



Curriculum for the Master's Programme in Engineering Psychology

Aalborg University
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Preface:

Pursuant to Act 261 of March 18, 2015 on Universities (the University Act) with subsequent changes, the following curriculum for the Master's programme in Engineering Psychology is stipulated. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Technical Faculty of IT and Design.

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Chapter 1: Legal Basis of the Curriculum, etc.

1.1 Basis in ministerial orders

The Master's programme in Engineering Psychology is organised in accordance with the Ministry of Higher Education and Science's Order no. 1328 of November 15, 2016 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 258 of March 18, 2015 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

1.2 Faculty affiliation

The Master's programme falls under the Technical Faculty of IT and Design, Aalborg University.

1.3 Board of Studies affiliation

The Master's programme falls under the Board of Studies for Electronics and IT.

1.4 Body of External examiners

The programme is affiliated with the body of external examiners for engineering educations: electro (In Danish: censorkorps for Ingeniøruddannelsernes landssækkende censorkorps; elektro).

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

2.1 Admission.

Applicants with a legal claim to admission (retskrav):

Applicants with one of the following degrees are entitled to admission:

- Bachelor of Science in Engineering Psychology, Aalborg University

Applicants without legal claim to admission:

Students with another Bachelor's degree, upon application to the Board of Studies, will be admitted after a specific academic assessment if the applicant is deemed to have comparable educational prerequisites. The University can stipulate requirements concerning conducting additional exams prior to the start of study

2.2 Degree designation in Danish and English

The Master's programme entitles the graduate to the designation *civilingeniør, cand.polyt.* (candidatus/candidata polytechnices) i produkt- og designpsykologi. The English designation is: Master of Science (MSc) in Engineering (Engineering Psychology).

2.3 The programmes specification in ECTS

The Master's programme is a 2-year, research-based, full-time study programme. The programme is set to 120 ECTS credits

2.4 Competence profile on the diploma

The following competence profile will appear on the diploma:

A Candidatus graduate has the following competency profile:

A Candidatus graduate has competencies that have been acquired via a course of study that has taken place in a research environment.

A Candidatus graduate is qualified for employment on the labour market on the basis of his or her academic discipline as well as for further research (PhD programmes). A Candidatus graduate has, compared to a Bachelor, developed his or her academic knowledge and independence so as to be able to apply scientific theory and method on an independent basis within both an academic and a professional context.

2.5 Competence profile of the programme:

The graduate of the Master's programme:

Knowledge

- Has a broad knowledge of theories, methods and practices associated with the professions of engineering.
- Has knowledge of theories and methods within psychology.
- Has knowledge in selected areas, that is based on the highest international research in a subject area.
- Can understand and, on a scientific basis, reflect upon knowledge and identify scientific problems.

Skills

- Excels in scientific methods, tools and general skills related to employment within engineering psychology.
- Is on a scientific basis able to apply theories, methods, tools and skills associated with employment within the fields of engineering psychology.
- Can on a scientific basis advance new theories and methods.
- Is able to assess theoretical and practical problems and to select and motivate relevant solutions on the basis of scientific method.
- Can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-specialists.

Competencies

- Can manage work and development situations that are complex, unpredictable and require new solutions.
- Can in a professional and independent manner participate in professional and interdisciplinary cooperation in the fields of engineering, design and psychology
- Can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility.
- Can independently take responsibility for own professional development and specialisation.
- Possesses high-level professional competencies in the intersection between the disciplines of, engineering, design and psychology.

Chapter 3: Content and Organization of the Programme

The programme is structured in modules and organised as a problem-based study. A module is a programme element or a group of programme 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. Examinations are defined in the curriculum.

The programme 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)
- teacher feedback
- reflection
- portfolio work

Overview of the programme:

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).

Semester	Module	ECTS	P/C *)	Assessment	Exam	
1.	Investigation of Subjective Experiences **)	15	P	7-point scale	Internal	
	Advanced Cognitive Psychology	5	C	Pass/Fail	Internal	
	Applied Experimental Psychology and Psycho-physics	5	C	7-point scale	Internal	
	Select 1	Computer Graphics Programming (elective)	5	C	7-point scale	Internal
		Machine Learning (elective)	5	C	7-point scale	Internal
		Prototyping and Fabrication Techniques (elective)	5	C	Pass/Fail	Internal
		User Experience Design for Multi-modal Interaction (elective)	5	C	Pass/Fail	Internal
2.	Interaction	15	P	7-point scale	External	
	Applied Cognitive Psychology and Experimental Social Psychology	5	C	7-point scale	Internal	
	Profiling in Engineering Psychology	5	C	Pass/Fail	Internal	
	Select 1	Image Processing and Computer Vision (elective)	5	C	7-point scale	Internal
		Human Sound Perception and Audio Engineering (elective)	5	C	Pass/Fail	Internal
3.	Applied Engineering Psychology	30	P	7-point scale	Internal	
4.	Master's Thesis	30, possible 60	P	7-point scale	External	
Total		120				

*) **P = Project** - **C = Course**

**) A compulsory course in Problem Based Learning (PBL) is offered as an integrated part of the project module to non-AAU bachelors. If non-AAU students get credit transfer for the 1st semester project module, then it has to be ensured that they get the PBL competences in other ways.

Description of modules

1st Semester

Investigation of Subjective Experiences (P) (15 ECTS)

Undersøgelser af subjektive indtryk

Purpose:

The project unit will support students in achieving deeper knowledge and skills in cognitive psychology of perception and use this knowledge to concrete problems.

Objective:

Students who complete the module:

Knowledge

- Understand methods to measure and transform subjective impression.
- Understand the perceptual and cognitive problems and use these in the project.

Skills

- Could use methods to measure and transform subjective impression.
- Could communicate scientific work in the form of a scientific paper and poster in English.

Competencies

Can synthesize the above information through the design, execution and statistical analysis of user experiments and/or psychophysical experiments

Can

- Design and prototype manufacture a product that enhances the interaction between users and the technical system by incorporating advanced knowledge of perception, cognition and/or emotion psychological aspects gained through the design, execution and evaluation of one or more usability test, where the interaction between users and technical systems are analysed.

or

- Clarify the human perceptual or cognitive performance in one or more modalities and report this for basic scientific use or in relation to specific applications.

Type of instruction:

The project is documented by:

- A scientific paper, written in English
- A poster, also in English
- Edited worksheets documenting the various project details

Exam format:

Individual oral examination based on the project documentation

Evaluation criteria:

As stated in the Joint Programme Regulations, it is a precondition for students, with a non-AAU bachelor's degree that they have passed the course in Problem Based Learning (PBL) at Aalborg University prior to the project examination.

Problem Based Learning (PBL) at Aalborg University

Problembaseret læring på Aalborg Universitet.

Prerequisites:

None, but the course is compulsory for non-AAU bachelors

Learning outcomes:

After completion of the course the student should

Knowledge:

- Know how to describe in own words some of the fundamental principles of Problem Based Learning (PBL) as implemented in the Aalborg PBL model at the Faculty of Engineering and Science.
- Know how to identify similarities and differences between the Aalborg PBL study environment and previous study environments, incl. strengths and weakness in bot environments

Skills:

- Be able to structure project management activities based on a well-formulated problem statement
- Be able to access project documentation based on scientific codes of conduct

Competences:

- Be able to plan for effective collaborative learning in an intercultural environment and manage group conflicts
- Be able ot reflect on, plan and manage a study project in a PBL learning environment

Content:

Lectures, discussions and group work. The course will take place during three Wednesday afternoons.

Assessment:

Internal assessment during the course/class participation according to the rules in the Examination Policies and Procedures, Addendum to the Joint Programme Regulations of the Technical Faculty of IT and Design, Aalborg University. In this case the assessment is primarily based on the oral performance during the course. This means that the student has to be active during the course time and participate in discussions. The course is an integrated part of the project and a precondition for participation in the project examination for non-AAU bachelors. Consequently, no diploma will be issued for the course nor will it appear on the academic transcripts.

Grading:

Passed/Failed

Assessment criteria:

As stated in the Joint Programme Regulations

Advanced Cognitive Psychology (C) (5 ECTS)

Udvidet kognitionspsykologi

Prerequisites:

Basic knowledge in General and Cognitive Psychology (Almen- og kognitionspsykologi)

Purpose:

The course aims to support the study of personal experience in relation to design of user interfaces through personal experiences conscious expression and function. Experience is here defined narrowly as perception, memory, emotions, thinking, self and motivation.

Objective:

Students who complete the module:

Knowledge

- Have elaborated understanding of cognitive approaches, concepts and methods
This knowledge should be, but not necessarily limited to:
 - knowledge of perception
 - knowledge about memory, recollections and Self
 - knowledge of motivation and emotion psychology
 - knowledge of basic themes, and classic and modern theories
 - knowledge of empirical studies of particular relevance for the field

Skills

- Can apply this knowledge to relate constructively to theory and empirical.
- Can apply this knowledge to explore concrete everyday phenomena.
- Can apply this knowledge in the design of user interfaces.

Competencies

- Can relate to different ethical theory approaches cognitive psychology.
- Can deal independently and critically to theoretical and practical approaches.
- Can apply the acquired knowledge in practical and relevant contexts.

Type of instruction:

As described in the introduction to Chapter 3.

Exam format:

Individual oral or written examination

Evaluation criteria:

As stated in the Joint Programme Regulations

Applied Experimental Psychology and Psycho-physics (5 ECTS)

Anvendt eksperimentalspsykologi og psykofysik

Prerequisites:

Basic Statistics and Probability Theory

Objective:

Students who complete the module:

Knowledge

Must have knowledge of the psychophysical methods that can be used to measure human perception, cognition, and performance, including:

- Threshold and comparison methods
- Quantitative methods for measuring psychophysical responses including, nominal, ordinal, interval and ratio scales.
- Transformation of data to relevant scales. Normalization and standardization.
- Comparative and non-comparative scaling: paired comparison and semantic differential techniques.
- Probabilistic choice models for paired comparison (BTL), and the concept of transitivity.
- Descriptive analysis, including selection and use of censor panels for scaling experiments, word elicitation, selection, scaling and analysis.
- Practical design of scales.
- Design of scaling experiments.
- Factor analysis.

Skills

The students must be able to:

- Carry out measurement and scaling of psychophysical responses.
- Use statistical software for analysis of the results.

Competencies

- Can choose the appropriate psychophysical method for a given problem.
- Have experience carrying out experiments using appropriate methods.
- Can analyse the results from experiments using appropriate statistical methods.

Type of instruction:

Lectures followed by exercises and/or lab-work.

Exam format:

Individual oral or written examination.

Evaluation criteria:

As stated in the Joint Programme Regulations

Computer Graphics Programming (C) (Elective) (5 ECTS)

Computer grafikprogrammering

Prerequisites:

Basic knowledge in Linear Algebra

Purpose:

The course provides an introduction to real-time computer graphics concepts and techniques. The course focuses on programmable functionalities as offered by graphics APIs, supplemented with a presentation of the relevant underlying theories. The course also introduces the concepts of Virtual Reality and Augmented Reality, and how computer graphics is used in the context of these application areas.

Students who complete the module:

Knowledge

- Can describe the programmable graphics rendering pipeline as exposed for example by OpenGL.
- Can explain relevant mathematical transformations, including rotations, translations and projections in terms of matrix operations in homogeneous coordinates.
- Can explain real-time local illumination models, in particular the Phong reflection model, including the use of linearly interpolated attributes (colors and surface normals.)
- Can explain rasterization techniques, including texture mapping (diffuse reflection maps, gloss maps, environment/reflection maps), framebuffer operations (blending, stencil tests, depth tests), and anti-aliasing techniques (super-sampling, mip-map texture filtering).
- Can describe interpolation with Bezier and Hermite curves.
- Can describe the concepts of Virtual Reality and Augmented Reality, including relevant display technologies.
- Can discuss central issues relating to Virtual and Augmented Reality, including tracking, interaction possibilities, and degrees of realism.

Skills

- Can apply a graphics API such as OpenGL for procedurally generating and interactively controlling three-dimensional content.
- Can program simple vertex and fragment shaders (e.g. implementing per-vertex diffuse lighting and normal mapping).

Competencies

- Can learn further graphics APIs (such as Direct3D, OpenGL ES, SVG, X3D, WebGL in HTML5), game engines and APIs for user interaction.

Type of instruction:

As described in the introduction to Chapter 3.

Exam format:

Individual oral or written examination

Evaluation criteria:

As stated in the Joint Programme Regulations

Machine Learning (C) (Elective) (5 ECTS)

Machine learning

Prerequisites:

Basic knowledge in Probability Theory, Statistics, and Linear Algebra

Purpose:

The course gives a comprehensive introduction to machine learning, which is a field concerned with learning from examples and has roots in computer science, statistics and pattern recognition. The objective is realized by presenting methods and tools proven valuable and by addressing specific application problems.

Students who complete the module:

Knowledge

- Have knowledge about supervised learning methods including K-nearest neighbours, decision trees, linear discriminant analysis, support vector machines, and neural networks.
- Have knowledge about unsupervised learning methods including K-means, Gaussian mixture model, hidden Markov model, EM algorithm, and principal component analysis.
- Have knowledge about probabilistic graphical models, variational Bayesian methods, belief propagation, and mean-field approximation.
- Have knowledge about Bayesian decision theory, bias and variance trade-off, and cross-validation.
- Understand reinforcement learning.

Skills

- Can apply the taught methods to solve concrete engineering problems.
- Can evaluate and compare the methods within a specific application problem.

Competencies

- Can analyse a given problem and identifying appropriate machine learning methods to the problem.
- Can demonstrate understanding of the strengths and weaknesses of the methods.

Type of instruction:

As described in the introduction to Chapter 3

Exam format:

Individual oral or written examination

Evaluation criteria:

As stated in the Joint Programme Regulations

Prototyping and Fabrication Techniques (C) (Elective) (5 ECTS)

Prototyping og fremstillingsteknikker

Purpose:

In order to be part of a leading design team, it is essential to be able to develop and communicate new interaction design concepts for the implementation and production of future electronic devices. The course rationale is that students need to have an understanding of physical interaction design processes, where ideas are formed, developed and tested in proof-of-concept models that can be demonstrated to others via video, poster presentations, and working prototypes. The focus is on understanding and applying design and development strategies needed to move from concept to working prototype, with the most recent tools and techniques for producing new forms, input/output from computers and embedded systems, and interactive systems and devices. The course incorporates advanced fabrication techniques; students should be able to build a prototype for any concept they can imagine. By incorporating computer-assisted industrial and electronic design techniques, knowledge about specific design tools and procedures is gained. In order to be able to apply this knowledge, a thorough understanding of the many underlying concepts is required.

Students who complete the module:

Knowledge

- Have knowledge about various approaches to Concept Design methodologies.
- Have knowledge about standard methods and techniques for prototyping of new devices and systems.
- Understand the relationship between concept development and implementation/fabrication, specifically regarding research-based prototyping techniques

Skills

- Can apply concept design methods and prototyping techniques to real world scenarios involving fabrication of objects or systems with intended functionalities (e.g. responsive environments, interactive games, robots, musical interfaces, public installations, etc.)
Specific skills to be gained by the student may include many of the following:
 - Knowledge of concept development techniques
 - Knowledge of modelling and design tools
 - Knowledge of rapid prototyping techniques
 - Understanding advanced microcontroller programming
 - Understanding sensors, actuators, and displays
 - Understanding wired and wireless communication protocols
 - Understanding 3D input devices and haptics
 - Understanding iterative development (redesign/polish of product)
 - Understanding circuit design (schematic to printed circuit board)
 - Understanding Field Programmable Gate Arrays

Competencies

- Can analyse a problem, design a solution and translate it into a rapid prototyping design.
- Can analyse his/her solutions in order to compare and assess the potential of different concept design methods and prototyping techniques, iteratively making the proper design choices.
- Can synthesize results and concepts in a professional way equivalent to practices in both academic and industrial contexts.

Type of instruction:

The types of instruction for this course are decided in accordance with the current Joint Programme Regulations and directions are decided and given by the Study Board for Media Technology.

Exam format:

Individual oral or written examination

Evaluation criteria:

As stated in the Joint Programme Regulations

User Experience Design for Multi-modal Interaction (C) (Elective) (5 ECTS)

Design af brugeroplevelsen for multi-modal interaktion

Prerequisites:

Basic knowledge in Interaction Design and Usability

Purpose:

This course trains students to research, analyse, prototype, and conceptualize design considering all system aspects including the social and cultural contexts of use. The course gives a comprehensive knowledge about user involvement in the design process going beyond traditional methods such as usability lab testing.

The objectives are realized by presenting methods and tools in a case based framework and through the student's active participation in workshops and assignments.

Students who complete the module:

Knowledge

- Have knowledge about system design methods including the social and cultural contexts of use.
- Have knowledge derived from sociological and ethnographic fields for user behavior research.
- Have knowledge about qualitative research methods involving end users in the field, such as interview techniques and analysis and experience sampling.
- Have knowledge about scenario-based design methods.
- Have knowledge about principles for multi modal interaction design.
- Have knowledge about methods for multi modal evaluation and field studies.

Skills

- Can apply the taught methods to solve concrete design problems.
- Can evaluate and compare and apply the methods for a specific design problem.
- Can facilitate the design process involving users in real-life contexts.

Competencies

- Can decide how to choose the appropriate methods to suit different dimensions of a design problem at different stages in the process and the pitfalls of each approach.
- Understand the strengths and weakness of the methods.
- Can facilitate the design process involving users in contexts.

Type of instruction:

As described in the introduction to Chapter 3.

Exam format:

Individual oral or written examination.

Evaluation criteria:

As stated in the Joint Programme Regulations

2nd Semester

Interaction (P) (15 ECTS)

Interaktion

Purpose:

The project aims to create or explore an interaction. It could, for example be a man-machine interaction, a human-human interaction or human-machine-human interaction.

Objective:

Students who complete the module:

Knowledge

- Understand the fundamental aspects of the designed/examined interaction.
- Understand the psychological concepts that are either related to or possibly can describe the designed/examined interaction.
- Understand methods for the measurement of the designed/examined interaction influence on humans.

Skills

- Can design a prototype which is part of/or which can be used in connection with the designed/investigated interaction.
- Can measure on the designed/examined interaction with an aim of investigating the influence on humans.
- Can with the relevant tools analyse the measured data from this could account for the interaction's influence on humans.

Competencies

- Can synthesize the above information into a holistic understanding of the designed/examined the interaction and its influence on humans.

Can

- Design and prototype manufacture a product using knowledge of applied cognitive psychology, to improve the human's experience of a product. The improvement of the interaction could be measured through various user experience tests where a later statistical analysis could give a concrete estimate of the interaction's influence on the user.

or

- Investigate a given interaction, in order to provide design guidelines, suggestions for improvement, or a design concept that can increase or improve the interaction's influence on the user.

Type of instruction:

Project work

- A report

or

- A scientific paper, in conjunction with edited work sheets documenting the various details of the project.

Exam format:

Individual oral examination based on the project

Evaluation criteria:

As stated in the Joint Programme Regulations

Applied Cognitive Psychology and Experimental Social Psychology (C) (5 ECTS)

Anvendt kognitionspsykologi og eksperimentel socialpsykologi

Prerequisites:

1st Semester

Purpose:

The student will work with various psychological problems as they reflected in technological interactive systems.

Objective:

Students who complete the module:

Knowledge

- Have knowledge and understanding of perception-cognition and emotion psychological theories including: affordance, branding process, primer demotions, problem solving and creativity.
- Have an understanding of the complex interplay between psychological dimensions of human interaction with technical systems.
- Have knowledge of the individual's dependence on its context.
- Have knowledge of the forces as leads, influences and motivates individuals and groups to choose, waive or alter attitudes, evaluations, preferences and behaviour.
- Have knowledge of relevant research methods, including the social psychological experiment, and qualitative research methods.

Skills

- Can identify and understand the psychological problems in technological interactive systems.
- Can identify and understand social psychological issues in technological interactive systems.

Competencies

- Can apply theoretical knowledge to analyse practical problems and synthesize solutions based on it.

Type of instruction:

As described in the introduction to Chapter 3.

Exam format:

Individual oral or written examination.

Evaluation criteria:

As stated in the Joint Programme Regulations

Profiling in Engineering Psychology (C) (5 ECTS)

Profilering i produkt- og designpsykologi

Purpose:

This module requires students to reflect on their previously acquired competences and to plan for further studies within topics of relevance to their interests and to their academic progression. Students have to complete a study within a self-chosen topic.

Objective

Students who complete the module should acquire the following (within engineering psychology)

Knowledge

- Have insight into recent theories, methods and results
- Can understand and reflect on theories, methods and practice
- Can identify relevant research topics

Skills

- Can find and evaluate relevant information
- Can advance own professional profile
- Can chose and use relevant theories, methods, tools and data within the field
- Can apply correct terminology in communication with fellow students, teachers, users and others.

Competencies

- Can take part in cross-disciplinary activities with a professional approach
- Can identify and pursue personal professional interests and goals
- Can plan and implement self-study activities
- Can give peers constructive criticism and can respond appropriately to criticism from peers.
- Can discuss professional progression within the module and in relation to the education

Type of instruction:

As part of the learning objectives students must plan the implementation of the module and have it approved by a supervisor/coordinator and by the study board.

The objectives of module can also be met by attending modules at other programs and possibly at other institutions. In such cases, students must follow the guidelines and meet the deadlines for pre-approval of credit transfer. The Study Board maintains a list of courses previously approved for credit transfer.

Exam format:

Individual oral or written examination

Evaluation criteria:

As stated in the Joint Programme Regulations

Image Processing and Computer Vision (C) (Elective) (5 ECTS)

Billedbehandling og computervision

Prerequisites:

Basic knowledge in Linear Algebra and Statistics

Purpose:

Cameras capture visual data from the surrounding world. Building systems which can automatically process such data requires computer vision methods. Students who complete the module will understand the nature of digital images and video and have an inside into relevant theories and methods within computer vision and an understanding of their applicability.

Students who complete the module:

Knowledge

- Have knowledge about the primary parameters of a camera system.
- Have knowledge about the representation and compression of digital images and video signal.
- Understand the general framework of image processing as well as the basic point and neighborhood operations, i.e., binarization, colour processing, BLOB analysis and filtering
- Can explain the principles behind invariant feature point descriptors such as SIFT and Harris corners.
- Have knowledge of different motion analysis methods, such as background subtraction and optical flow.
- Understand the tracking frameworks such as the Kalman filter, mean-shift and the particle filter.
- Understand different shape analysis methods such as active-shape models, procrustes, Hungarian method.

Skills

- Can apply stereo vision to generate 3D data from two or more cameras. This implies projective geometry, camera calibration, epipolar geometry, correspondence and triangulation.
- Can apply advanced 2D segmentation methods such as Hough transform, compound morphology, and histogram-of-oriented histograms.
- Can demonstrate understanding of error propagation techniques as a tool for performance characterization of computer vision based solutions.

Competencies

- Can learn further computer vision methods and theories, and select an appropriate solution for a given problem.

Type of instruction:

As described in the introduction to Chapter 3.

Exam format:

Individual oral or written examination.

Evaluation criteria:

As stated in the Joint Programme Regulations

Human Sound Perception and Audio Engineering (C) (Elective) (5 ECTS)

Menneskets lydopfattelse og audio teknik

Prerequisites:

Basic knowledge about Electronic Circuit Theory

Purpose:

Students who complete the module:

Knowledge

- Have knowledge about the anatomy and physiology of the human ear.
- Have knowledge about hearing diagnosis and disorders.
- Have knowledge about fundamental properties of human sound perception (e.g. Loudness, pitch, masking, spatial hearing and time / frequency resolution).
- Have basic knowledge in modern audio engineering including recording, reproduction and signal processing techniques (perceptive coding principles and formats, audio effects).
- Have knowledge about multi-channel recording, storage and reproduction of sound.
- Have knowledge about public address techniques.
- Have insight in digital audio interfaces and standards.
- Have insight in low noise audio design and interconnections.

Skills

- Can set up audio systems for recording or reproduction in an appropriate way to optimize the system and minimize noise.
- Can set up audio systems according to relevant standards.

Competencies

- Based on the acquired knowledge, the student should be able to critically evaluate systems and specifications within audio and acoustics with a basis in human sound perception.

Type of instruction:

As described in the introduction to Chapter 3.

Exam format:

Individual oral or written examination.

Evaluation criteria:

As stated in the Joint Programme Regulations

3rd Semester

Applied Engineering Psychology (P) (30 ECTS)

Anvendt produkt- og designpsykologi

Purpose:

The student obtains a deeper understanding of the use of product and design psychological methods through immersion in a selected area of concern.

Objective:

Students who complete the module:

Knowledge

- Have a deepened understanding of the use of product and design psychology methods

Skills

- Acquire knowledge on a chosen topic within the programmes core areas.
- Can analyse problems based on the product and design psychology.
- Can synthesize selected parts of a solution.

Competencies

- Can analyse a problem based in technical and psychological theories and methods
- Can prepare and document solutions – for example in the form of a prototype substantiated by experimental results.

Type of instruction:

The project unit must meet student's individual wishes to tailor their education. This may, for example, be done through internships, stays at other Danish or foreign universities. Alternatively, through a traditional project, supplemented by compound courses from existing courses in related educations.

Exam format:

Individual oral examination based on the project documentation.

Evaluation criteria:

As stated in the Joint Programme Regulations

4th Semester

Master's Thesis (P) (30, possibly 60 ECTS)

Kandidatspeciale

The master thesis can be conducted as a long master thesis. If choosing to do a long master thesis, it has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS.

Prerequisites:

Passed 1st -3rd Semester

Objective:

Students who complete the module:

Knowledge

- Have knowledge, at the highest international level of research, of at least one of the core fields of the education
- Have comprehension of implications of research (research ethics).

Skills

- Can reflect on a scientific basis on their knowledge.
- Can argue for the relevance of the chosen problem to the education including specifically account for the core of the problem and the technical connections in which it appears
- Can account for possible methods to solve the problem statements of the project, describe and assess the applicability of the chosen method including account for the chosen delimitation and the way these will influence on the results of the product
- Can analyse and describe the chosen problem applying relevant theories, methods and experimental data
- Can describe the relevant theories and methods in a way that highlights the characteristics and hereby document knowledge of the applied theories, methods, possibilities and delimitations within the relevant problem area
- Can analyse and assess experimental data, including the effect the assessment method has on the validity of the results.

Competencies

- Can communicate scientific problems in writing and orally to specialist and non-specialist.
- Can control situations that are complex, unpredictable and which require new solutions.
- Can independently initiate and to perform collaboration within the discipline and interdisciplinary as well, and to take professional responsibility.
- Can independently take responsibility for his or her own professional development and specialization.

If the project is carried out as a long master's thesis the learning objectives include those defined for the 3rd Semester of the education.

Type of instruction:

As described in the introduction to Chapter 3.

Problem based project oriented project work individual or in groups of 2-3 persons

Exam format:

Individual oral examination based on a written report.

Evaluation criteria:

As stated in the Joint Programme Regulations

Chapter 4: Entry into Force, Interim Provisions and Revision

The curriculum is approved by the Dean of the Faculty of Engineering and Science and enters into force as of September 2017.

Students who wish to complete their studies under the previous curriculum from September 2012 must conclude their education by the summer examination period 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 Master's Thesis

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 formulation 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 Board of Studies can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Master's thesis 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. 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 programme at a university in Denmark or abroad

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

5.3 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.

5.4 Exemption

In exceptional circumstances, the Board of Studies study 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.

5.5 Rules and requirements for the reading of texts

It is assumed that the student can read academic texts in his or her native language as well as in English and use reference works etc. in other European languages.

¹ Or another foreign language (upon approval from the Board of Studies)

² The Board of Studies can grant exemption from this.

5.6 Additional information

The current version of the curriculum is published on the Board of Studies' website, including more detailed information about the programme, including exams.

