvements. The students will present how research questions are formulated and developed for their master thesis. They will receive insights in the basic requirements and opinions from jury members. Furthermore, the student will present and comment each other's project descriptions, revise these with regards to the feedback from fellow students and teacher, before it is submitted for final approval.

CEN 801. Special Studies
Hours (Theoretical-Practical): 1 (1-0) **ECTS: 0**

This course is covering student's studies with assigned Mentor. Consultancy for the topic and direction for the thesis is deciding together under this course with students and mentor.

Elective Courses

CEN 517. Distributed Systems
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**
This course covers a broad range of topics related to distributed systems. Distributed systems consist of a set of PCs or workstations connected by a network, that run special software that allows for transparent sharing of the distributed computing resources and data.

CEN 551. Management Information Systems
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**
This course helps you to understand what IT components are available and how you can utilize appropriate IT applications for success. You will learn the terminology used in the field of IT and how IT principles can apply to your businesses. The course stresses the competitive advantage of using IT and the return on investment that you can see. It focuses on the basic principles of Information Technology: hardware and software components, database technology, telecommunications and networking, e-commerce and e-business, Enterprise Resource Planning (ERP), Decision Support Systems (DSS), Artificial Intelligence (AI) and Expert Systems (ES), systems development and implementation, and the ethical and societal issues involved in IT.

CEN 559. Machine Learning
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**
This introductory course gives an overview of many concepts, techniques, and algorithms in machine learning, beginning with topics such as classification and linear regression and ending up with more recent topics such as boosting, support vector machines, hidden Markov models, and Bayesian networks. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered.

CEN 665. Data Communication and Computer Networks
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**
The course emphasizes basic principles and topics of computer communications. The first part of the course provides an overview of interfaces that interconnect hardware and software components, describes the procedures and rules involved in the communication process and most importantly the software which controls computers communication. The second part of the course discusses network architectures and design principles, and describes the basic protocol suites. The third part of the course introduces the concept of internetworking, a powerful abstraction that deals with the complexity of multiple underlying communication technologies.

CEN 582. Computer and Networks Security
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**
The profile of the programme comprises the development of the technical-scientific knowledge and professional skills in the study areas of Computer and Networks Security.

CEN 591. Neural Networks
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**
This course will cover basic neural network architectures and learning algorithms, for applications in pattern recognition, image processing, and computer vision. Three forms of learning will be introduced (i.e., supervised, unsupervised and reinforcement learning) and applications of these will be discussed. The students will have a chance to try out several of these models on practical problems. This is an advanced level course suited for graduate

students in Computer Science and Engineering. It is primarily intended for students who are interested in doing research in the areas of Neural Networks and Computer Vision. There are many open problems in this areas suitable for investigation by Master's students leading to a professional paper or master thesis.

CEN 592. Pattern Recognition
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

This class deals with the fundamentals of characterizing and recognizing patterns and features of interest in numerical data. We discuss the basic tools and theory for signal understanding problems with applications to user modeling, affect recognition, speech recognition and understanding, computer vision, physiological analysis, and more. We also cover decision theory, statistical classification, maximum likelihood and Bayesian estimation, nonparametric methods, unsupervised learning and clustering. Additional topics on machine and human learning from active research are also talked about in the class.

CEN 595. Scientific Research Methods
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

The course aims to provide in-depth knowledge of research design and methodology and to train the student in writing a study plan and critically reviewing scientific literature.

CEN 552. Data Mining
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

This course will examine methods that have emerged from both fields and proven to be of value in recognizing patterns and making predictions from an applications perspective. We will survey applications and provide an opportunity for hands-on experimentation with algorithms for data mining using easy-to- use software and cases.

CEN 553. E-Business / E-Commerce
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

This course is designed to provide delegates with the skills required to develop and manage a thriving e-business or e-commerce department of a larger business. Developed by e-Business leaders, this e-Business course will cover a range of topics and provide delegates will a solid foundational understanding.

CEN 585. Advanced Computer Networks
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

This is an advanced-level course on the recent developments in computer networks. The topics to be covered include current topics of research and development such as Routing, Congestion Control, Multicasting and Resource Reservation in the Internet, Wireless Networks, including wireless ad hoc networks, Peer-to-peer networks (P2P), Performance Study of Computer Networks, and if time permits, Multiprotocol Label Switching (MPLS) and Network Security. This is a graduate class and hence, the emphasis will be on in-depth critical analysis of (a few) current research problems and proposed solutions. We do not attempt to provide a broad overview of the entire area of computer networking! We will have a special emphasis on Future Internet including topics such as Data center networks, optical networks, Multimedia networking and P2P networks.

CEN 562. Embedded Systems
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

In this class, the fundamentals of embedded system hardware and firmware design will be explored. Issues such as embedded processor selection, hardware/firmware partitioning, glue logic, circuit design, circuit layout, circuit debugging, development tools, firmware architecture, firmware design, and firmware debugging will be discussed. The Intel 8051, a very popular microcontroller, will be studied. The architecture and instruction set of the microcontroller will be discussed, and a wirewrapped microcontroller board will be built and

debugged by each student. The course will culminate with a significant final project which will extend the base microcontroller board completed earlier in the course. Learning may be supplemented with periodic guest lectures by embedded systems engineers from industry. Depending on the interests of the students, other topics may be covered.

CEN 563. Network Programming
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

This course focuses on the programming aspects of computer networks. The goal of this course is to understand the current trends of communication protocols, socket programming, interprocess communication, and to understand how network research is done. We will cover the network programming in both wired networks and wireless networks.

EEE 530. Statistical Signal Processing
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

The course introduces the notion of representing signals using parametric models; it extends the broad topic of statistical estimation theory covered in the Probability, Random Variables, and Estimation Theory course for determining optimal model parameters. In particular, the Bayesian paradigm for statistical parameter estimation is introduced. Emphasis is placed on relating these concepts to state-of-the-art applications and signals.

CEN 512. Database Programming
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

The course expands on topics that were introduced in undergraduate database course, adds new and advanced topics and develops practical database programming skills. It begins with a review of the database environment and development process, in which basic SQL and PL/SQL are introduced, including database cursors, triggers, procedures, functions and packages. You will be required to learn and develop skills using the developer tools, Forms Builder and Reports Builder in this course.

CEN 537. Knowledge Management
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

Thorough coverage of the latest theory and practice of Knowledge Management (KM), with an integrated interdisciplinary presentation that makes sense of the confusingly wide variety of computer science and business KM perspectives arising simultaneously from artificial intelligence, information systems, and organizational behavior. Solidly covers the "hard" technical components of computer tools and technology for managing knowledge, without losing sight of the "soft" management needs and challenges in leveraging knowledge effectively within an organization. Critically evaluates the nature, computer representation, access, and utilization of knowledge versus information within a human context. Essential preparation for managerial, technical, and systems workers alike in today's modern knowledge-based economy.

CEN 576. Computational Methods in Bioinformatics
Hours (Theoretical-Practical): 3 (3-0) **ECTS: 7.5**

This course demonstrates how computational methods that have possibly been presented in other computing courses can be applied to solve problems in an application area. We look at problems related to the analysis of biological sequence data (sequence bioinformatics) and macromolecular structures (structural bioinformatics). Computing scientists need to be able to understand problems that originate in areas that may be unfamiliar to them, and to identify computational methods and approaches that can be used to solve them. Biological concepts needed to understand the problems will be introduced.