The Technical Faculty of IT and Design
The Study Board of Electronics and IT

AALBORG UNIVERSITY

Curriculum for the Bachelor's Program in IT, Communication and New Media

Aalborg University
September 2017

Campus: Copenhagen

Preface:

Pursuant to Act 261 of March 18, 2015 on Universities (the University Act) with subsequent changes, the following curriculum for the Bachelor's program in IT, Communication and New Media is established. The program also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Technical Faculty of IT and Design, The Faculty of Engineering and Science, and The Faculty of Medicine.

Study Board of Electronics and IT

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Chapter 1: Legal Basis of the Curriculum, etc.

1.1 Basis in ministerial orders

The Bachelor's program in IT, Communication and New Media is organized in accordance with the Ministry of Higher Education and Science's Ministerial Order no. 1328 of November 15, 2016 on Bachelor's and Master's Programs at Universities (the Ministerial Order of the Study Programs) and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order) with subsequent changes. Further reference is made to Ministerial Order no. 257 of March 18, 2015 (the Admission Order) and Ministerial Order no. 114 of February 13, 2015 (the Grading Scale Order) with subsequent changes.

1.2 Faculty affiliation

The Bachelor's program falls under The Technical Faculty of IT and Design, Aalborg University.

1.3 Study Board affiliation

The Bachelor's program falls under the Study Board of Electronics and IT at School of Information and Communication Technology.

1.4 Body of External Examiners

The Bachelor's program falls under the Body of External Examiners for Engineers (electronic engineering).

Chapter 2: Admission, Degree Designation, Program Duration and Competence Profile

2.1 Admission

Admission to the Bachelor's program in IT, Communication and New Media requires an upper secondary education.

The program's specific entry requirements are:

- English B *or* an acceptable IELTS
- Mathematics A
- Physics B

cf. the Ministerial Order on Admission and Enrolment on Bachelor Programmes at Universities.

The University can stipulate requirements concerning conducting additional exams prior to the start of study.

2.2 Degree designation in Danish and English

The Bachelor's program entitles the graduate to the designation:

- Bachelor (BSc) i teknisk videnskab (IT, kommunikations- og medieteknologi). The English designation is:

  Bachelor of Science (BSc) in Engineering (IT, Communication and New Media).

2.3 The program's specification in ECTS credits

The Bachelor's program is a 3-year, research-based, full-time study program. The program is set to 180 ECTS credits.

2.4 Competence profile on the diploma

The following will appear on the diploma:

- A graduate of the Bachelor's program has competencies acquired through an educational program that has taken place in a research environment.
- A graduate of the Bachelor's program has fundamental knowledge of and insight into his/her subject's methods and scientific foundation. These properties qualify the graduate of the Bachelor's program for further education in a relevant Master's program as well as for employment on the basis of the educational program.

2.5 Competence profile of the program:

The graduate of the Bachelor's program:

Knowledge	• possess knowledge about theories, methodologies and practice in the areas of IT, communication and new media • are able to understand and reflect on theories, methodologies and practice within these subject areas • have knowledge in design and planning processes in relation to development of ICT applications
Skills	• are able to apply selected methodologies and tools within IT, communication and new media • are able to analyse and evaluate theoretical and practical issues within IT, communication and new media in a broader socio-economic context • are able to develop and implement ICT based services and applications using programming and system development skills • are able to explain the reasons for and choose relevant solution models • are able to communicate academic and technical issues and solution models to peers and non-specialists or collaboration partners and users from an interdisciplinary perspective
Competencies	• are able to handle complex and development-oriented situations in study or work contexts • are able to solve problems using mathematical tools • are able to combine technology, user, economy, and policy perspectives • are able to independently participate in discipline-specific and interdisciplinary cooperation with a professional approach • are able to identify their own learning needs and organize their own learning in different learning environments

Chapter 3: Content and Organization of the Program

The program is structured in modules and organised as a problem-based study. A module is a program element or a group of program elements, which aims to give students a set of professional skills within a fixed time frame specified in ECTS credits, and concluding with one or more examinations within specific exam periods. The examinations are defined in the curriculum.

All projects are to be conducted in English. The study board may, in some cases, exempt from this.

The program is based on a combination of academic, problem-oriented and interdisciplinary approaches and organised based on the following work and evaluation methods that combine skills and reflection:

- lectures
- classroom instruction
- project work
- workshops
- exercises (individually and in groups)
- project work and exercises in labs
- teacher feedback
- reflection
- portfolio work

The BSc education in IT, Communication and New Media is taught in English. All activities, including the above stated, are carried out in English. All exercise work and deliverables, project-work (as well as any documentation in connection to these) delivered by the student must be written in English and all exams are carried out in English. In accordance with the current Joint Programme Regulations, The Study Board of Electronics and IT may choose to exempt from this rule in extraordinary cases, which in principle requires a well-documented application from the student and/or teacher.

Overview of the program:

All modules are assessed through individual grading according to the 7-point scale *or* Pass/Fail. All modules are assessed by external examination (external grading) or internal examination (internal grading or assessment by the supervisor only).

Semester 1: IT systems in a market perspective					
Semester	Module	ECTS	Assessment	Exam	Type
1st	P0: Project in Conceptual Design of an ICT Application	5	Pass/Fail	Internal	Mandatory
1st	P1: Project in Object-oriented Programming	10	7-point scale	Internal	Mandatory
1st	Problem Based Learning in Science, Technology and Society	5	Pass/Fail	Internal	Mandatory
1st	Linear Algebra	5	7-point scale	Internal	Mandatory
1st	Object-oriented Programming 1	5	7-point scale	Internal	Mandatory
Semester 2: System development					
Semester	Module	ECTS	Assessment	Exam	Type
2nd	Project in System Development	15	7-point scale	External	Mandatory
2nd	Software Engineering	5	7-point scale	Internal	Mandatory
2nd	Object-oriented Programming 2	5	7-point scale	Internal	Mandatory
2nd	Discrete Mathematics	5	7-point scale	Internal	Mandatory
Semester 3: Distributed systems and users					
Semester	Module	ECTS	Assessment	Exam	Type
3rd	Project in Distributed Systems and Users	15	7-point scale	Internal	Mandatory
3rd	Distributed Systems	5	7-point scale	Internal	Mandatory
3rd	Digital signal processing	5	7-point scale	External	Mandatory
3rd	Interaction Design	5	7-point scale	Internal	Mandatory
Semester 4: Communication and media technologies					
Semester	Module	ECTS	Assessment	Exam	Type
4th	Project in Communications and Media Technologies	15	7-point scale	External	Mandatory
4th	Communication and Media Technologies	5	7-point scale	Internal	Mandatory
4th	Introduction to Economics	5	7-point scale	Internal	Mandatory
4th	Introduction to Probability and Applied Statistics	5	7-point scale	Internal	Mandatory
Semester 5: Application development and security					
Semester	Module	ECTS	Assessment	Exam	Type
5th	Project in Application Development and Security	15	7-point scale	Internal	Mandatory

5th	Network and Application Security	5	7-point scale	Internal	Mandatory
5th	Computer Networks and the Internet	5	7-point scale	Internal	Mandatory
5th	ICT in Organizations	5	7-point scale	External	Mandatory
Semester 6: IT, Communication and New Media					
Semester	Module	ECTS	Assessment	Exam	Type
6th	BSc Project	20	7-point scale	External	Mandatory
6th	Internet of Things	5	7-point scale	Internal	Elective
6th	Technology and Society	5	7-point scale	Internal	Elective
6th	Business Law	5	7-point scale	Internal	Elective
6th	Introduction to Engineering Psychology	5	7-point scale	Internal	Elective
	Total	180			

The 6th semester students must choose 2 of the elective courses.

Most courses introduce scientific methods, which are specific to the topic of the course. For instance mathematical methods are introduced in the courses Linear Algebra and Calculus, methods for programming in Object-oriented Programming, etc. Scientific theory and scientific methods in general are included in the course Problem Based Learning in Science, Technology and Society. Moreover, the students develop their skills in this area in their project work, where they will apply scientific methods in practice and reflect on their applicability in the subsequent process evaluation.

3.1 1st semester

Title:

P0: Project in Conceptual Design of an ICT Application
(P0: Projekt i konceptuelt design af en IKT-applikation)

Prerequisites:

Objectives:

Students who complete the module:

Knowledge:

- Must have knowledge about typical work processes in a problem based project
- Must have knowledge about the basic principles in scientific work, e.g., academic honesty
- Must have knowledge of what the subject of IT, Communication and New Media includes
- Must have knowledge about the concept of user friendliness
- Must be able to understand the concept of problem based learning

Skills:

- Must be able to analyse individual as well as organizational learning processes
- Must be able to organize a short period (less than a month) of collaboration in-group and with supervisor
- Must be able to communicate the reflections and results of the problem based project work: orally, graphically and in writing
- Must be able to apply problem based learning in group work
- Must be able to perform a simple SWOT analysis

Students who complete P0 project unit will have gained their first experience in using the problem-based learning method. Furthermore, students will be introduced to the discipline of IT, communication and new media.

The students will be required to present a general conceptual design of an ICT application. The concept must include a business model, considerations on user friendliness, a SWOT analysis and an actor analysis. An example of an ICT-based application suitable for the project is an e-shop selling goods or services via web portal or a mobile portal. Furthermore, the students will be required to prepare a written P0 process analysis.

Type of instruction:

Students will do their project work in groups. The groups will receive instruction and feedback from the teacher.

Exam format: Internal. Oral examination based on a written project report. Assessment: Pass/Fail.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

P1: Project in Object-oriented Programming

(P1: Projekt i objektorienteret programmering)

Prerequisites:

The project builds on knowledge obtained in the P0 project module: Project in Conceptual design of an ICT application (Projekt i konceptuelt design af en IKT-applikation).

Objectives:

To provide the student with practical experience defining a project within the area of IT, communication and new media, which includes use of object-oriented programming, to implement the project by working in groups and to document the solution in a project report.

Students who complete the module:

Knowledge:

- Must have knowledge about IT, communication and new media technologies in order to identify relevant contextual perspectives of a given technology
- Must have knowledge about project management in a long-term problem based project (in this case 2-3 months)
- Must have knowledge of methodological consideration to describe the theoretical and empirical foundation of the project
- Must have knowledge about how an object oriented programming language can be used to solve a specific problem
- Must have knowledge about commonly occurring data structures and algorithms
- Must have knowledge about the implementation and use of commonly occurring data structures and abstract data types

Skills:

- Must be able to analyse individual as well as organizational learning processes by scientifically recognized concepts and methods
- Must be able to organize and manage a longer-term project considering group and supervisor collaboration
- Must be able to structure and communicate the reflections and results of the problem based project work; orally, graphically and in writing
- Must be able to identify and define a problem suitable for a project involving object-oriented programming
- Must be able to use an object-oriented programming language and associated class library to implement parts of programs and small programs in order to solve a specific problem
- Must be able to plan and perform systematic test of the programme applied
- Must be able to discuss/assess the quality of the solution in a wider context

Competencies:

- Must be able to take responsibility of one's own learning during a longer-termed project period and be able to generalize the gained experiences
- Must have competencies in using object oriented programming in solving programming tasks, especially programming tasks related to communication and new media
- Must have competences in documentation and discussion of the wider market related im-

plications of a real life application
Type of instruction: Students will do their project work in groups. The groups will receive instruction and feedback from the teacher. Students have to prepare a written P1 process analysis. Students will get support to identify relevant contextual perspectives by consultancy, a group meeting, and commenting on papers and presentation at the status seminar.
Exam format: Internal. Oral examination based on a written project report. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Problem Based Learning in Science, Technology and Society
(Problembaseret læring i videnskab, teknologi og samfund (PBL))

Prerequisites:

Objectives:

The students shall theoretically as well as practically understand how to plan and execute a scientific problem-based project with technological, social and humanistic relevance. This includes an understanding of how technological aspects and contextual circumstances can be identified and included in the development of a problem solution.

Students who complete the module:

Knowledge:

- Must have knowledge of basic learning theories
- Must have knowledge of project planning and managements techniques
- Must have knowledge of different approaches to problem-based learning (PBL), including the Aalborg model approach, where problems are related to social and/or humanistic contexts
- Must have understanding of different resources for analysis and assessment of problems and solutions related to IT, communication and new media technologies from scientific, technological, ethical and social perspectives
- Must apply methods for analysis and assessment of problem within the field of IT, communication and new media technologies, including market and stakeholder analysis, and technologies and services assessments

Skills:

- Must be able to apply basic principles related to planning and management of a problem-based project: basic study techniques, phases in a problem-oriented project, from initial problem to problem analysis and problem formulation, design and implementation
- Must be able to analyse and evaluate the organisation of the project group work and collaboration, especially regarding identification of strong and weak factors, and, based on this, suggest how group organisation and collaboration can be improved in future situations: team roles, group dynamics, communication within the group and externally, creativity, methods for analysis and documentation of learning processes
- Must be able to analyse group conflicts, causes and possible solutions
- Must be able to analyse and evaluate own contribution to study and learning, especially regarding identification of strong and weak factors, and, based on this, consider continuous course of events and their contributions to the learning processes, learning styles and the study
- Must be able to analyse methods used in the project from a scientific point of view: science theory, qualitative and quantitative approaches
- Must be able to apply fundamental key areas, concepts and methods for evaluation and development of technical solutions considering the technology in itself, and in relation to social contexts and human circumstances (holistically): technology assessment methods, contexts and communication, media sociology (e.g., life styles, consumption, sociological methods), different forms of user test, innovation and creativity

Competencies:

- Must be able to apply knowledge (application) and understanding regarding being part of a team-based project work
- Must be able to understand and communicate project work (application)
- Must be able to analyse own learning processes
- Must be able to analyse and document learning processes within the group (analysis)
- Must be able to create optimal collaborative learning processes (application)
- Must be able to apply knowledge and understanding of science, technology and society (application); from a technological perspective (including competencies on applying different technology assessment methods), and from a holistic perspective (including competencies on life style, consumption, and technology development, different contexts and forms of communication, innovative and creative processes)

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination. Assessment: Pass/Fail.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Linear Algebra

(Lineær algebra)

Prerequisites: No special prerequisites for the module.

Objectives:

Linear algebra is a fundamental tool for virtually all engineering mathematics.

Students who complete the module:

Knowledge:

- Must have knowledge about definitions, results and techniques within the theory of systems of linear equations
- Must be able to demonstrate insight into linear transformations and their connection with matrices
- Must have obtained knowledge about the computer tool MATLAB and how it can be used to solve various problems in linear algebra
- Must have acquired knowledge of simple matrix operations
- Must know about invertible matrices and invertible linear mappings
- Must have knowledge of the vector space Rn and various subspaces
- Must have knowledge of linear dependence and independence of vectors and the dimension and bases of subspace
- Must have knowledge of the determinant of matrices
- Must have knowledge of Eigen values and eigenvectors of matrices and their use
- Must have knowledge of projections and orthonormal bases
- Must have knowledge of first order differential equations, and on systems of linear differential equations

Skills:

- Must be able to apply theory and calculation techniques for systems of linear equations to determine solvability and to provide complete solutions and their structure
- Must be able to represent systems of linear equations using matrix equations, and vice versa
- Must be able to determine and apply the reduced Echelon form of a matrix
- Must be able to use elementary matrices for Gaussian elimination and inversion of matrices
- Must be able to determine linear dependence or linear independence of small sets of vectors
- Must be able to determine the dimension of and basis for small subspaces

Competencies:

- Must demonstrate development of his/her knowledge of, understanding of, and ability to make use of, mathematical theories and methods within relevant technical fields
- Given certain pre-conditions, must be able to make mathematical deductions and arguments based on concepts from linear algebra

Type of instruction: Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.
Exam format: Internal. Oral or written examination. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Object-oriented Programming 1

(Objektorienteret programmering 1)

Prerequisites:

Objectives:

To provide the student with a foundation for the systematic development of programs using object-oriented modelling and programming.

The student should acquire an understanding of basic concepts and mechanisms in an object-oriented programming language such that the student is able to use the language and associated class library to implement small programs.

Students who complete the module:

Knowledge:

- Must have knowledge about commonly occurring concepts and mechanisms in an object-oriented programming language
- Must have knowledge about commonly occurring data structures and algorithms
- Must have knowledge about the implementation and use of commonly occurring data structures and abstract data types

Skills:

- Must be able to use an object-oriented programming language and associated class library to implement parts of programs and small programs
- Must be able to plan and perform systematic test of small programs
- Must be able to discuss/assess the quality of a given program

Competencies:

- Must have competencies in using object-oriented programming in solving programming tasks, especially programming tasks related to communication and new media

Contents:

- Introduction to programs and machines
- Fundamental sequential programming
- Introduction to object-oriented programming
- Test and debugging
- Basic data structures and algorithms
- Introduction to software system documentation
- Development of simple graphical user interfaces

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination based upon mandatory assignments. The as-

sessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

3.2. 2nd semester

Title:

P2: Project in System Development

(P2: Projekt i systemudvikling)

Prerequisites:

The students should have basic programming experience.

Objectives:

For students to develop key competences in how to use system development processes for development of software and IT, and to work with requirements specifications. Overall the project balances around possibilities and limitations of communication networks and how these are incorporated in requirements specifications and actual system development.

Students who complete the project:

Knowledge:

- Must have knowledge about methods for planning and developing an IT product in order to identify, analyse and assess the contextual impacts and perspectives of a given technology
- Must have knowledge about how to design the interaction between a potential user and an IT product
- Must have knowledge about the most important concepts in iterative system developments such as for example UP
- Must have knowledge about central IT and software development models such as the Waterfall model, Agile development, the spiral lifecycle model, Extreme Programming, etc.
- Must have knowledge about development of requirement specifications as a basis for developing an IT project

Skills:

- Analyse and model individual as well as organizational learning processes based on experiences from P0 and P1
- Must be able to apply IT development models to an actual case
- Must be able to apply user interaction models as a basis for requirements specifications
- Must be able to apply advanced object-oriented system development
- Must be able to develop a requirement specification for a given IT product
- Must be able to link user requirements with the requirement specification for a given product using UML diagrams
- Must be able to evaluate an IT development project based on requirements
- Must be able to reflect on the construction and reconstruction of science and technology in a user and society perspective
- Must be able to relate the professional practice within the discipline to the needs of humans and different societies
- Must be able to analyse technical or natural scientific problems by use of social science methodology
- Must be able to assess the impacts on humans and society from the proposed solutions

Competencies:

- Must have competencies in independently managing a longer termed project
- Have competencies in generalizing the gained experiences with project management and put them into perspective of the future course of study
- Must have competencies in reflection on the ethical perspective of engineering and science and discussion of implications of a responsible professional practice
- Must have competencies in development of a requirements specification
- Must have competencies in elicitation of user requirements and to translate these into the requirement specification for a specific product
- Must have competencies in user interaction models
- Must have competencies in IT development (for example a mobile application) by use of the System Development Process

Type of instruction:

Students will do their project work in groups. The groups will receive instruction and feedback from the teacher. Students have to prepare a written P2 process analysis. Students will get support to identify relevant contextual perspectives by consultancy; a group meeting, and commenting on papers and presentation at the status seminar.

Exam format: External. Oral examination based on a written project report. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Software Engineering

(Software Engineering)

Prerequisites:

The students should have basic programming experience.

Objectives:

To provide students with knowledge in different development methods for development of software. This involves understanding of process models (plan-driven as well as agile), analyses for requirements as well as software validation and evolution.

Students who complete the module:

Knowledge:

- Must understand about requirements engineering and specification
- Must know about different process models for software design and development
- Must understand the difference between a plan driven process model and an incrementable agile process model
- Must know the Waterfall model, the Spiral model, Extreme Programming and SCRUM, amongst others
- Must understand when to use which process model for a given project
- Must be able to link user requirements and technical requirements for a specific IT software
- Must be able to explain the interaction between a system and users
- Must be able understand different methods for validation and testing

Skills:

- Must be able to identify and compare different use situations for a particular IT product
- Must be able to identify, analyse and compare different methodologies for elicitation of requirements
- Must be able to describe and use different techniques for requirements analysis and specification
- Must be able to use UML as part of the requirements analysis and specification development
- Must be able to define verifiable criteria for a software or parts of a software
- Must be able to evaluate and validate different software solutions
- Must be able to plan and perform evaluations of software or parts of the software
- Must be able to design and conclude on a requirement specification for a given application

Competences:

- Must be able to develop a requirement specification for particular software
- Must have competences in discussing and documenting different approaches to development of software competences
- Must have competences in carrying out the different phases of a software engineering process
- Must be able to evaluate the process of software engineering and the single elements in relation to the purpose of the software being developed

Type of instruction: Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.
Exam format: Internal. Oral or written examination. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Object-oriented Programming 2
(Objekt-orienteret Programmering 2)

Prerequisites:

The module adds to knowledge obtained in Object-oriented Programming 1.

Objectives:

Objectives:

- To provide the student with knowledge of important concepts in object-oriented analysis and design that can be used to build programming models
- To provide the student with skills to perform object-oriented implementation and testing of developed programming models in Java

Students who complete the module:

Knowledge:

- Must have knowledge about common architectures and design patterns
- Must understand complex programming issues such as: the concept of multithreaded programs, typical synchronization problems and common solutions to these
- Must have knowledge about programming for portable devices in Java
- Must have knowledge of manual and automated software testing principles and methods

Skills:

- Must be able to implement modeled systems by using object-oriented principles
- Must be able to use common architectures and design patterns
- Must be able to implement and execute test-cases
- Must be able to perform complex programming such as data-serialization and use the Java API classes to program “attractive” GUIs, including using custom dialog boxes
- Must be able to discuss and evaluate the design and quality of object-oriented programs

Competencies:

- Must have the competencies to apply object-oriented principles, programming, and testing in the context of IT, communication and new media services.

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Oral or written examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Discrete Mathematics

(Diskret matematik)

Prerequisites:

The module builds on knowledge obtained in Linear Algebra.

Objectives:

Students who complete the module:

Knowledge:

- Must understand set theory: sets, relations, functions, partial orderings, equivalence relations
- Must understand fundamental number theory: modular arithmetic, Euclidean algorithm, the Chinese remainder theorem, Fermat's little theorem and prime factorization
- Countability of the rational numbers
- Must understand recursive/iterative algorithms
- Must understand time complexity: asymptotic notation and Big-O notation
- Must know about logarithm and exponential functions with base 2
- Must know about combinatorics and the binomial formula
- Must know about recursive functions and recurrence relations
- Must know about proof techniques: weak and strong induction and proof by contradiction, contraposition and constructive
- Must understand logic: propositional logics and quantifiers
- Must understand graph theory: directed and undirected graphs, path, simple path and trees
- Graph algorithms: search in graphs and shortest path

Skills

- Must be able to construct proofs (using the proof techniques of the course) for results within the course
- Must be able for formulate in writing mathematical results related to the course

Competencies:

- Must have competencies in the use of concepts and techniques of discrete mathematics, including in connection with algorithms

Type of instruction:

The teaching in Discrete Mathematics is a combination of sessions with lectures, exercises, and miniprojects.

Exam format: Internal. Oral or written examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

3.3 3rd semester

Title:

Project in Distributed Systems and Users
(Projekt i distribuerede systemer og brugere)

Prerequisites:

Objectives:

The purpose of this project module is to acquire knowledge, skills and competencies regarding the implementation and use of distributed information technology in a specific application based on identified user requirement.

Students who complete the project:

Knowledge:

- Must have knowledge about computer networks
- Must have knowledge about distributed information technology systems including protocol design and system architecture
- Must have knowledge about methodologies for elicitation of user requirements and user evaluations

Skills:

- Must be able to involve users in requirement specifications for user interfaces
- Must have basic skills in implementing network technologies and distributed information technology systems, including intranet and groupware
- Must be able to implement client-server based or a peer-to-peer based application

Competencies:

- Must demonstrate competences in performing analyses of user requirements for information and knowledge
- Must have competences in presenting user scenarios based on user needs
- Must have competences in choosing relevant computer networks and information technology systems meeting organizational needs for knowledge and information sharing
- Must have competences in development and implementation of a distributed system

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Distributed Systems

(Distribuerede systemer)

Prerequisites:

The module builds on knowledge obtained in the 2nd semester.

Objectives:

To introduce the student to a number of different techniques used for development of distributed systems.

Students who complete the module:

Knowledge:

- Must have knowledge about architectures of distributed systems
- Must have knowledge about application layer protocols
- Must have knowledge about relevant client side web technologies
- Must have knowledge about using Java Beans
- Must have knowledge about simple client/server applications using Java RMI

Skills:

- Must be able to use relevant architectures to design distributed systems
- Must be able to design application layer protocols
- Must be able to use relevant client side web technologies
- Must be able to use Java Beans
- Must be able to implement simple client/server applications using Java RMI

Competencies:

- Must be able to apply distributed technologies in design development of IT applications

Type of instruction:

The lessons consist of theory combined with practical exercises and are closely related to the project course consisting in the development of a distributed system.

Exam format: Internal. Written or oral examination based on assignments. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Digital signal processing

(Digital signalprocessering)

Prerequisites:

The module adds to knowledge obtained in Discrete Mathematics.

Objectives:

Students who complete the module:

Knowledge:

- Must have knowledge of basic signal sampling and its limitations
- Must be able to explain the concepts of aliasing
- Must have knowledge about linear time invariant systems including impulse response, difference equation, convolution, stability, and causality
- Must have knowledge of finite impulse response filters
- Must have knowledge about definition, basic properties and theorems regarding discrete Fourier transform
- Must be able to explain frequency domain spectra and relate them to their time domain representations.

Skills:

- Must be able to analyse digital signals and finite impulse response filters by using the methods of convolution, difference equation, impulse response and frequency domain response
- Must be able to design finite impulse response filters from a set of specifications using MATLAB functions
- Must be able to apply the design tools of MATLAB to calculate the filter coefficients
- Must be able to implement and test digital filters using MATLAB

Competencies:

- Must be able to solve signal processing related problems in a practical context
- Must be able to apply signal processing algorithms and analyse the results

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Individual oral examination based on a written mini-project report. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Interaction Design
(Interaktionsdesign)

Prerequisites:

Students should have experience in Software Engineering.

Objectives:

- To provide students with competences in involving users in software design and development of user interfaces.
- To provide students insight into the process of interaction design
- To provide a foundation for students to understand the concept of user centric design and can relate this to software engineering in general.
- To obtain experience in prototyping as foundation for design

Students who complete the module:

Knowledge:

- Must be able to understand central concepts interaction design, user centric development, process models, GUI, usability, and user experience, amongst others
- Must know different techniques and methods for elicitation of user requirements hereunder creativity techniques
- Must be able to characterise different types of users and their needs
- Must have knowledge about how to involve users in a design process. This includes knowledge about design models such as participatory design
- Must have knowledge about prototyping as design approach
- Must have knowledge about different techniques of how to do usability test designs such as cognitive walkthroughs, heuristic evaluation, focus groups, questionnaires, field studies, etc.
- Must understand how to formulate different goals and evaluation criteria for interaction design of different interfaces

Skills:

- Must be able to identify different interaction design problems
- Must be able to perform user evaluation of a particular software, system or interface using specific user involving techniques
- Must be able to elicitate user requirements by involvement of users and application of techniques (such as “think-aloud” test, and interviews, amongst others)
- Must be able to reflect on the interaction design and decide on which users to involve in the process
- Must be able to demonstrate how a system or interface design has been made through use of conceptual models

Competencies:

- Must have competencies in evaluation of different user interfaces (GUIs) and interface styles
- Must have competencies in analysing different target/user types and understand the differences in involvement of various user segments and user groups for feedback on design
- Must have competencies in involvement of users for user requirement elicitation
- Must be able to apply an iterative method for interaction design
- Must be able to select and apply user-involving evaluation methods and techniques

Type of instruction: Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.
Exam format: Individual written or oral examination. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

3.4 4th semester

Title:

Project in Communications and Media Technologies
(Projekt i kommunikations- og medieteknologier)

Prerequisites:

The project adds to knowledge obtained in P0 and P1.

Objectives:

The purpose of this project is to give the students an understanding of the technologies behind ICTs and media technologies. The students must use the theories and methods learned from the course Communication and Media Technologies on a specific case within ICT and media technologies.

Students who complete the module:

Knowledge:

- Must have knowledge about the key technologies and standards for fixed, mobile and wireless networks
- Must have knowledge about the structure, architecture and topologies deployed in the communication networks
- Must have knowledge about the key technologies and standards for the major media technologies
- Must have knowledge about Quality of Service (QoS) parameters for different service classes in different networks

Skills:

- Must be able to discuss the advantages and disadvantages of different network types in relation to specific services and applications
- Must be able to identify the QoS parameters related to specific service classes and evaluate their role in design of communication and media networks infrastructures

Competencies:

- Must have competencies in applying project- and team-based learning to complete a team project, including preparation of problem definition, coherent analysis and writing of a technical report with clear formulation of results and conclusions, and with proper use of source references
- Must have competencies in assessing the usefulness of different media and communication technologies in relation to different services and applications
- Must have the competencies in deploying the knowledge, skills and competencies acquired in the course Communication and Media Technologies while developing this project

Type of instruction:

Students will do their project work in groups. The groups will receive instruction and feedback from the teacher. In this project the groups choose either to implement a communication service or to analyse a concrete problem related to communication technologies.

Exam format: External. Oral examination based on a written project report. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Communication and Media Technologies
(Kommunikations- og medieteknologier)

Prerequisites:

Objectives:

The objective of this course is to give the students an understanding of the communication networks, technologies, architecture, topologies and standards, including the major technological components used in the communication networks. The aim is to have an understanding of the major parameters, which are decisive when constructing network infrastructures.

Students who complete the module:

Knowledge:

- Must have knowledge about the structure of a communication network, including the specific characteristics of communicative versus distributive networks
- Must have knowledge about different network topologies and architectures and their advantages and disadvantages in relation to specific applications
- Must have knowledge about the reference models used in communication networks, including the OSI and TCP/IP reference models
- Must have knowledge about different transmission media technologies
- Must have knowledge about different modulation technologies
- Must have knowledge about different multiplexing technologies
- Must have knowledge about radio propagation
- Must have knowledge about QoS parameters and services classes
- Must have knowledge about mobility issues in communication networks
- Must have knowledge about the main mobile and wireless communication standards
- Must have knowledge about the major media infrastructure technologies, including digital TV and radio

Skills:

- Must be able to specify the parameters influencing the coverage, capacity and QoS in communication networks
- Must be able to discuss mobility management within one network and between different networks
- Must be able to discuss the parameters affecting the development of mobile and wireless communication networks

Competencies:

- Must have competencies to combine the acquired knowledge and skills to develop a technical analysis related to a specific problem in communication networks

Type of instruction: Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.
Exam format: Internal. Written examination or Oral examination. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Course module:
Introduction to Economics
(Indledende økonomi)

Prerequisites:

Objectives:

The overall objective is to provide a basic understanding of key concepts in economic theory with emphasis on microeconomics.

Students who complete the module:

Knowledge

- Must have knowledge about the type of problems addressed by economic theory
- Must have knowledge about the market forces of supply and demand
- Must have knowledge about the different types of market structures
- Must have knowledge about the main cost concepts including short and long term aspects
- Must have knowledge about consumer and producer behaviour

Skills

- Must be able to apply economic theories and methodologies for analysing the markets for ICT services
- Must be able to apply a variety of economics concepts to both the business and individual decision making process
- Must be able to apply national account figures for a description of economic development
- Must be able to explain wage and price determination in an open economy
- Must be able to apply economics models to real world scenarios

Competencies

- Must have the competencies to discuss the changes in the ICT market
- Must have the competencies to discuss how differences in market structure affect price and output
- Must have the competencies to discuss the role of the competitive process
- Must be able to discuss the role of technical development in economic theory

Type of instruction:
Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal individual oral or written examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are stated in the Joint Programme Regulations.

Title:

Introduction to Probability and Applied Statistics

(Introduktion til sandsynlighedsregning og anvendt statistik)

Prerequisites:

The module builds on knowledge obtained in Calculus and Linear Algebra as taught at 1st and 2nd semester.

Objectives:

To introduce the student to concepts and ideas within statistics and how statistics can be applied to problems relevant to engineers in "ITCOM".

Students who complete the course module will obtain the following qualifications:

Knowledge:

- Must have knowledge about fundamental concepts in probability, including conditional probability and independence.
- Must have knowledge about discrete and continuous random variables and relevant properties of these.
- Must have knowledge about various examples of descriptive statistics, e.g. histograms and scatterplots.
- Must have knowledge about statistical inference, including estimation, confidence intervals and hypothesis testing.
- Must have knowledge about important statistical models, like linear regression (simple and multiple), analysis of variance, logistic regression and log-linear models (in particular contingency tables).

Skills:

- Must be able to, given specific data, specify a relevant statistical model and account for the assumptions and limitations of the chosen model.
- Must be able to use relevant software for carrying out the statistical analysis of given data and be able to interpret the results of the analysis.

Competencies:

- Must be able to judge the applicability of statistics within own area.
- Must be capable of performing a critical judgement of the results of a statistical analysis.
- Must be capable of communicating the results of a statistical analysis to people with no or little background within statistics.

Type of instruction:

Lectures in combination with practical exercises and self-study or similar.

Exam format: Internal. Oral or written examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

3.5 5th semester

Title:

Project in Application Development and Security
(Projekt i applikationsudvikling og sikkerhed)

Prerequisites:

The project builds on knowledge obtained in the projects included in 1st – 3rd semester.

Objectives:

To enable students to develop advanced secure applications and services based on state-of-the-art technologies and the knowledge and skills acquired during the previous semesters. The project should make use of solid skills in software engineering, network and media technologies, and analysis of user requirements in an organisation.

Students who complete the module:

Knowledge:

- Must have knowledge about computer networks and network protocols
- Must have knowledge of user interface design
- Must have knowledge about theories on knowledge sharing and knowledge management in an organisation
- Must have knowledge of security concepts

Skills:

- Must be able to understand information and communication needs in an organisation
- Must be able to develop applications using context information and media distribution
- Must be able to understand and overcome limitations of servers, networks and mobile terminals
- Must be able to make qualified decisions on client-server issues and choice of networks
- Must be able to include security elements in mobile and web-based applications, e.g., for mobile payment

Competencies:

- Must have competencies in identifying user needs in an organisation
- Must have competencies in combining a wide range of networks, technologies and devices in order to realize advanced and non-trivial applications and solutions
- Must have competencies in comparing and assessing the potential of different technologies, methods and approaches in order to make the proper design choices for optimum functionality

Type of instruction:

Students will do their project work in groups. The groups will receive instruction and feedback from the teacher.

Exam format: Internal. Oral examination based on a written project report. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Network and Application Security

(Netværks- og applikationssikkerhed)

Prerequisites:

Objectives:

Today any computer professional must have a basic knowledge about network security. This course will present a practical and theoretical survey of the basic concepts, principles and practice of cryptography and network security.

Students who complete the module:

Knowledge:

- Must be able to understand the basic concepts, principles and practice of cryptography and network security
- Must be able to understand professional articles and documentation concerning security issues
- Must have knowledge about where to get more information concerning security issues
- Must be able to understand the various threats, vulnerabilities and attack methods and the function and application of network components and applications used for countering threats
- Must be able to understand the various classes of cryptographic algorithms, explain their relative properties and the interplay of algorithms in network security applications and protocols
- Must be able to understand the methods for authentication of people, network traffic and systems in the covered protocols and applications
- Must be able to understand the typical content and best practices in a company's security policy

Skills:

- Must be able to design, realize and document a security solution in a network
- Must be able to apply tools for analysing and generating network traffic to study security protocols and to test, verify and document the implemented solution
- Must have the ability to take security issues into account when developing IT-systems

Competencies:

- Must have competencies in implementing security systems based on current best practices

Contents:

- Network Security, Cryptography: Symmetric Encryption, Asymmetric Encryption, Hash Functions. Network Security Applications: Authentication Applications, Electronic Mail Security, IP security, Web security.
- System Security: Intruders, Malicious Software, Firewalls, Intrusion Detection Systems, Security Policies.

Type of instruction:

Class teaching, lab exercises and one group project.

Approximately 60% of the time will be spent on lab exercises and the group project.
Exam format: Internal. Written or oral examination based on project. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Computer Networks and the Internet

(Computer-net og Internettet)

Prerequisites:

Basic programming experience in one programming language (C, C++, Java, etc.)

Objectives:

To enable the student to analyse network architectures, define protocols and analyse network traffic using protocol analysers like Wireshark / Ethereal.

Students who complete the module:

Knowledge:

- Must be able to understand concepts like protocol, congestion and flow control, fragmentation, addressing forms, byte stuffing and multiplexing /de-multiplexing
- Must have knowledge about mainstream network components like routers, switches, hubs and their use
- Must have knowledge about services provided by the most important protocols and explain the relations among the services provided and the content of the protocol header

Skills:

- Must be able to use FSM-diagrams and latter diagrams to design a protocol
- Must be able to use protocol analysers like Wireshark / Ethereal to analyse network traffic
- Must be able to discus and evaluate the use of a) addressing forms, b) forward error correction versus error detection, c) stability of routing algorithms, d) explicit and implicit congestion control, e) available standards for local area networks (wired as wireless), f) implications on higher protocol layers of the NAT protocol, and g) IP4 versus IP6
- Must be able to implement, document and demonstrate a product that fulfils the requirement specification
- Must be able to identify, execute and document relevant tests for the developed product
- Must be able to demonstrate and document the ability to identify the major problem areas and the ability to carry out a systematic reduction into well-defined sub problems
- Must be able to identify and execute measurements and experiments for further reduction of uncertainties within the problem areas
- Must be able to create alternative models for the solutions. Select a particular solution based on a documented evaluation of the alternatives

Competencies:

- Must be able to use network principles and methods for design of protocols to analyse subjects related to computer networks

Contents:

Basic architecture: Computer Networks and the Internet

Application layer: HTTP, FTP, SMTP, POP3, DNS and socket programming.

Transport layer: TCP and UDP.

Network layer: IP, ICMP, NAT, Routing Algorithms and Routers.

Data Link Layer: Ethernet, Wireless LAN, Bridges, Switches and Hubs.

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

ICT in Organizations

(IKT i organisationer)

Prerequisites:

Objectives:

The purpose of this module is for the students to develop a theoretical understanding and practical skills and competences concerning the implementation and use of information and communication technologies as a means in managing organizations and private companies.

Students who complete the module:

Knowledge:

- Must have knowledge about theories on organizations and communities
- Must have knowledge about theories regarding the management of distributed organizations and communities
- Must have knowledge about theories on knowledge sharing and management
- Must have knowledge about drivers and barriers concerning the implementation of information technology systems in organizations
- Must have knowledge about needs and use of ICT systems in different kinds of organisations
- Must have knowledge about basic e-business concepts

Skills:

- Must have skills in the use and application of different relevant information technology systems
- Must have basic skills in analysing organizational structures

Competencies:

- Must demonstrate competences in the identification and analysis of the organizational requirements for knowledge and information sharing
- Must have competences in describing and discussing the challenges in sharing information and knowledge via information technology systems
- Must have competences in choosing and describing knowledge and information for IT based system
- Must have acquired competences in choosing relevant technology systems
- Must have competences in applying the acquired knowledge and skills on specific company cases

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: External. Written or oral exam or mandatory assignments. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

3.6 6th semester

Title:
BSc Project
(Bachelorprojekt)

Prerequisites:
The module builds on knowledge obtained in the 1st - 5th semester.

Objectives:
To demonstrate the total acquired knowledge, skills and competencies as described for this bachelor study program (cf. chapter 2 and 3 of this document).

Students who complete the project:

Knowledge:

- Must have knowledge of how to design and develop a solution to an ICT related problem serving the needs of the end user

Skills:

- Must be able to identify organizational, market and legal implications of a given solution to a problem

Competencies:

- Must show command of the competencies acquired in the semesters 1-5

Type of instruction:
Students will work individually or in groups. The students will receive instruction and feedback from the teacher.

Exam format: External. Assessment is based on a written report and oral presentation. If a project includes development of a prototype, this shall be demonstrated during the examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Internet of Things

(Internet of Things)

Prerequisites:

Objectives:

Students who complete the module:

Knowledge

- Must have knowledge of sensor node technology
- Must have knowledge of hardware architectures for wireless sensor networks.
- Must have knowledge of pperating systems for wireless sensor networks and their respective design issues
- Must have knowledge of IEEE 802.15 standard and communication technologies associated with it Low Energy Bluetooth, ZigBee, Z-wave, etc.
- Must have an understanding of short range communication standards like – Radio-frequency identification (RFID) and Near Field Communication (NFC)
- Must have detailed knowledge of protocols used in different layers, eg., Medium Access Control (MAC) protocols, routing protocols, transport control protocols
- Must have knowledge of Network management for Wireless Sensor Networks
- Must have knowledge of different security mechanisms used today for maintaining the confidentiality, integrity and authenticity of the data, sensor nodes and the networks

Skills

- Must have skills to design sensor networks based on requirements
- Must be able to monitor and manage sensor data
- Must be able to identify vulnerabilities in the system
- Must be able to propose efficient techniques for routing and handling of data

Competencies

- Must be able to successfully combine hardware, embedded software, web services and create systems that are interactive and practical
- Must be able to apply the theories and tools for Internet of Thing (IoT) in specific application areas
- Must have competencies to set some design rules, protocols for IoT architecture

Type of instruction: Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Technology and Society
(Teknologi og samfund)

Prerequisites:

Objectives:

The purpose of this module is for the students to acquire a basic theoretical understanding and empirical knowledge regarding the social conditions for technology development and the broader societal implications of technology implementation and use specifically with respect to communication and media technologies.

Students who complete the module:

Knowledge:

- Must have knowledge of theories concerning the drivers of technology development, technology innovation and technology paths
- Must have knowledge of theories concerning the relationship between technology, economy and policy developments
- Must have knowledge of theories concerning invention, innovation and diffusion
- Must have knowledge of theories regarding technological paradigms
- Must have knowledge of theories regarding the social construction of technologies and stakeholder analysis
- Must have knowledge of the history of technology development specifically in the field of transport and communication technologies

Skills:

- Must have skills in identifying the relationships between technology, economic and policy developments regarding specific technology developments
- Must have skills in performing a basic technology assessment analysis
- Must have skills in performing a stakeholder analysis

Competencies:

- Must demonstrate competences in identifying different theoretical approaches to the analysis of technology developments in a societal framework
- Must have competences in choosing and combining relevant theoretical frameworks for the analysis of technology developments at a micro and macro level
- Must have competences in differentiating between social conditions for technology developments and implications of technology development

Contents:

This module concerns the relationships between technology and societal developments primarily from a macro perspective. It provides the students with a historic and contemporary overview of technology developments in the information and communication technology area. It, furthermore, provides the students with theoretical approaches to understanding such technology developments.

Type of instruction: Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.
Exam format: Internal. Written or oral exam or mandatory assignments. The assessment is performed in accordance with the 7-point scale.
Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Business Law
(Forretningsjura)

Prerequisites:

Objectives:

To give the students an introduction to the Danish/ EU legal instruments and law relevant for the IT, communication and media industry and other businesses, so they can identify and deal with legal issues in a timely manner.

Students who complete the module:

Knowledge:

- Must have insight at overview level in selected Danish/ EU laws
- Must have basic knowledge about the legal aspects of setting up a business or a public limited liability company in Denmark
- Must have basic knowledge about the relation between Danish and EU law
- Must have knowledge about commercial law, company law, and the sale of goods act
- Must have knowledge about public procurement law and marketing law
- Must have knowledge about IT contract and regulation of intellectual property rights (IPR)

Skills:

- Must be able to present basic legal problems related to the laws above
- Must be able to present relevant contractual documents in company including employee contracts and contracts between business partners
- Must be able to understand public procurement procedures

Competencies:

- Must be able to identify the relevant legal aspects related to development and market introduction of a given communication, media and information technology and other businesses

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination based on a synopsis. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Title:

Introduction to Engineering Psychology

(Introduktion til engineering-psykologi)

Prerequisites:

Objectives:

Within Engineering Psychology one of the important pillars is to assess the performance of products in relation to human use of them. To do this in a qualified way, students should acquire knowledge of the psychological factors that come into play and gain experience in experiment design and export, as well as analysis and treatment of experiment data.

The students who complete the course module:

Knowledge:

- Must have knowledge of the Engineering Psychology main courses from experimental psychology, and an understanding of relevant methods from experimental psychology
- Must have knowledge about designing scientific experiments and analyse the data collected through this
- Must understand empiricism and hypothesis formation

Skills:

- The student must be able to apply theories and techniques for the design of scientific experiments
- The students must able to use statistical data analysis methods and establish relationships and patterns between the experimental variables
- Students must be able to combine psychological theories and experimental design methods to investigate human experience and understanding of the outside world

Competencies:

- Students will be able to formulate and evaluate hypotheses concerning the relationship and difference between experimental variables
- The students have competencies in psychological theories and experimental conditions, and be able to relate and develop experimental paradigms and test hypotheses

Type of instruction:

Refer to the overview of instruction types listed in the start of chapter 3. The types of instruction for this course are decided according to the current Joint Programme Regulations and directions are decided and given by The Study Board of Electronics and IT.

Exam format: Internal. Written or oral examination. The assessment is performed in accordance with the 7-point scale.

Evaluation criteria: Are mentioned in the Joint Programme Regulations.

Chapter 4: Entry into Force, Interim Provisions and Revision

The curriculum is approved by the Dean of The Technical Faculty of IT and Design and enters into force as of September 2017 for students commencing 1st and 3rd semester.

Students enrolled on the previous curriculum from 2015 must conclude their education by the summer examination period in 2018 at the latest, since examinations under the previous curriculum are not offered after this time.

Chapter 5: Other Provisions

5.1 Rules concerning written work, including the Bachelor's project

In the assessment of all written work, regardless of the language it is written in, weight is also given to the student's spelling and writing ability, in addition to the academic content. Orthographic and grammatical correctness as well as stylistic proficiency are taken as a basis for the evaluation of language performance. Language performance must always be included as an independent dimension of the total evaluation. However, no examination can be assessed as 'Pass' on the basis of good language performance alone; similarly, an examination normally cannot be assessed as 'Fail' on the basis of poor language performance alone.

The study board can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Bachelor's project must include an English summary.[1] If the project is written in English, the summary must be in Danish.[2] The summary must be at least 1 page and not more than 2 pages (this is not included in any fixed minimum and maximum number of pages per student). The summary is included in the evaluation of the project as a whole.

5.2 Rules concerning credit transfer (*merit*), including the possibility for choice of modules that are part of another program at a university in Denmark or abroad

In the individual case, the study board can approve successfully completed (passed) program elements from other Master's programs in lieu of program elements in this program (credit transfer). The study board can also approve successfully completed (passed) program elements from another Danish program or a program outside of Denmark at the same level in lieu of program elements within this curriculum. Decisions on credit transfer are made by the study board based on an academic assessment. See the Joint Programme Regulations for the rules on credit transfer.

5.3 Rules concerning the progress of the Bachelor's program

The student must participate in all first year examinations by the end of the first year of study in the Bachelor's program, in order to be able to continue the program. The first year of study must be passed by the end of the second year of study, in order that the student can continue his/her Bachelor's program.

In special cases, however, there may be exemption from the above if the student has been on a leave of absence. Leave is granted during first year of study only in the event of maternity, adoption, military service, UN service or where there are exceptional circumstances.

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[1] Or another foreign language (French, Spanish or German) upon approval by the Board of Studies.

[2] The Board of Studies can grant exemption from this.

5.4 Rules for examinations

The rules for examinations are stated in the Examination Policies and Procedures published by The Technical Faculty of IT and Design on their website.

5.5 Exemption

In exceptional circumstances, the study board can grant exemption from those parts of the curriculum that are not stipulated by law or ministerial order. Exemption regarding an examination applies to the immediate examination.

5.6 Rules and requirements for the reading of texts

At programs that are taught in Danish, it is assumed that the student can read academic texts in modern Danish, Norwegian, Swedish and English and use reference works, etc., in other European languages. At programs taught in English, it is assumed that the student can read academic text and use reference works, etc., in English.

5.7 Additional information

The current version of the curriculum is published on the study board's website, including more detailed information about the program, including exams.