



Curriculum for the Master's Programme in Industrial Design Cand.scient.tech.

Aalborg University
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Preface

Pursuant to Act 960 of August 14, 2014 on Universities (the University Act) with subsequent changes, the following curriculum for the Master's programme in Industrial Design is stipulated. The programme also follows the Framework Provisions and the Examination Policies and Procedures for the Faculty of Engineering and Science.

Commencement of this curriculum is 1. September 2015.

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Chapter 1: Legal Basis of the Curriculum

1.1 Basis in ministerial orders

The Master's programme in Industrial Design is organized in accordance with the Ministry of Higher Education and Science's Ministerial Order no. 1520 of December 16, 2013 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) and Ministerial Order no. 670 of June 19, 2014 on University Examinations (the Examination Order) with subsequent changes. Further reference is made to Ministerial Order no. 1488 of December 16, 2013 (the Admission Order) and Ministerial Order no. 250 of March 15, 2007 (the Grading Scale Order) with subsequent changes.

1.2 Faculty affiliation

The Master's programme falls under the Faculty of Engineering and Science, Aalborg University.

1.3 Board of Studies affiliation

The Master's programme falls under the Board of Studies for Architecture and Design, School of Architecture, Design and Planning.

1.4 Censorship

The Master's program falls under the Danish "Ingeniøruddannelsernes landsdækkende censorkorps".

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

2.1 Admission

Admission to the Master's programme in Industrial Design requires a Bachelor of Science (BSc) in Engineering (Architecture and Design).

All students applying must document English language qualifications comparable to an 'English B level' in the Danish upper secondary school (minimum average grade 02).

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:

Cand.scient.tech. i industrielt design / Master of Science (MSc) in Technology (Industrial Design)

2.3 The programme's specification in ECTS credits

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 graduate of the Master's programme has competencies acquired through an educational program that has taken place in a research environment.

The graduate of the Master's programme can perform highly qualified functions on the labor market on the basis of the educational programme. Moreover, the graduate has prerequisites for research (a Ph.D. programme). Compared to the Bachelor's degree, the graduate of the Master's programme has developed her/his academic knowledge and independence, so that the graduate can independently apply scientific theory and method in both an academic and occupational/professional context.

2.5 Competence profile of the programme:

The graduate of the Master's programme:

Knowledge

- Must have a broad knowledge of theories, methods and practices associated with the professions of engineering, architecture and design combined with a knowledge of methods and practices associated with the professionalisms of engineering, architecture and design ranging from the design component to the building section to the city as a whole
- Must have advanced knowledge of analytical approaches to technical and societal aspects 'of the profession
- Must have a broad knowledge of both analogue and digital tools for the development and representation of design
- Must have extensive knowledge of the methods and theories of engineering related design applied to the styling of design components, building parts, buildings and entire building

developments

- Must have an advanced knowledge of periods, theories, works and principal figures in the history of general design
- Must be able to account for research and practice based knowledge about the field of industrial design in an integrated engineering perspective and is able to reflect and communicate this
- Must be able to understand and explain systematic and scientific rigor, as applied in engineering sciences and be able to apply these in reasoning and methodological reflection in and on the process of development
- Must be able to explain, analyse, apply and reflect on a creative combinations of methods, technologies and approaches from various engineering fields in order to create new solutions
- Must have a broad cross disciplinary insight in Industrial design engineering design processes and business processes and how to manage these

Skills

- Must be able to demonstrate the ability to make advanced integrated design* proposals at different scales
- Must be able to practically apply theories, methods and tools within industrial design and to apply skills associated with employment within the fields of engineering and architecture on a scientific basis
- Must be able to assess theoretical and practical problems and to select and motivate relevant solutions in architecture, design and engineering on the basis of scientific methods
- Must be able to communicate disciplinary problems and solutions to both peers and non-specialists as well as to collaborators and users, and to analyse and understand the connections between design, architecture, cities and society as a whole
- Must be able to apply advanced theories and methods in technical fields of knowledge such as planning, construction, technique and climatology
- Must excel in organizing the design process, from the strategic scope to construction and product maturation, adjusting the approach to the demands of the situation
- Must excel in revealing and integrating explicit or tacit user needs and synthesize these needs and market opportunities into innovative integrated solutions**, in non-standard situations with complex and ill-defined problems
- Must be able to design by integrating a desired expression and experience through form and function into technical sound products, constructions and solutions, with due consideration to state of the art technology, manufacturing abilities, costs and configuration of supply chain
- Must be able to apply scientific methods and techniques in the development of products*** and in doing research that may contribute to research projects and to the development of new knowledge and new business opportunities
- Must demonstrate high skills in communicating complex problems and solutions to both peers and non-specialists

* Integrated Design: The process is fundamentally a technical and scientific product development process, in which analysis and synthesis of social and human science aspects in relation to needs, sales and use of products and solutions are systematically and methodically integrated through external validation and abductive reasoning, capable of handling wicked problems and open-ended processes..

** Solution: Refer to a broader proposal encompassing business modelling, strategies, network organisation and possible service elements

*** Products: Broader interpretation of a product and may include immateriel components

Competencies

- Must be able to handle and manage complex and development-oriented situations in relation to both study and work
- Must be able with a professional approach independently and with demonstrable overview to participate in professional and interdisciplinary cooperation in the fields of engineering, architecture and design
- Must be able to identify own learning needs and structure own learning in various learning environments with a view to solving new types of problems
- Must possess high-level professional competencies in the intersection between the disciplines of engineering, architecture and design
- Must be able to independently and professionally manage and facilitate a design process that integrates engineering disciplines in order to design innovative solutions that include both technical rigor and design features
- Must be able to recognize the relevant disciplines and aspects like functionality, technology, aesthetics, use, market and marketing, manufacturing, logistics, consumer, business and sustainability and is able to integrate and synthesise these aspects in the design and development of products
- Must be able to review and assess integrated solutions while taking into account both engineering, design and business perspectives

Chapter 3: Content and Organization of the Programme

The programme is structured in modules and organized as a problem-based study. A module is a program 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 organized 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 or by assessment by the supervisor only).

Industrial Design 1st to 4th semester

Semester		P= Project module C= Course modules	Module	ECTS	Assessment	Exam	
1 st		C	Integrated Design Theory and Methodology	5	Pass/Fail	Internal	
		C	Advanced Integrated Design: Pre-phase	5	7-point scale	Internal	
		C	Component Construction	5	7-point scale	Internal	
		C	Production and Economy	5	Pass/Fail	Internal	
		P	Corporate Product Development	10	7-point scale	Internal	
2 nd		C	Advanced Integrated Design: Business Development	5	7-point scale	Internal	
		C	Process Technology and Material Characteristics: Flexible Automation	5	Pass/Fail	Internal	
		C	Technology and Form	5	Pass/Fail	Internal	
		P	Sector Product Development	15	7-point scale	External	
3 rd	A <i>or</i>	a <i>or/and</i>	C	Project Management in Industrial Design Engineering and Research	5	Pass/Fail	Internal
		b <i>or/and</i>	C	Advanced Simulation Methods: Process Management	5	Pass/Fail	Internal
		c <i>or/and</i>	C	Advanced Simulation Methods: Technology Interaction	5	Pass/Fail	Internal
		d <i>and</i>	C	Advanced Simulation Methods: Ergonomic Design and Simulation Interaction	5	Pass/Fail	Internal
		e	P	Engineering in the Design Field: Value, Method and Approach	20	7-point scale	Internal

Semester		P= Project module C= Course modules	Module	ECTS	Assessment	Exam
	B or	C	Project Management in Industrial Design Engineering and Research	5	Pass/Fail	Internal
		P	Academic Internship	25	7-point scale	Internal
	C or	P/C	Study at another university	30	Transfer of credits	Transfer of credits
	D	P	Long Master's Thesis ¹	+30	7-point scale	External
4th		P	Master's Thesis	30	7-point scale	External
Total 120 ECTS						

Minimum 90 ECTS are evaluated by 7-point scale, and minimum 45 ECTS are evaluated with an external examiner.

¹ See module description for the Master's thesis. The Long Master's thesis is prepared in the 3rd and 4th semesters; the extent is 60 ECTS.

Master in Industrial Design 1st semester

Title:	Integrated Design Theory and Methodology (5 ECTS) <i>Integreret design-teori og -metodik</i>
Prerequisites:	A BSc degree (Bachelor) in Architecture and Design or similar.
Objective:	<p>The aim of the course is to enable students to gain a practical and theoretical understanding of project work using the problem-based learning approach (PBL) as well as of the method used in 'industrial design', architectural design' and 'urban design' respectively, viz. the integrated design process (IDP) in which strategically chosen parameters from engineering are integrated throughout the entire industrial, architectural or urban design process respectively.</p> <p>Students who complete the module:</p> <p>Knowledge</p> <ul style="list-style-type: none"> • Must have knowledge and understanding of project-organised problem-based learning • Must have knowledge of the integrated design process (IDP) • Must have knowledge of group work and ways to solve conflicts • Must have knowledge and understanding of the planning and structuring of project documentation <p>Skills</p> <ul style="list-style-type: none"> • Must be able to apply problem-based learning methods and use an integrated design process in relation to respectively an industrial, architectural and urban design project • Must be able to work in a group • Must be able to evaluate collective working processes <p>Competencies</p> <ul style="list-style-type: none"> • Must be able to apply project-organised learning techniques to actual problems related to working in a group • Must be able to apply the integrated design process in project work
Type of instruction:	See general description of the types of instruction described in the introduction to Chapter 3.
Exam format:	Version L.
Evaluation criteria:	As stated in the Framework Provisions.

Title: Advanced Integrated Design: Pre-phase (5 ECTS)

Avanceret integreret design: Præ-fasen

Prerequisites: A BSc degree (Bachelor) in Architecture and Design or similar.

Objective: The aim is to familiarise students working professionally with the theories, tools and methods required for the pre-product development phase in which the focus is on “what to design” and “why” in terms of specifying both product, context and use of product and target group. This also includes the business modelling, product market positioning, value proposition, mission and vision for the product and the relation to the client company’s brand and market position.

Students who complete the module:

Knowledge

- Must be able to account for and evaluate models, methods and theories of the design process, with emphasis on the early phases
- Must be able to account for and reflect upon methods and models used for analysing the internal and external factors, which constitute a company’s business context, and account for the type of knowledge which derives usable in a product specification
- Must be able to account for and evaluate a range of market, user and trend oriented methods, which are applied to establish the basis of projects and to verify and test assumptions made during a design process
- Must be able to apply and explain methods and theories for defining the value base and business proposition of a given design concept

Skills

- Must be able to select and apply methods to analyse a company’s market position, product portfolio, competition as well as core competences and strategic strengths
- Must be able to select and apply market, user and trend based methods and processes for identifying potential new markets – on the basis of which a new product concept can be developed
- Must be able to generate a visual presentation of a conceptual proposal for a new product including the business perspectives
- Must be able to rapidly conceptualise and roughly sketch a product on the basis of a set of defined values, including the principles which lie behind its aesthetic expression, use and construction

Competencies

- Must be able to independently plan and carry out a pre-phase design process including internal and external business analysis, leading to a strategic market position, and the development of a value proposition towards the end-user/customer and a conceptual/principle design
- Must be able to define a clear value basis and business case for the product to be developed, and specify it’s relation to the company’s present brand and market position

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L².

² Please refer to Enclosure A for a description of the various exam formats.

Evaluation criteria: As stated in the Framework Provisions.

Title: **Component Construction (5 ECTS)**
Komponentkonstruktion

Prerequisites: A BSc degree (Bachelor) in Architecture and Design or similar.

Objective: The aim of the course is to give an insight into a broad range of issues in relation to the construction of product details regarding production, assembly, durability, use, expression, distribution and disposal/recycling as integrated in construction and material choices of products or a product line. The students learn to apply these principles by systematic and concurrent inclusion of appropriate methods and system. The students get insight into various product configurations with the use of both traditional and new manufacturing processes and materials and learn to create new combinations in an integrated process.

Students who complete the module:

Knowledge

- Must have knowledge of theory and practical solutions on appropriate detailing in relation to a broad variety of materials and constructions in general available from existing databases
- Must be able to account for and evaluate the typical and state of the art principles for appropriate design of details in plastic, metal and other relevant materials
- Must be able to account for and reflect on the general principles for the exploration of critical aspects concerning the design of the detail and the general construction layout in relation to construction, production, assembly/disassembly issues and use

Skills

- Must be able to use data bases, research and structured data collection to get knowledge on smart detailing in relation to a broad variety of materials and constructions
- Must be able to analyse typical and state of the art principles for the construction of smart construction details in plastic, metal and other relevant materials and communicate these in clear form
- Must be able to use general principles for the exploration of critical aspects concerning the design of the detail and the general construction layout in relation to construction, production and use

Competencies

- Must be able to find and analyse critical aspects concerning the construction and design of product details and their relation to a wide range of product layouts and to integrate their findings in a new product construction, where critical aspects on materials, manufacturing, user experience and durability have been handled and designed into an integrated product

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L.

Evaluation criteria: As stated in the Framework Provisions.

Title: Production and Economy (5 ECTS)

Produktion og økonomi

Prerequisites: A BSc degree (Bachelor) in Architecture and Design or similar.

Objective: The aim is to enable the students to acquire an understanding of how product features and product structure will determine the possibilities and limitations in the whole product lifecycle. This includes cost and adaptability related to production, sales, installation, service, and recycling.

Students who complete the module:

Knowledge

- Must have knowledge of the cost and effort involved in various ways of constructing, assembling and manufacturing products and product components
- Must have knowledge of the relationship between a given product structure and the limitations and possibilities in different lifecycle situations
- Must be able to demonstrate knowledge of central theories and methods used in product families and product platforms
- Must have knowledge of the theories and methods of project management and of the financial aspects of product development (e.g. budgeting)
- Must have knowledge of basic technology and market scanning tools, basic methods for carrying out trend and competitor analysis and of the market-specific relation between cost of production and retail price point

Skills

- Must be able to give a rough estimation of production costs of a given product
- Must be able to decide, argue and explain in detail the relationship between the design of the proposed method of construction, assembly and production and its market potential and price point and subsequently account for the implications for these of any changes in design

Competencies

- Must be able to argue for the relationship between retail price and expected sales (in units) of a given product and from this specify the maximum acceptable production costs
- Must be able to design and construct a simple product within a given price point using specified materials, production methods/processes and assembly methods

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L.

Evaluation criteria: As stated in the Framework Provisions.

Title: Corporate Product Development (10 ECTS)

Produktudvikling for en virksomhed

Prerequisites: A BSc degree (Bachelor) in Architecture and Design or similar.

Objective: The aim of the project is to enable the students to work professionally in a collaborative engineering based design and product development process with a client (company) to achieve a professional design proposal in coherence with predefined targets and criteria, encompassing both market and user context as well as manufacturing and production context.

Students who complete the module:

Knowledge

- Must be able to account for and reflect on the scientific validity of the main experiments, tests, proposals and evaluations affecting the decision-making in the design process
- Must be able to explain and argue for production methods and manufacturing tools in relation to the manufacturer's market position, culture and capabilities
- Must be able to account for the main critical issues in the design proposal related to market and production feasibility and the appropriate course of action to amend these

Skills

- Must be able to identify, generate and communicate relevant product development research of use, market, production and technology and use this to create a design brief stating the objectives of the design proposal and generate visions and specifications and continuously revise this during the development process
- Must be able to estimate market potential, retail price point and determine the target cost of production per unit and design and construct product and product component proposals related to this price point, with due consideration to available production methods and manufacturing tools and capacity
- Must be able to research, explain and evaluate a main technology used in the product design or manufacturing process in the project
- Must apply and argue the choice of design and construction methods used to generate proposals depending on the specific focus at a given time throughout the design process

Competencies

- Must be able to generate and present an innovative product solution for a given company, market and target group, that integrates design, construction and production aspects at an advanced level and demonstrate the ability to select, assess and further develop critical aspects of the solution
- Must be able to design a product that integrates functional aspects and features with desired visual expression, tactile and cognitive use-experience considerations that appeals to the target group
- Must be able to design central components in details, estimating the market potential and production costs for a given number of units and present the proposal in a decision-ready manner for a client
- Must be able to ensure that construction and production costs do not exceed the specified price and that the product's appearance, market position and overall presentation are in keeping with the company brand

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version P.

Evaluation criteria: As stated in the Framework Provisions.

Master in Industrial Design 2nd semester

Title: **Advanced Integrated Design: Business Development (5 ECTS)**

Avanceret integreret design: Forretningsudvikling

Prerequisites: 1st semester in Industrial Design Engineering at Architecture & Design or similar..

Objective: The aim is to enable the students to acquire an understanding of how design engineering can be used strategically and as a tool for creating new business concepts with possible triple bottom line perspectives and to enable them to acquire the knowledge and skills necessary for them to engage in these processes to create value for both companies, users and potentially society and environment.

Students who complete the module:

Knowledge

- Must be able to account for theories of innovation, business models and strategic design and reflect on the role of design and its possibilities within the development of new business areas and their practical application
- Must be able to explain and evaluate methods, theories and techniques to identify, verify, make business of and communicate innovation and entrepreneurship
- Must be able to account for the feasibility and approximate cost of the proposed technology used in the product, product development or service implementation
- Must be able to explain, evaluate and reflect on the value creation in a business case in relation to more than financial terms, e.g. sustainability, social value and value for end-users

Skills

- Must be able to use design oriented techniques to further develop, describe and evaluate business models and business plan and strategy in relation to product or service development
- Must be able to use and argue specific techniques and methods for innovation and entrepreneurship and apply these to opportunity identification and problem solving in relation to choice of innovation focus
- Must be able to present a cross-disciplinary founded business concept and adapt communication style and content to different stakeholders
- Must be able to apply knowledge on production costs and possibilities, advanced technology and manufacturing possibilities to support a business case

Competencies

- Must be able to use and implement innovation theory as an integrated part of developing ideas and designing concepts, services or product proposals to create more possibilities for value creation and innovation focus
- Must be able to generate a design proposal for a new business and communicate the commercial potential, strategic potential and innovative strength, technological feasibility thereof in a simple, clear and strong form
- Must be able to scientifically describe and reflect on a complex, cross-disciplinary process involving innovation and entrepreneurship
- Must be able to develop a concept that combines design-relevant aspects with business potential and clearly explain the commercial aspects of a concept in relation to a business plan and reflect on the concept in relation to innovation theory

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L.

Evaluation criteria: As stated in the Framework Provisions.

Title:	Process Technology and Material Characteristics: Flexible Automation (5 ECTS) <i>Procesteknik og materialeegenskaber: Fleksibel automation.</i>
Prerequisites:	1 st semester in Industrial Design Engineering at Architecture & Design or similar.
Objective:	Through this course, the students are introduced to flexible, demand-driven and customer-defined manufacturing automation. The course outlines non-trivial application of robotic systems to customer-configured manufacturing of industrially produced consumer items. Students who complete the module: Knowledge <ul style="list-style-type: none"> • Must have a basic knowledge and understanding of theories and terminologies regarding process automation • Must have an understanding of highly flexible and integrated automation technologies (e.g. industrial robots, vision, automatic programming) • Must have an understanding of potential and limitation of flexible automation manufacturing • Must have understanding of elementary logistics of adaptable production systems Skills <ul style="list-style-type: none"> • Must be able to use various technologies to realize flexible manufacturing systems (vision, robotics, automatic programming) • Must be able to make a concept design of a whole flexible manufacturing system • Must be able to integrate and implement elements of a flexible manufacturing system into a small and limited manufacturing system Competencies <ul style="list-style-type: none"> • Must have the ability to overview consequences of process automation • Must be able to undertake product definition according to configurable products and adaptive automation methods, in close collaboration with production and logistics specialists
Type of instruction:	See general description of the types of instruction described in the introduction to Chapter 3.
Exam format:	Version L.
Evaluation criteria:	As stated in the Framework Provisions.

Title: **Technology and Form (5 ECTS)**

Teknologi og form

Prerequisites: 1st semester in Industrial Design Engineering at Architecture & Design or similar.

Objective: The aim of this course is to develop advanced skills in the combination of technology in products or for producing products and visual understanding of form and composition in a product design for a given context. The course will introduce cutting edge technologies in relation to production. The course will also focus on theories of perception and cognition in relation to form, complex form analysis, analogies, metaphors, storytelling etc. in order to strengthen the students' professional knowledge of form and how metaphors and analogies influence the target group's perception of form. The study of new technologies will establish an up-to-date knowledge in this field. The course will test this integrated knowledge in a short design project on an advanced level.

Students who complete the module:

Knowledge:

- Must have knowledge of a variety of cutting edge technologies applicable in products or materials, production and assembly processes, etc. and how these technologies can push design and product development in practice and research
- Must be able to account for and reflect on methods and theories of perception, cognition, metaphors, analogies and storytelling in relation to form, composition and design for a particular company, market segment, market trend or otherwise specified context and target group

Skills:

- Must be able to identify, analyse and integrate cutting edge technologies with form, function and construction in a conceptual product design proposal
- Must be able to screen and analyse the design potential in new materials and technologies in databases, through contact with companies and sample studies
- Must be able to analyse various types of product design and to specify and communicate their typical expressions within a product category
- Must be able to use advanced methods to analyse and develop form in composition and design to a qualitatively specified desired expression related to a particular company, segment, market trend, product category or otherwise specified context

Competencies:

- Must be able to generate a design proposal that through advanced form giving methods and integration of cutting-edge technologies aims precisely at a predefined expression and functionality for a target market
- Must be able to use and integrate different approaches like field studies and technology screening to support the development of innovative products

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L.

Evaluation criteria: As stated in the Framework Provisions.

Title:	Sector Product Development (15 ECTS) <i>Produktudvikling for en sektor</i>
Prerequisites:	1 st semester in Industrial Design Engineering at Architecture & Design or similar.
Objective:	The aim of the project module is to broaden the scope of design engineering by scoping product development to an entire sector and starting with ill-defined user needs as basis for market development including choice and combination of organizations, supply chain and business modeling needed to be integrated into a focused complex product development process.

Students who complete the module:

Knowledge:

- Must be able to account for, evaluate and reflect on concrete case-based knowledge of problems and possibilities for transforming poorly-defined needs into strategies, concepts and specified product proposals to be produced and distributed in a network business structure
- Must be able to account for and reflect on the scientific validity of the main experiments, tests, proposals and evaluations affecting the decision-making in the design process, with special focus on linking the ill-defined needs to all other aspects
- Must be able to account for the main critical issues in the design proposal related to the business case, product design and construction, supply chain setup, production capability and the appropriate course of action to amend these

Skills:

- Must be able to identify, research and specify design opportunities and tasks in relation to a concrete sector including; cultural, demographic, market, technological or environmental themes
- Must be able to translate ill-defined needs into a market description and a business model and plan for a product proposal, including a proposal for most relevant organisational and value chain structure
- Must be able to identify, design in detail and evaluate most relevant production aspect or component construction in order to most effectively support the value proposition of the business case
- Must be able to plan, organise and carry out a rapid design process and integrated product development while maintaining a high degree of awareness on linking user needs to key characteristics for proposed products, business model, plan and market

Competencies:

- Must show ability to combine a diversity of analytical and creative tools and methods in an integrated process leading from the identification of opportunities and needs to designing and specifying a product family or product/service and its aesthetic components to be implemented in a sector-based business structure
- Must be able to clearly describe and communicate a solution that is based on an advanced integration of business, design and engineering
- Must be capable of developing, analysing, reflecting on and discussing the integration of a holistic design approach with a suitable business structure and plan

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version C.

Evaluation criteria: As stated in the Framework Provisions.

Master in Industrial Design 3rd semester

Title: **Project Management in Industrial Design Engineering and Research (5 ECTS)**

Projektleidelse i industrielt design og forskning

Prerequisites: The student must have knowledge, skills and competencies within the architectural design and engineering field corresponding to the completion of the MSc01 and MSc02 Architectural Engineering education or similar.

Objective: A summary approach to project management within design, product and knowledge development. Linking previous project experiences and approaches to project management theories and methodological knowledge production, this module aims to elevate the students understanding of project management and capability to design projects within product development and knowledge production..

Students who complete the module:

Knowledge:

- Must be able to describe, analyse and evaluate current theories and practice in project management in product development.
- Must be able to describe and analyse a coherent relation between objective, data, theories and methods for a relevant research project framing for a knowledge production project.

Skills:

- Must be able to apply methods of planning and scheduling of product development projects in relation to resources.
- Must be able to construct, revise and use a project framing for a relevant, minor research project.
- Must be able to identifying work elements, estimating activity durations, preparing network schedules and schedule updates, analysing planned vs. actual project progress

Competencies:

- Can analyse and apply relevant methods and theories for project management in product development and/or knowledge production and research projects within a given set of resources and prerequisites.

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L.

Evaluation criteria: As stated in the Framework Provisions

Title: **Advanced Simulation Methods: Process Management (5 ECTS)**

Avanceret simulering: Procesmanagement

Prerequisites: The student must have knowledge, skills and competencies within the industrial design and engineering field corresponding to the completion of the MSc01 and MSc02 Industrial Design Engineering education or similar.

Objective: The aim of the course is to provide the students with relevant and advanced knowledge and skills within a subject related to managing the design and development process for products or services. The particular subject will vary and must be related to a similar project subject.

Students who complete the module:

Knowledge

- Must be able to account for, evaluate and reflect on relevant advanced methods and theories within a subject related to design and development process management
- Must be able to account for and reflect on methods for communicating both methods and results to design professionals and researchers

Skills

- Must be able to design a basic relevant research setup for experiments, case studies or simulations pertaining to the chosen subject within design and development process management
- Must be able to use and reflect on central methods and theories pertaining to the chosen subject in a controlled environment and experimental setup
- Must be able to communicate methods and results of experiments, studies, etc. within the chosen subject to design professionals and researchers

Competencies

- Must be able to apply the central theories and methods within a particular subject of design and development process management to design a simulation setup that allows for experimentation and reflection with scientific rigour

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version L.

Evaluation criteria: As stated in the Framework Provisions.

- Title:** **Advanced Simulation Methods: Technology Interaction (5 ECTS)**
Avanceret simulering: Teknologiinteraktion
- Prerequisites:** The student must have knowledge, skills and competencies within the industrial design and engineering field corresponding to the completion of the MSc01 and MSc02 Industrial Design Engineering education or similar.
- Objective:** The aim of the course is to provide the students with relevant and advanced knowledge and skills within a subject related to integrating technology into the design, construction, manufacturing or supply chain of a product or service. The particular subject will vary and must be related to a similar project subject.
- Students who complete the module:
- Knowledge**
- Must be able to account for, evaluate and reflect on relevant advanced methods and theories within a subject related to integrating technology into the design, construction, manufacturing or supply chain of a product or service
 - Must be able account for and reflect on methods for communicating both methods and results to design professionals and researchers
- Skills**
- Must be able to design a basic relevant research setup for experiments, case studies or simulations pertaining to the chosen subject integrating technology into the design, construction, manufacturing or supply chain of a product or service
 - Must be able to use and reflect on central methods and theories pertaining to the chosen subject in a controlled environment and experimental setup
 - Must be able to communicate methods and results of experiments, studies, etc. within the chosen subject to design professionals and researchers
- Competencies**
- Must be able to apply the central theories and methods within a particular subject of integrating technology into the design, construction, manufacturing or supply chain of a product or service to design a simulation setup that allows for experimentation and reflection with scientific rigour
- Type of instruction:** See general description of the types of instruction described in the introduction to Chapter 3.
- Exam format:** Version L.
- Evaluation criteria:** As stated in the Framework Provisions.

Title:	Advanced Simulation Methods: Ergonomic Design and Simulation Interaction (5 ECTS) <i>Avanceret simulering: Ergonomisk design og simuleringsinteraktion</i>
Prerequisites:	The student must have knowledge, skills and competencies within the industrial design and engineering field corresponding to the completion of the MSc01 and MSc02 Industrial Design Engineering education or similar
Objective:	The aim of the course is to provide the students with relevant and advanced knowledge and skills within a subject related to ergonomic simulations. The particular subject will vary and must be related to a similar project subject. Students who complete the module: Knowledge <ul style="list-style-type: none"> • Must have gained knowledge concerning available computational tools and techniques for investigation of the ergonomic properties of products • Must understand the connection between body loads and potential discomfort or development of injury • Must have knowledge concerning experimental methods for recording body motions, forces acting on the body and muscle activity Skills <ul style="list-style-type: none"> • Must be able to define and analyse common computer tools for investigation of ergonomics issues such as digital manikins and musculoskeletal simulation • Must be able to interpret output from such tools in terms of risk of discomfort or injury Competencies <ul style="list-style-type: none"> • Must be able to make informed decisions on which ergonomics methods and tools to apply for a given design case • Must be able to apply the obtained skills to make creative decisions about new designs or design changes to products that affect their ergonomic qualities using simulation tools
Type of instruction:	See general description of the types of instruction described in the introduction to Chapter 3.
Exam format:	Version L.
Evaluation criteria:	As stated in the Framework Provisions.

Title:	Engineering in the Design Field: Value, Method and Approach (20 ECTS) <i>Ingeniørfaget i designfeltet: Værdi, metode og tilgang</i>
Prerequisites:	The student must have knowledge, skills and competencies within the industrial design and engineering field corresponding to the completion of the MSc01 and MSc02 Industrial Design Engineering education or similar.
Objective:	The project aims at providing opportunities for the students to explore and gain knowledge of a subject of their own choice within the field of industrial design engineering while acquiring competencies in the rigorous structuring and communication of their knowledge production. The project module should be related to a course module with supporting methods and theories related to the chosen subject of the project module.
	Students who complete the module:
	<p>Knowledge</p> <ul style="list-style-type: none"> • Must be able to identify, define and frame a relevant subject for investigation and research within the field of industrial design engineering • Must be able to account for relevant theoretical positions and related methodologies pertaining to the chosen subject • Must have knowledge of practice within the chosen field related to industrial design engineering • Must be able to account for and reflect on theories used or the methodologies applied within the chosen subject • Must be able reflect on the test results in relation to the field and activities of the profession e.g. international professional standards <p>Skills</p> <ul style="list-style-type: none"> • Must be able to evaluate and assess the research problem in relation to their completed investigations and/or experiments and use this as a basis for synthesising proposals for quality designs, constructions, systems or processes • Must be able to frame the research problem taking into account the interdependency between type of knowledge wanted, the possible methods of investigation and type of data produced • Must be able to communicate results or partial results of the project work in a manner that is on a par with professional research reporting <p>Competencies</p> <ul style="list-style-type: none"> • Must be able to plan and carry out research of a chosen subject and have the capacity to describe the chosen problem in a theoretical and methodological framework as well as to draw conclusions on the basis of own analysis of the results
Type of instruction:	See general description of the types of instruction described in the introduction to Chapter 3.
Exam format:	Version P.
Evaluation criteria:	As stated in the Framework Provisions.

Title: Academic Internship (25 ECTS)

Projektorienteret forløb

Prerequisites: The student must have knowledge, skills and competencies within the industrial design and engineering field corresponding to the completion of the MSc01 and MSc02 Industrial Design Engineering education or similar.

Objective: The objective is to give the students an opportunity to use the skills acquired during the 1st and 2nd semesters and at the same time provide opportunities for the students to explore and gain knowledge of a subject of their own choice within the field of industrial design engineering while acquiring competencies in the rigorous structuring and communication of their knowledge production. The company can often function as a case for the research related to the project assignment.

Students who complete the module:

Knowledge:

- Must be able to identify, define and frame a relevant subject for investigation and research within the field of industrial design engineering
- Must be able to account for relevant theoretical positions and related methodologies pertaining to the chosen subject
- Must have knowledge of practice within the chosen field related to industrial design engineering
- Must have knowledge of theories used or the methodologies used within the chosen subject
- Must be able to reflect on the test results in relation to the field and activities of the profession e.g. international professional standards

Skills:

- Must be able to evaluate and assess the research problem in relation to their completed investigations and/or experiments and use this as a basis for synthesising proposals for quality designs, constructions, systems or processes
- Must be able to frame the research problem taking into account the interdependency between type of knowledge wanted, the possible methods of investigation and type of data produced
- Must be able to communicate results or partial results of the project work in a manner that is on a par with professional research reporting

Competencies:

- Must be able to plan and carry out research of a chosen subject and have the capacity to describe the chosen problem in a theoretical and methodological framework as well as to draw conclusions on the basis of own analysis of the results

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version P.

Evaluation criteria: As stated in the Framework Provisions.

Master in Industrial Design 4th semester

Title:	Master's Thesis (30 ECTS) <i>Kandidatspeciale</i>
Prerequisites	The student must have knowledge, skills and competencies within the industrial design and engineering field corresponding to the completion of the MSc01 - MSc03 Industrial Design Engineering education or similar.
Objective:	The aim of this project is to provide students with the opportunity to demonstrate their mastery of key competencies in a design engineering based self-driven process.

Students who complete the module:

Knowledge

- Must be able to account for the relevant design related knowledge and identify design relevant problems within the chosen subject
- Must account for the appropriate research-based knowledge in the design process
- Must demonstrate a high degree of awareness regarding the main experiments, tests, proposals and evaluations affecting the decision-making in the design process and thoroughly account for the scientific validity of test, investigations and other type of data used in the design process
- Must demonstrate a high degree of awareness regarding the main critical issues in the design proposal and the appropriate course of action to amend these

Skills

- Must be able to design by integrating a desired expression and experience through form and function into technical sound products, constructions and solutions, with due consideration to state of the art technology, manufacturing abilities, costs and configuration of supply chain
- Must demonstrate the ability to frame the design assignment using professional tools and methods and generate a design proposal based on clearly defined values, user needs and or business plan that meets predefined criteria, target values and cost range
- Must demonstrate the ability to select, use and reflect on the appropriate methods for analysing problems, users, technologies, constructions, competitors, markets, products, strategies, companies and own design based product or solution proposals
- Must demonstrate the ability to select and use the appropriate method, technique and tools for carrying out experiments and synthesising design based product or solution proposals
- Must demonstrate the ability to navigate a design process, by continuously driving the design process forward by focusing on the most relevant part of the project and delimit the scope accordingly
- Must demonstrate high skills in communicating complex problems and solutions to both peers and non-specialists

Competencies

- Must achieve a high degree of integration of selected appropriate aspects of the subject of choice, in a coherent proposal for a solution within the broad field of design engineering

- Must be able to independently and professionally manage and facilitate a design process that integrates engineering disciplines in order to design innovative solutions that include both technical rigor and design features
- Must be able to review the final proposal while taking into account both engineering, design and business perspectives

Type of instruction: See general description of the types of instruction described in the introduction to Chapter 3.

Exam format: Version C.

Evaluation criteria: As stated in the Framework Provisions.

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 2015.

Students who wish to complete their studies under the previous curriculum must conclude their education by the summer examination period 2016 at the latest, since examinations under the previous curriculum are not offered after this time.

In accordance with the Framework Provisions for the Faculty of Engineering and Science and The Faculty of Medicine at Aalborg University, the curriculum must be revised no later than 5 years after its entry into force.

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.³ If the project is written in English, the summary must be in Danish.⁴ 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 program at a university in Denmark or abroad

In the individual case, the Board of Studies can approve successfully completed (passed) program elements from other Master's programs in lieu of program elements in this program (credit transfer). The Board of Studies 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 Board of Studies based on an academic assessment. See the Framework Provisions 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 Faculty of Engineering and Science on their website.

5.4 Exemption

In exceptional circumstances, the Board of Studies 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 Completion of the Master's programme

The Master's program must be completed no later than four years after it was begun.

³ Or another foreign language (upon approval from the Board of Studies).

⁴ The Board of Studies can grant exemption from this.

5.6 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.

5.7 Additional information

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

Enclosure 1: Evaluation formats

Evaluation formats for the Bachelor and Master programmes under the Board of Studies for Architecture and Design, School of Architecture, Design and Planning.

Please refer to the study guide of the relevant semester and module for further descriptions of the chosen evaluation format.

Project modules

Evaluation format C – Project module with external examination:

The module is assessed by an oral assessment based on written material, typically a jointly prepared (or in exceptional cases, prepared by the individual student) project module report (containing the report/analyzes/posters/drawings/models or similar) where the individual examinee's contribution is not indicated. It is further presumed that the student has regularly and actively participated in evaluation seminars etc..

The module is assessed with external examination.

The written material is submitted in physical form to the semester secretary and also digitally uploaded to the directory assigned by the semester secretary. This according to the current delivery requirements in the Semester Description or Study Guide.

Evaluation format P – Project module with internal examination:

The module is assessed by an oral assessment based on written material, typically a jointly prepared (or in exceptional cases, prepared by the individual student) project module report (containing the report/analyzes/posters/drawings/models or similar) where the individual examinee's contribution is not indicated. It is further presumed that the student has regularly and actively participated in evaluation etc..

The module is assessed with internal examination.

The written material is submitted in physical form to the semester secretary and also digitally uploaded to the directory assigned by the semester secretary. This according to the current delivery requirements in the Semester Description or Study Guide.

Course modules:

Evaluation format L – Course module, oral or written assessment.

Comprising of:

Evaluation format La – Course module, oral assessment:

The module is assessed with an oral assessment based on written material prepared by the individual student such as a portfolio presentation or a (possibly jointly prepared) project module report (containing the report/analyses/posters/drawings/models or similar). It is further presumed that the student has regularly and actively participated in evaluation seminars.

Oral assessment with aid and without preparation time.

The written material must be digitally uploaded to the directory assigned by the semester secretary. This according to the current delivery requirements in the Semester Description or Study Guide.

Evaluation format Lb – Course module, oral assessment:

The module is assessed with an oral exam based on the objectives for the course module. The examinee pulls a known and predefined question, after which the assessment begins.

Oral assessment without aid and without preparation time

Evaluation format Lc – Course module, oral assessment:

The module is assessed with an oral exam based on the objectives for the course module. The examinee pulls a question, gets preparation time, after which the assessment begins.

Oral assessment without aid and with preparation time – aid is allowed in the preparation time.

Evaluation format Ld – Course module, written assessment:

The module is assessed with a written assignment based on central parts of the objectives for the course module through one or more written assignments (including reports/analyses/posters/drawings/models or the like).

A written assignment is developed during the execution of the course module.

The written material must be digitally uploaded to the directory assigned by the semester secretary. This according to the current delivery requirements in the Semester Description or Study Guide.

Evaluation format Le – Course module, written assessment:

The module is assessed with a written assignment based on central parts of the objectives for the course module.

A written assignment given by the end of the course module and completed within a defined time frame.

The written material must be digitally uploaded to the directory assigned by the semester secretary. This according to the current delivery requirements in the Semester Description or Study Guide.

Evaluation format V – Course module:

The module is passed by the student's regular and active participation in teaching/ evaluation seminars or the like and by compliance with the assignment requirements of the course module.

The module is assessed by internal assessment.