



AALBORG UNIVERSITET

**CURRICULUM FOR THE MASTER'S  
PROGRAMME IN INDUSTRIAL DESIGN  
CAND.TECH., 2016**

MASTER OF SCIENCE (MSC) IN TECHNOLOGY  
AALBORG

MODULES INCLUDED IN THE CURRICULUM

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# ADVANCED INTEGRATED DESIGN: PRE-PHASE

2018/2019

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

#### EXAMS

Name of exam	Advanced Integrated Design: Pre-phase
Type of exam	Written or oral exam Please refer to Enclosure A for a description of the various exam formats.

ECTS	5
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Advanceret integreret design: Præ-fasen
Module code	AODITM1K161
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Sarah Guldhammer Olesen</a> , <a href="#">Tenna Doktor Olsen Tvedebrink</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# COMPONENT CONSTRUCTION

2018/2019

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

#### EXAMS

Name of exam	Component Construction
Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Komponentkonstruktion
Module code	AODITM1K162
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# PRODUCTION AND ECONOMY

2018/2019

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Production and Economy
Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids
Assessment	Passed/Not Passed

Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Produktion og økonomi
Module code	AODITM1K163
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

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# CORPORATE PRODUCT DEVELOPMENT

2018/2019

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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
- Must be knowledgeable about the fundamental principles of Problem Based Learning (PBL) as implemented in the Aalborg PBL model at the Faculty of Engineering and Science (\*)

(\*)To obtain the knowledge, skills and competence marked with (\*) it is presupposed that students follow the course in Problem Based Learning and Project Management that the school offers all foreign students in the beginning of 1st semester.

#### 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
- Must be able to structure project management activities based on a wellformulated problem formulation (\*)

(\*)To obtain the knowledge, skills and competence marked with (\*) it is presupposed that students follow the course in Problem Based Learning and Project Management that the school offers all foreign students in the beginning of 1st semester.

#### COMPETENCES

- 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
- Must be able to reflect on, plan and manage a study project in a PBL learning environment (\*)

(\*)To obtain the knowledge, skills and competence marked with (\*) it is presupposed that students follow the course in Problem Based Learning and Project Management that the school offers all foreign students in the beginning of 1st semester.

## TYPE OF INSTRUCTION

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

## EXAM

### EXAMS

Name of exam	Corporate Product Development
Type of exam	Oral exam based on a project
ECTS	15
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Produktudvikling for en virksomhed
Module code	AODITM1P164
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# ADVANCED INTEGRATED DESIGN: BUSINESS DEVELOPMENT

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained on the 1st semester.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Advanced Integrated Design: Business Development
Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

### FACTS ABOUT THE MODULE

Danish title	Avanceret integreret design: Forretningsudvikling
Module code	AODITM2K161
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

### ORGANISATION

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# PROCESS TECHNOLOGY AND MATERIAL CHARACTERISTICS: FLEXIBLE AUTOMATION

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained on the 1st semester.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### KNOWLEDGE

- 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

- 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Process Technology and Material Characteristics: Flexible Automation
Type of exam	Written or oral exam
ECTS	5

Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Procesteknik og materialeegenskaber: Fleksibel automation
Module code	AODITM2K162
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# TECHNOLOGY AND FORM

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained on the 1st semester.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### KNOWLEDGE

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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Technology and Form
Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

### FACTS ABOUT THE MODULE

Danish title	Teknologi og form
Module code	AODITM2K163
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

### ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design



# SECTOR PRODUCT DEVELOPMENT

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained on the 1st semester.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Sector Product Development
Type of exam	Oral exam based on a project
ECTS	15
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	As stated in the Joint Programme Regulations.

### FACTS ABOUT THE MODULE

Danish title	Sector Product Development
Module code	AODITM2P164
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

### ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# PROJECT MANAGEMENT IN INDUSTRIAL DESIGN ENGINEERING AND RESEARCH

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Project Management in Industrial Design Engineering and Research
Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids

Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Projektledelse i industrielt design og forskning
Module code	AODITM3K161
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# ADVANCED SIMULATION METHODS: PROCESS MANAGEMENT

2018/2019

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Advanced Simulation Methods: Process Management
Type of exam	Written or oral exam

ECTS	5
Permitted aids	Without aids
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Avanceret simulering: Procesmanagement
Module code	AODITM3K162
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# ADVANCED SIMULATION METHODS: TECHNOLOGY INTERACTION

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

#### EXAMS

Name of exam	Advanced Simulation Methods: Technology Interaction
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Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Avanceret simulering: Teknologiinteraktion
Module code	AODITM3K163
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design



# ADVANCED SIMULATION METHODS: ERGONOMIC DESIGN AND SIMULATION INTERACTION

2018/2019

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### KNOWLEDGE

- 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

- 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Advanced Simulation Methods: Technology Interaction
Type of exam	Written or oral exam
ECTS	5
Permitted aids	Without aids

Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

## FACTS ABOUT THE MODULE

Danish title	Avanceret simulering: Ergonomisk design og simuleringsinteraktion
Module code	AODITM3K164
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Gulddammer Olesen</a>

## ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# **ENGINEERING IN THE DESIGN FIELD: VALUE, METHOD AND APPROACH**

**2018/2019**

## **PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE**

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.

## **CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE**

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:

### **LEARNING OBJECTIVES**

#### **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 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

#### **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

#### **COMPETENCES**

- 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

### EXAMS

Name of exam	Engineering in the Design Field: Value, Method and Approach
Type of exam	Oral exam based on a project
ECTS	20
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

### FACTS ABOUT THE MODULE

Danish title	Ingeniørfaget i designfeltet: Værdi, metode og tilgang
Module code	AODITM3P165
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	20
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

### ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
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# ACADEMIC INTERNSHIP

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The objective is to give the students an opportunity to use the skills acquired during the 1<sup>st</sup> and 2<sup>nd</sup> 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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Academic Internship
Type of exam	Oral exam based on a project
ECTS	25
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations.

### FACTS ABOUT THE MODULE

Danish title	Projektorienteret forløb
Module code	AODITM3P167
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	25
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

### ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design

# LONG MASTER'S THESIS

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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

### EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	60
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	As stated in the Joint Programme Regulations.

### FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale - lang afgang
Module code	AODITM3P169
Module type	Project
Duration	2 semesters
Semester	Autumn
ECTS	60
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

### ORGANISATION

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design



# MASTER'S THESIS

**2018/2019**

## PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

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.

## CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

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:

### LEARNING OBJECTIVES

#### 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

#### COMPETENCES

- 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****EXAMS**

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	30
Permitted aids	Without aids
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	As stated in the Joint Programme Regulations.

**FACTS ABOUT THE MODULE**

Danish title	Kandidatspeciale
Module code	AODITM4P161
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Location of the lecture	Campus Aalborg
Responsible for the module	<a href="#">Tenna Doktor Olsen Tvedebrink</a> , <a href="#">Sarah Guldhammer Olesen</a>

**ORGANISATION**

Study Board	Study Board of Architecture & Design
Department	Department of Architecture, Design and Media Technology
Faculty	Technical Faculty of IT and Design