AALBORG UNIVERSITY
DENMARK

Curriculum for the Master's Programme in Operations and Innovation Management

Aalborg University
September 2018

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Preface

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

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Chapter 1: Legal Basis of the Curriculum, etc.

1.1 Basis in ministerial orders
The Master's programme is organised in accordance with the Ministry of Higher Education and Science's Order no. 1328 of November 15, 2016 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) with subsequent changes and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 111 of January 30, 2017 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

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

1.3 Board of Studies affiliation
The Master's programme falls under the Study Board of Industry and Global Business Development.

1.4 External Examiners Corps
The Master's programme is associated with the External Examiner Corps of Engineers (Mechanical Engineering).

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

2.1 Admission
Applicants with a legal right of admission (retskrav):

- None

Applicants without legal right of admission:

- Bachelor of Science in Global Business Engineering – AAU
- Bachelor of Science in Business Administration – CBS
- Bachelor of Engineering in Chemistry and Business Economy – DTU
- Bachelor of Engineering in Manufacturing and Management – DTU
- Bachelor of Engineering in Process and Innovation – DTU
- Bachelor of Engineering in IT – AU
- Bachelor of Engineering in Interaction Design – SDU
- Bachelor of Engineering in Global Management and Manufacturing – SDU
- Bachelor of Engineering in Business Development Engineer – AU
- Bachelor of Science in Product Development and innovation – SDU
- Bachelor of Science in Innovation and Business – SDU
- Bachelor of Science in Product Development and Innovation – SDU
- Bachelor of Science in Global Business Informatics – ITU
- Bachelor of Science in Design and Innovation - DTU

2.2 Degree designation in Danish and English
The Master's programme entitles the graduate to the designation cand.tech. (candidatus/candidata technologiae) i værdikæder og innovationsledelse. The English designation is: Master of Science (MSc) in Technology (Operations and Innovation Management).

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 Candidatus graduate has the following competency profile:

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

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

2.5 Competence profile of the programme:
The graduate of the Master's programme:

Knowledge	- Has knowledge in the following subject areas that, in selected areas, is based on the highest international research in a subject area: - Global technology and engineering management. - Operations management in global value chains. - Conceiving, designing, implementing and improving value chains in an organization or a network of organisations - Innovation and change management. - Methods and concepts for analysing and researching global value chains. - Key management systems in the global organization or network of organisations. - Sustainable aspects within value chains - Can understand, apply and, on a scientific basis, reflect over the subject area's knowledge and identify scientific problems. - Has knowledge about how to integrate technological considerations and issues into the design and implementation of global business systems and value chains.
Skills	- Excels in analysing complex engineering oriented business problems and designing new integrative solutions using scientific methods and tools and general skills related to employment within global operations and innovation management. - Can evaluate and select among the subject area's(s') scientific theories, methods, tools and general skills and, on a scientific basis, advance new analyses and solutions. - Can communicate research-based knowledge and discuss professional and scientific problems with both peers and non-

specialists.

- Can apply theories, methods and concepts in different empirical settings.

- Can combine technological insights with market and value chain considerations in the design and improvement of innovative value chains.

Competencies

- Can manage work and development in complex and unpredictable situations requiring new solutions.
- Can independently initiate and implement discipline-specific and interdisciplinary cooperation and assume professional responsibility.
- Can independently take responsibility for own professional development and specialisation.
- Will become a leader of managing technological change and innovation in a global value chain context.
- Can give emphasis to the creative deployment and importance of technologies in the creation of global value chains.

Chapter 3: Content and Organisation of the Programme

The study programme in Operations and Innovation Management with a focus on Global Management is intended to prepare students for the management of technological and value chain changes in a global business context; the programme's main focal point are conception, design, implementation, and improvement of value chains in an organization or network of organisations.

The aim of the programme is to provide the students with a research based foundation for conceiving, designing, implementing and improving value chains within an organization or a network of organizations. The students should be equipped to manage these processes and should be able to deal with the challenges emerging in connection herewith drawing upon theoretical frameworks for managing technology, innovations, operations, outsourcing/offshoring and processes in connection with global value chains. This will enable students to manage advanced technological, organizational and processual development, improvement and implementation within global value chains.

The programme aims at providing the students with an in-depth professional knowledge and high-level practical skills within the area of value chain conception, design, implementation, improvement. To obtain these goals, the Master of Science and Technology programme is organised into modules and laid out as a problem-based, project-organised course of study. Each semester has an overall theme which serves a focal point in both modules and the project work.

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

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

- Lectures
- Classroom instruction
- Project work
- Workshops
- Exercises (individually and in groups)
- Teacher feedback
- Reflection
- Portfolio work.

3.1 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 assessment by the supervisor only).

Semes-ter	P= Project module C= Course modules	Module	ECTS	Assessment	Exam
1st	Configuration, Design and Implementation of Manufacturing or Service Value Chains				
	P	Configuration, Design and Implementation of Manufacturing or Service Value Chains	15	7-point scale	External
	C	Research Methods and Analysis	5	7-point scale	Internal
	C	Operations Management and Productivity Improvement	5	7-point scale	Internal
	C	Outsourcing and Procurement	5	7-point scale	Internal
2nd	Innovation and Implementation within Value Chains				
	P	Innovation and Implementation within Value Chains	15	7-point scale	Internal
	C (Mandatory)	Innovation, Technology and Change	5	7-point scale	Internal
	C (Mandatory)	Developing Integrated Solutions	5	7-point scale	Internal
	C (Elective)	Engineering Key Processes	5	7-point scale	Internal
	C (Elective)	Sustainable Operations Management	5	7-point scale	Internal
3rd	Operations and Innovation Management				
	P	Operations and Innovation Management	30	7-point scale	Internal
	P	Academic Internship	30	7-point scale	Internal
	P	Long Master's Thesis	30	7-point scale	External
4th	Operations and Innovation Management				
	P	Master's Thesis	30, possible 60	7-point scale	External
SUM			120		

3.2 Configuration, Design and Implementation of Manufacturing or Service Value Chains, 1st semester

3.2.2 Configuration, Design and Improvement of Manufacturing or Service Value Chains

Title: Configuration, Design and Improvement of Manufacturing or Service Value Chains / Konfiguration, design, og implementering af produktions eller service værdikæder

Objectives: This project module attempt to integrate the internal perspective from the course "Operations Management and Productivity Improvement" with the external perspective from the course "Outsourcing and Procurement" – in order to create improvements in the configuration and design of a value chain in organizations or networks of organizations.

Students who complete the module can:

Knowledge
- Account for how to integrate selected parts of operation management and productivity theories, tools, and methods with the aim of configuring and designing an improved value chain of a manufacturing or service organization in practice.
- Understand the role for and the deployment of technologies within the process of improving value chains in organizations or networks of organizations.
- Explain how to overcome real life challenges connected to the (re)configuration and improvement value chains in organizations or networks of organizations.
- Show how to operationalize theoretical contributions to practical settings.
- Understand how sustainability considerations can be included the configuration, design and improvement of value chains.

Skills
- Combine insights from the literature and theory when configuring, designing, and improving value chains in organizations, networks of organizations.
- Analyse the role of technologies in value chains.
- Write a well-structured project report, written with clear arguments including the following elements:
  o Develop and delimit an original formulation of the problem being investigated,
  o Critically explore and apply relevant theories and analytical approaches to the problem under investigation,
  o Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny,
  o Make a rigorous, systematic, and comprehensive analysis of the problem under investigation.
- Evaluate of the findings and recommendations/solutions, methods and, if relevant, considerations regarding the limitations and generalisability of the study.

Competencies
- Operationalize theoretical contributions in a practical setting.
- Work together as a team to analyse and collect data in connection to problems in relation to conceiving and designing a value chain in a real life setting.

- Integrate considerations on the deployment of technologies into the configuration, design, and improvement of the value chain of an organization, networks of organizations or value chains.

Type of instruction: The module is carried out as group-based problem-oriented project work. The group work is carried out as an independent work process in which the students themselves organize and coordinate their workload in collaboration with a supervisor. The project is carried out in groups with normally no more than 6 members.

Examination format: External, oral group examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.2.3 Research Methods and Analysis

Title: Research Methods and Analysis/ Forskningsmetoder og Analyse

Objectives: This course aims to develop students' skills to understand, apply and evaluate research methods and tools in problem-based projects with academic rigor. A particular emphasis is on research design, data collection and data analysis and ensuring validity and reliability.

Students who complete the module have:

Knowledge

- A coherent and profound understanding of research design approaches for studying value chains and business systems and processes.
- Understanding of how to operationalize theory as part of research design, data collection and data analysis.
- Understanding of quantitative and qualitative methods to collect data about value chains and business systems and processes, including the trade-offs between different data collection methods.
- Understanding of quantitative and qualitative methods to analyse value chains and business systems and processes.
- Understanding of approaches to ensure validity and reliability in relation to research design, data collection and data analysis.
- Knowledge of the state-of-the-art of technological developments within data generation.

Skills

- Developed skills in applying and evaluating quantitative and qualitative research designs necessary for understanding, analyzing and improving value chains and business systems and processes.
- Developed skills in applying and evaluating quantitative and qualitative methods for data collection and data analysis.

Competencies

- Be able to select and operationalize appropriate quantitative and qualitative research designs.
- Be able to select and operationalise appropriate quantitative and qualitative approaches to data collection and data analysis.
- Be able to analyse and improve value chains and business systems and processes.

Type of instruction: The Teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.2.4 Operations Management and Productivity Improvement

Title: Operations Management and Productivity Improvement / Produktionsledelse og produktivitetsudvikling

Objectives: This course focuses on managing and developing operations and productivity. Taking the strategic development of the operations function as its point of departure the course will focus on how to manage operations within the company. Besides managing operations the course will also focus on how to analyze and improve production systems and processes. The course will also include service operations.

Students who complete the module are expected to:

Knowledge

- Have gained understanding planning principles and concepts in manufacturing and service operations.
- Have gained insight into the use of technologies in productions and service systems.
- Have developed a understanding about how processes and systems can be improved using concepts such as lean, six sigma and total quality management.
- Have gained knowledge different production philosophies and their core elements.
- Have developed insight into the strategic development of manufacturing and service operations.
- Have developed an understanding of the relation between manufacturing and service processes and systems and the surrounding organization, society and environment.

Skills

- Be able to evaluate the use of technologies in production and service systems.
- Be able to describe manufacturing and service processes and systems.
- Be able to identify appropriate productivity improvement methods in a given situation depending on the actual contingencies.
- Be able to identify appropriate productivity improvement methods taking into consideration the long term sustainability goals (including financial, social and environmental goals).
- Be able to identify and evaluate key trade-offs in connection with the design and improvement of production and services systems.
- Be able to design manufacturing and service processes and systems which fits with the surrounding organization

Competencies

- Be able to improve manufacturing and service processes using technologies.
- Be able to operationalize and apply improvement methodologies and tools in a practical context.
- Be able to realise and implement productivity improvement in manufacturing and services.
- Be able to improve performance taking into consideration the sustainability perspective.

Type of instruction: The Teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.2.5 Outsourcing and Procurement

Title: Outsourcing and Procurement / Outsourcing og indkøb.

Objectives: The course focuses on the external dimensions of contemporary global pro-
                          duction systems. Focus is especially on global strategies, outsourcing choic-
                          es/practices, supplier related choices/practices and procurement choic-
                          es/practices.

                          Students who complete the module are expected to have:

Knowledge

- An understanding of the central international management theories.
- An understanding of the determinants behind the configuration of a company's internationalization choices.
- Knowledge of strategic procurement and the associated challenges.
- Knowledge of different key managerial challenges pertaining to the out-sourcing decision, supplier selection, relationship building and collabora-tion with suppliers.
- Knowledge of the role of digitalization with regards to configuration of global value chains.
- Knowledge of the role of technological issues and sustainability when making outsourcing and procurement decisions.

Skills

- Developed skills in applying the international management theories when configuring global value chains.
- Developed skills to evaluate different options concerning internationali-zation choices from the perspective of international management.
- Developed skills to critically asses the limitations to international man-agement theories and supplier management theories.
- Develop skills in making outsourcing choices, supplier management, and to procurement.

Competencies

- Be able to discuss in a nuanced way the problem complex associated with internationalization with specific focus on aspects relating to owner-ship advantages, locational choices and internalization issues.
- Be able to discuss in a nuanced way central issues in respect to supplier management and procurement.
- Be able to provide theory informed yet independent reflections on the adequacy of the international management and supplier management theories.
- Develop abilities to craft and implement relevant organizational set-ups in the global companies or companies interested in internationalizing.

Type of instruction: The Teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.3 Innovation and Implementation within Value Chains, 2nd semester

3.3.1 Innovation and Implementation within Value Chains
Title: Innovation and Implementation within Value Chains / Innovation og implementering i værdikæder

Recommended academic prerequisites:
              The module builds upon the knowledge acquired in 1st semester.

Objectives: This project module attempt to integrate the different perspectives from the courses taught during the semester. The idea in this project module is for the students to work with problems related to implementing and using innovations and technologies in a sustainable, coherent, and value creating manner within value chains of organizations or network of organizations.

Students who complete the module can:

Knowledge
- Account for how to integrate selected parts of theories, tools, and methods with the aim of implementing innovative solutions in the value chain of manufacturing or service organizations or networks of organizations.
- Understand the implementation of technologies in organizations, networks of organizations or value chains.
- Explain how to overcome real life challenges connected with innovation and the associated implementation of changes within value chains in organizations, networks of organizations or value chains.
- Show how to operationalize theoretical contributions to practical settings.
- Understand how sustainability considerations can be included the implementation of within the value chains organizations, networks of organizations or value chains.

Skills
- Combine insights from the literature and theory when designing implementing approaches for novel value chains in organizations or networks of organizations.
- Write a well-structured project report, written with clear arguments including the following elements:
  - Develop and delimit an original formulation of the problem being investigated.
  - Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - Make a rigorous, systematic, and comprehensive analysis of the problem under investigation.
- Evaluate of the findings and recommendations/solutions, methods and, if relevant, considerations regarding the limitations and generalisability of the study.

Competencies
- Operationalize theoretical contributions in a practical setting.
- Work together as a team to analyse and collect data in connection to problems in relation to implementing changes in a value chain in a real life setting.

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- Integrate considerations on the application of technologies into the implementation of changes within the value chain of an organization, networks of organizations or value chains.

Type of instruction: The module is carried out as group-based problem-oriented project work. The group work is carried out as an independent work process in which the students themselves organize and coordinate their workload in collaboration with a supervisor. The project is carried out in groups with normally no more than 6 members.

Examination format: Internal, oral group examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.3.2 Innovation, Technology and Change

Title: Innovation, Technology and Change / Innovation, teknologisk udvikling og forandring

Recommended academic prerequisites:
The module builds upon the knowledge acquired in 1st semester.

Objective: This course focuses on managing innovation and technology as well as organizational change, which often accompany technological innovations. Relatedly, the course highlights that innovation and technological development needs innovation and change management to successfully develop, implement and realize inventions and new technologies.

Students who complete the module are expected to:

Knowledge

- Have gained understanding of the role of and relationship between innovation, technology and change in organizations, networks of organizations or supply chains.
- Have gained understanding of different types of innovation and innovation management theories.
- Have gained knowledge about organizational change and change management methods, and theories.

Skills

- Be able to analyse, design and manage innovation, technology, and change processes in an organization, network of organizations or supply chains.
- Be able to identify and evaluate appropriate innovation, development and change approaches depending on internal and external contingencies.
- Be able to combine insights about innovation, technology and change management to capture their value creating potential within an organization, network of organizations or in supply chains.

Competencies

- Be able to design, evaluate, and improve innovation, technology, and change management initiatives and processes in an organization, network of organizations or supply chains.
- Be able to operationalise and apply theories and methods about innovation, technology, and change management to analyse and evaluate such initiatives in an organization, network of organizations or supply chains.
- Be able to realise and implement innovation, technology, and change management initiatives in an organization, network of organizations or supply chains.

Type of instruction: The Teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.3.3 Developing Integrated Solutions

Title: Developing Integrated Solutions / Udvikling af integrerede løsninger

Recommended academic prerequisites:
                           The module builds upon the knowledge acquired in 1st semester.

Objectives: The focus areas of the course are on developing and implementing integrated solutions to bring innovative products or services into new markets. This entails a focus on three different, but related, perspectives. Firstly, it is necessary to be able to set-up a value chain possibly including both upstream and downstream perspectives. Secondly, it is necessary to carry out effective project management and master the needed practical tools. Thirdly, it is necessary to integrate different aspects into the solution – for example technology, supply chain, customer, and stakeholder aspects.

                           Students who complete the module have:

Knowledge

- An understanding of the requirements and challenges related to developing and implementing an integrated solution needed for bringing innovative products and service into to new markets.
- An understanding of how value chains can be developed possibly including both upstream and downstream aspects.
- An understanding of project management and related tools and concepts.
- An understanding of how different aspects within the value chain can be integrated and aligned.

Skills

- Managing a project aimed at developing and implementing an integrated solution for bringing an innovative product or service to market.
- Developing, designing, and setting-up an integrated value chain including both upstream and downstream aspects.
- Identifying and analyzing how different aspects of the integrated solution can be integrated and aligned.
- Develop skills in managing the behavioural dimension of project management.

Competencies

- Develop and design integrative solutions for bringing new products and services into new markets.
- Select and operationalize theories, models, and concepts in connection with the development and design of the integrated solution.
- Critically asses the implications of the integrated solution for the relevant stakeholders.

Type of instruction: The teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.3.4 Engineering Key Processes

Title: Engineering Key Processes / Udvikling og forbedring af nøgle processer

Recommended academic prerequisites:
                                The module builds upon the knowledge acquired in 1st semester.

Objectives: The core idea in this course is to allow the students to analyze core organizational functions, processes and systems – these can be inside the organization or spanning organizational boundaries. Furthermore, the students should be able to improve the integration and alignment of these core organizational functions, processes and systems in a structured and systematic manner.

                                Students who complete the module can:

Knowledge

- Understand inter-relationships between organizational functions, processes and systems like R&D, technological development, operations and supply chain.
- Understand key trade-offs between choices made in different organizational functions, processes and systems and understanding the impact of functional decisions on overall corporate performance.
- Describe methods to assess the financial implications of decisions within core organizational functions, processes, and systems.
- Explain the possibilities to conduct risk management at functional and organizational level.
- Account for cross-functional linkages between organizational functions, processes, and systems for the efficient management in the global organization and its value chains.
- Have knowledge about technology as a key process enabler in the global organization.

Skills

- Identify improvement opportunities integrating multiple functions within an organization and partners across the supply and value chain.
- Evaluate suggestions for improvements inside the organization and across the supply and value chain in a structured and systematic manner.
- Analyze the sources of risks across functions.
- Develop a holistic performance management system for individual functions and overall organization.

Competencies

- Design efficient cross-functional organizational and inter-organizational processes and systems including logistics, supply chain, and new product development ensuring integration, risk management and efficiency.
- Design performance management systems for functions considering their linkage to overall firm performance

Type of instruction: The teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.3.5 Sustainable Operations Management

Title: Sustainable Operations Management / Bæredygtig produktionsledelse

Recommended academic prerequisites:
> The module builds upon the knowledge acquired in 1st semester.

Objectives: This course addresses the key choices in developing and managing operation and organizations to achieve sustainable production with safety, viability, efficiency and quality simultaneously. Intra-organizationally the course focusses on designing and managing jobs, tasks, technology, people and collaboration. Extra-organizationally the course addresses sustainability issues about sustainable operations in networks of organizations or supply chains stemming from demands by regulatory agencies, partners, customers and competitors.

       Students who complete the module are expected to:

Knowledge

- Have gained understanding of how to develop and manage sustainable operations in an organization.
- Have gained understanding of how to develop and manage sustainable operations in networks of organizations or supply chains.
- Have gained understanding of the role of technology in developing and managing sustainable operations in organizations, networks of organizations or supply chains.
- Have gained understanding of different theoretical perspectives on developing and managing sustainable operations in organizations, networks of organizations or supply chains.

Skills

- Be able to analyse and evaluate sustainable operations in organizations, network of organizations or supply chains.
- Be able to develop and manage sustainable operations in organizations, network of organizations or supply chains.
- Be able to combine insights about internal and external perspectives and requirements for sustainable operations development to improve viability, efficiency and quality in an organization, a network of organizations or in a supply chain.

Competencies

- Be able to conceive and design sustainable operations initiatives and processes in an organization, network of organizations or supply chains by operationalizing and applying methods and theories about sustainable operations development.
- Be able to improve the viability, efficiency and quality of sustainable operations initiatives and processes in an organization, network of organizations or supply chains.

Type of instruction: The teaching is organized in accordance with the general forms of teaching, see chapter 3.

Examination format: Internal, oral/written examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.4 Operations and Innovation Management, 3rd semester

3.4.1 Operations and Innovation Management
Title: Operations and Innovations Management / Værdikæder og innovationsledelse

Recommended academic prerequisites:
     The module builds upon the knowledge acquired during the first two semesters

Students who complete the module:

Knowledge
- Deep knowledge of the subject matter in the specific area of the project.

Skills
- Evaluate the concepts, theories and methodologies applied in the solution of the problem.
- Account for the choices made during the solution of the problem and substantiate that these are made on a high professional level.
- Assess and evaluate the limitations of the concepts, theories and methodologies applied in the solution of the problem.
- Plan, execute and report an extensive individual research project within an agreed time frame.
- Write a well-structured project report, written with clear arguments including the following elements:
  o Develop and delimit an original formulation of the problem being investigated.
  o Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  o Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  o Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Conduct technological development and research, and solve complicated technical problems using scientific methods

Competencies
- Analyse and solve an actual problem of industrial relevance through application of systematic research and development processes, including advanced analytical, experimental, and/or numerical methods and models.
- Work together with a manufacturing or service organisation and to identify operations and/or supply chain management problems and finally develop data driven and robust solutions using technologies.
- Operationalize theoretical contributions in a practical setting.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic or other consequences of the proposed solutions.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral

Organization: The project may be finalized with a project report or in the form of a scientific paper with supporting appendices documenting the research conducted and reported in the paper.

Type of instruction: The project work is carried out as an independent work process in which the students themselves organise and coordinate their workload in collaboration with a supervisor. The project may be carried out individually or in groups. The project may be finalized with a project report or in the form of a scientific paper with supporting appendices.

Examination format: Internal, oral group examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.4.1 Academic Internship

Title: Academic Internship / Projektorienteret forløb i en virksomhed

Recommended academic prerequisites:
        The module builds upon the knowledge acquired during the first two semesters on the education.

        Students who complete the module:

Knowledge

- Deep knowledge of the subject matter in the specific area of the project

Skills

- Evaluate the concepts, theories and methodologies applied in the solution of the problem.
- Account for the choices made during the solution of the problem and substantiate that these are made on a high professional level.
- Assess and evaluate the limitations of the concepts, theories and methodologies applied in the solution of the problem.
- Plan, execute and report an extensive individual research project within an agreed time frame.
- Write a well-structured project report, written with clear arguments including the following elements:
  o Develop and delimit an original formulation of the problem being investigated.
  o Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  o Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  o Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Conduct technological development and research, and solve complicated technical problems using scientific methods.

Competencies

- Analyse and solve an actual problem of industrial relevance through application of systematic research and development processes, including advanced analytical, experimental, and/or numerical methods and models.
- Work together with a manufacturing or service organisation and to identify operations and/or supply chain management problems and finally develop data driven and robust solutions using technologies.
- Operationalize theoretical contributions in a practical setting.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic or other consequences of the proposed solutions.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral.

Type of instruction: The student works in a company providing experience in solving advanced and relevant engineering tasks on a level corresponding to the learning objectives outlined above and with a progression in the degree of difficulty of the tasks during the period. The type of work must allow for an academic report to be made.

The student writes either a project report or a case-based project report within the theme of the 3rd semester of the education; cf. "Guidelines for Project Work in an External Organisation (Academic Internship)" laid down by the School of Engineering and Science.

Examination format: Internal, oral group examination.

Evaluation criteria: Are stated in the Joint Programme Regulations

3.5 Operations and Innovation management, 4th semester

3.5.1 Master's Thesis

Title: Master's Thesis / Kandidatspeciale

The master thesis can be conducted as a long master thesis using both the 3rd and 4th semester. If choosing to do a long master thesis, it has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS.

Recommended academic prerequisites:

The module builds upon the knowledge acquired in the first three semesters

Objectives: Describe the objectives to be obtained by following the module. As a guidance, this can contain objectives within knowledge, skills and competencies (see the below example), but this is not required for all modules.
Students who complete the module:

Knowledge

- Deep knowledge of the subject matter in the specific area of the project.

Skills

- Plan, execute and report an extensive individual research project within an agreed time frame.
- Apply scientific methodology in solving a wide variety of problems within the field of specialization.
- Perform scientific work in relevant topics of the field of the specialization.
- Apply a wide range of technologies and engineering methods in research and development projects in the field of specialization.
- Write a well-structured project report, written with clear arguments including the following elements:
  - o Develop and delimit an original formulation of the problem being investigated.
  - o Critically explore and apply relevant theories and analytical approaches to the problem under investigation.
  - o Assemble and process valid and reliable data, relevant to the problem and sub-problems under scrutiny.
  - o Make a thorough, systematic, and comprehensive analysis of the problem under investigation.
- Participate in or lead projects within the fields of the specialisation.

Competencies

- Plan, execute and report an extensive individual research project within an agreed time frame.
- Conduct technological development and research, and solve complicated technical problems using scientific methods.
- Work independently with a project on a complex problem within their field of interest on the highest possible level within their specialization.
- Take part in both discipline-specific and interdisciplinary cooperation to solved complex problems.
- Compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Consider economic consequences and impact on society, environmental and safety issues related to the project.
- Communicate a balanced view of the results and conclusions of the project in well-organized written and oral presentation.

Type of instruction: In this module, the Master's Thesis is carried out. The module constitutes independent project work and concludes the programme. Within the approved topic, the Master's Thesis must document that the level of the programme has been attained.

Examination format: Oral examination with participation of an external examiner.

Evaluation criteria: Are stated in the Joint Programme Regulations

Chapter 4: Entry into Force, Interim Provisions and Revision

The curriculum is approved by the dean and enters into force as of September 2018.

Students who wish to complete their studies under the previous curriculum from 2017 must conclude their education by the summer examination period 2019 at the latest, since examinations under the previous curriculum are not offered after this time.

Chapter 5: Other Provisions

5.1 Rules concerning written work, including the Master's Thesis

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

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

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

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

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

5.3 Rules for examinations

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

All students who have not participated in Aalborg University's PBL introductory course during their Bachelor's degree must attend the introductory course "Problem-based Learning and Project Management". The introductory course must be approved before the student can participate in the project exam. For further information, please see the School of Engineering and Science's website.

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[1] Or another foreign language (French, Spanish or German) upon approval by the study board.
[2] The study board can grant exemption from this.

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

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

5.6 Additional information
The current version of the curriculum is published on the study boards' website, including more detailed information about the programme, including exams.