AALBORG UNIVERSITET

STUDIEORDNING FOR KANDIDATUDDANNELSEN I PRODUKTIONSLEDELSE, 2022

CIVILINGENIØR
AALBORG

MODULER SOM INDGÅR I STUDIEORDNINGEN

INDHOLDSFORTEGNELSE

DESIGNING GLOBAL BUSINESS SYSTEMS AND VALUE CHAINS

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Can account for the relationships between theories on global business systems and value chains.
- Can understand the role for and the deployment of choices in the design of (global) companies, supply chains, manufacturing systems, and production networks.

SKILLS

- Can analyze and develop an integrated solution to a practical problem, usually in the form of a project developed in and together with a company.
- Can write a well-structured project report, written with clear arguments.
- Can critically explore empirical problems and account for the choice of theories and approaches to analyze and solve the selected problem.

COMPETENCES

- Is able to operationalize theoretical contributions on global business systems and value chains as well as other relevant scientific fields in a practical setting.
- Can work together as a team to analyze and develop integrated and feasible solution(s) to a practical organizational problem.
- Can work together with an organization in an academically yet practically adequate manner.
- Is able to demonstrate how to operationalize theoretical contributions to practical settings.
- Possess the ability to identify and propose solutions with special focus on cross-functional issues.

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.

EXTENT AND EXPECTED WORKLOAD

Since it is a 15 ECTS project module the expected workload is 450 hours for the student.

EXAM

EXAMS

Name of exam	Designing Global Business Systems and Value Chains
Type of exam	Oral exam based on a project
ECTS	15
Assessment	7-point grading scale
Type of grading	External examination

Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Design af globale forretningssystemer og værdikæder
Module code	M-OM-K1-1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Charles Møller

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

ADVANCED OPERATIONS MANAGEMENT

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained both theoretical and practical knowledge about stochastic simulation and its utilisation in improvement of planning and control systems in companies and supply chains
- Have gained knowledge of a number of numerical and mathematical methods and models for designing and improving planning and control concepts in companies and supply chains
- Have gained knowledge and understanding about numerical analysis of demand patterns
- Have gained knowledge about advanced order management systems
- Have gained knowledge about stochastic discrete event simulation and simulation tools
- Have gained knowledge to identify key performance indicators relevant to evaluate stochastic simulation models.

SKILLS

- Be able to analyse and develop order management systems for both industrial and service companies
- Be able to conduct a numerical analysis of a company's and supply chain's performance. This involves both choice and utilisation of statistical analysis methods on selected elements of companies and supply chains
- Show understanding the utilisation of probabilistic models in connection with design and usage of planning and control systems. This includes knowledge and insight into the opportunities and limitations of probabilistic models
- Be able to utilise stochastic discrete event simulation to assess opportunities and limitations of a production system and be able to utilise simulation as a tool for analysis and synthesis in their project work
- Be able to be model and simulate a specific company's production system and evaluate the performance of this system
- Be able to design and redesign planning and control systems in production and service management companies and supply chains adapted to a company's or supply chain's specific situation.

COMPETENCES

- Be able to combine a number of mathematical tools in an appropriate manner to conduct an analysis of the as-is situation of a company or supply chain.

TYPE OF INSTRUCTION

The course consists of a number of lectures as well as the student's independent learning effort. The form and extent of the course is determined and described in connection with planning the semester. The lesson plans, literature etc. are created in connection with this. The course is conducted as a combination of single-disciplinary, problem-oriented and cross-disciplinary fields of study, and it is structured from a work and evaluation form which combines skills and reflection:

- Lectures
- Class work
- Project work
- Workshops
- Exercises (alone and in groups)
- Teacher feedback
- Reflection on content
- Portfolio work.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Advanced Operations Management
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Advanced Operations Management
Module code	M-OSM-K1-2
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

DEVELOPMENT OF QUALITY, RISK, AND PROJECT MANAGEMENT SYSTEMS 1

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained knowledge of theories of quality control; business processes and supply chains
- Have gained knowledge of project planning and control as well as techniques for this
- Have gained knowledge of IT-systems for project planning and control
- Have gained knowledge of financial control of activities in engineer/manufacture to order companies with long project durations.

SKILLS

- Be able to understand quality control in relation to the company's business processes and analyse an organisation's need for quality control emphasising the supply chain, as well as give suggestions to changes and improvements of parts of or the entire system
- Be able to understand financial control of activities in engineer/manufacture to order companies. This includes: liquidity control, financial capacity control and calculations for planning, control and follow-up on the company's order-based production
- Be able to understand resource-constrained project management problems and plan the execution of projects under constraints (e.g. budgetary, time, resource), including the use of methods for project planning and control
- Be able to understand how IT-systems can support business processes and work flows in project-driven companies.

COMPETENCES

- Be able to design quality and project management systems in companies with order based production while taking into account how such systems interact with a company's core activities and other control systems, especially the financial control systems
- Be able to specify projects and constraints as well as problems which may arise in project-driven companies
- Be able to use the attained knowledge in regards to how companies develop quality control systems.

TYPE OF INSTRUCTION

The course consists of a number of lectures as well as the student's independent learning effort. The form and extent of the course is determined and described in connection with planning the semester. The lesson plans, literature etc. are created in connection with this. The course is conducted as a combination of single-disciplinary, problem-oriented and cross-disciplinary fields of study, and it is structured from a work and evaluation form which combines skills and reflection:

- Lectures
- Class work
- Project work
- Workshops
- Exercises (alone and in groups)
- Teacher feedback
- Reflection on content
- Portfolio work.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Development of Quality, Risk, and Project Management Systems 1
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Udvikling af kvalitets-, risiko - og projektstyringssystemer 1
Module code	M-OSM-K1-4
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

FLEXIBLE MANUFACTURING

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained knowledge about mass customization systems in an operations management context
- Have gained knowledge about assessment of mass customization performance
- Have gained knowledge about product architecture, manufacturing architecture and their relations to mass customization
- Have gained knowledge about flexible manufacturing systems, reconfigurable manufacturing systems, changeable manufacturing systems, automated manufacturing systems and the differences between these.
- Have gained knowledge of planning methods designed specifically for flexible manufacturing systems.

SKILLS

- Be able to analyze a product family in terms of variety and product architecture
- Be able to evaluate different IT solutions supporting mass customization, including product configurators and perform basic modelling
- Be able to analyze a range of manufacturing tasks and evaluate different types of manufacturing systems to determine the appropriate level of flexibility vs. automation
- Be able to model flexible manufacturing problems

COMPETENCES

- Have the competence to evaluate a company’s product portfolio in terms of volume, variety and manufacturing tasks and identify solutions for IT system support and manufacturing system design.

TYPE OF INSTRUCTION

The course consists of a number of lectures as well as the student’s independent learning effort. The form and extent of the course is determined and described in connection with planning the semester. The lesson plans, literature etc. are created in connection with this. The course is conducted as a combination of single-disciplinary, problem-oriented and cross-disciplinary fields of study, and it is structured from a work and evaluation form which combines skills and reflection:

- Lectures
- Class work
- Project work
- Workshops
- Exercises (alone and in groups)
- Teacher feedback
- Reflection on content
- Portfolio work.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Flexible Manufacturing
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Fleksibel produktion
Module code	M-OSM-K1-3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Ann-Louise Andersen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

DEVELOPMENT AND INNOVATION OF GLOBAL BUSINESS SYSTEMS AND VALUE CHAINS

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge obtained in 1st semester. Furthermore, this project builds on the three courses taught in the 2nd semester

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Has gained in-depth knowledge of development and innovation of global business systems and value chains using supply chain operations on real life problems.

SKILLS

- Can demonstrate the skills to choose among and apply in practice the theories, concepts, methods and tools taught in this semester.
- Can analyze, and develop an integrated solution to a practical problem, usually in the form of a project developed in and together with an organization.

COMPETENCES

- Is able to operationalize theoretical contributions on global business systems and value chains as well as other relevant scientific fields in a practical setting.
- Can work together as a team to analyze and develop integrated and feasible solution(s) to a practical organizational problem.
- Can work together with an organization in an academically yet practically adequate manner.
- Is able to demonstrate how to operationalize theoretical contributions to practical settings.
- Possess the ability to identify and propose solutions with special focus on cross-functional issues.

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.

EXTENT AND EXPECTED WORKLOAD

Since it is a 15 ECTS project module the expected workload is 450 hours for the student.

EXAM

PREREQUISITE FOR ENROLLMENT FOR THE EXAM

- An approved PBL competency profile is a prerequisite for participation in the project exam.

EXAMS

Name of exam	Development and Innovation of Global Business Systems and Value Chains

Type of exam	Oral exam based on a project
ECTS	15
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Udvikling og innovation af globale forretningssystemer og værdikæder
Module code	M-OM-K2-1A
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Charles Møller

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

BUSINESS INTELLIGENCE AND ANALYTICS

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Account for Business Intelligence (BI) concepts, theories and methods including:
  - Creation of knowledge from either people/employees/"experts" or from analysing existing data
  - Knowledge representation
  - Traditional BI handling systems such as expert systems, knowledge base systems, decision support systems and executive information systems.

SKILLS

- Make decisions about the optimal use of the BI concepts, theories, methods and selected systems for identification of needs, development of alternative solutions, evaluation selection and implementation
- Use BI in disciplines such as enterprise engineering/modelling, business analytics, data mining, etc.

COMPETENCES

- Apply knowledge and skills in relation to business intelligence development projects and thereby apply the knowledge handling activities: knowledge acquisition, knowledge verification, knowledge representation and knowledge engineering.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Business Intelligence and Analytics
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Business Intelligence og analytiske metoder
Module code	M-OIM-K2-3

Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

MANUFACTURING AND SUPPLY CHAIN SYSTEMS 2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained knowledge of the structure and functionality of manufacturing and supply chain systems such as Enterprise Resource Planning, Advanced Planning & Scheduling, Vendor Managed Inventory, Optimisation Suites and Shop Floor Planning & Control
- Have gained knowledge of planning technologies and configuration of manufacturing and supply chain systems
- Have gained knowledge of how to share information and coordinate decisions in a supply chain

SKILLS

- Be able to work with differentiated manufacturing and supply chain control
- Be able to work with manufacturing and supply chain control principles
- Be able to work with information sharing levels

COMPETENCES

- Be able to select and design differentiated manufacturing and supply chain control principles
- Be able to develop planning and control solutions

TYPE OF INSTRUCTION

The course consists of a number of lectures as well as the student's independent learning effort. The form and extent of the course is determined and described in connection with planning the semester. The lesson plans, literature etc. are created in connection with this. The course is conducted as a combination of single-disciplinary, problem-oriented and cross-disciplinary fields of study, and it is structured from a work and evaluation form which combines skills and reflection:

- Lectures
- Class work
- Project work
- Workshops
- Exercises (alone and in groups)
- Teacher feedback
- Reflection on content
- Portfolio work.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Manufacturing and Supply Chain Systems
Type of exam	Written or oral exam
ECTS	5

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Fremstillings- og forsyningskædesystemer
Module code	M-OSM-K2-2
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Hans-Henrik Hvolby, Iskra Dukovska-Popovska

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

DEVELOPMENT OF QUALITY, RISK, AND PROJECT MANAGEMENT SYSTEMS 2

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge obtained in the 1st semester of the MSc in Operations and Supply Chain Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Have gained knowledge of a range of selected models and methods in the area of quality and project management, including:
  - Planning, control and optimising in multi-project environments
  - Models, methods and tools to develop advanced quality, environmental and project management systems
  - Risks management and performance measurements.
- Have gained knowledge of how quality, project and management accounting systems can be incorporated as strategic elements in a company
- Have gained knowledge of how quality, project and management accounting systems can be integrated with a company's other management systems
- Have gained knowledge of risk identification and risk management in ETO productions, and how such risks can be addressed as a strategic business advantage.

SKILLS

- Be able to analyse an organisation's need for quality and project management, internal as well as external in relation to customers and suppliers
- Be able to analyse a group of projects with simultaneous lifetime and to evaluate existing project portfolios
- Be able to apply advanced methods and models in the improvement suggestions for an organisation's current quality and project management systems
- Be able to identify and analyse risk factors for project portfolios and understand risk management systems, also with a strategic focus
- Be able to evaluate the effect of the implementation of suggested methods and models.

COMPETENCES

- Be able to understand and identify the connection between the quality system and a company's other control systems as well as relations to suppliers and customers in the value chain
- Be able to design and understand project management systems with conflicting success criteria, limited resources available and limited budgets
- Be able to analyse risk factors for a project portfolio, understand risk management systems and to turn risks into business opportunities.

TYPE OF INSTRUCTION

The course consists of a number of lectures as well as the student's independent learning effort. The form and extent of the course is determined and described in connection with planning the semester. The lesson plans, literature etc. are created in connection with this. The course is conducted as a combination of single-disciplinary, problem-oriented and cross-disciplinary fields of study, and it is structured from a work and evaluation form which combines skills and reflection:

- Lectures
- Class work

- Project work
- Workshops
- Exercises (alone and in groups)
- Teacher feedback
- Reflection on content
- Portfolio work.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Development of Quality, Risk, and Project Management Systems 2
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Udvikling af kvalitets-, risiko- og projektstyringssystemer 2
Module code	M-OSM-K2-4
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

GLOBAL IMPLEMENTATION

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge obtained in the 1st and 2nd Semester

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Holds knowledge of analytical and experimental methods for analysis of advanced engineering tasks.
- Understands the connection between theory and practice.

SKILLS

- Is able to solve complex business problems by applying advanced management engineering theory, methods and tools.
- Is able to evaluate and choose among potentially relevant theories, concepts and methodologies applied in the analysis and solution design of a practical business engineering problem.
- Is able to develop solution alternatives and evaluate consequences of solution alternatives and make a well-informed choice based on that.
- Is able to evaluate the relevance and limitations of the theories, concepts, methods and tools actually applied in the project.

COMPETENCES

- Is able to analyze 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.

TYPE OF INSTRUCTION

The project 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 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.

The total workload of the semester has to be equivalent to 30 ECTS. For further information about the organization of the module please see the Joint Programme Regulations.

EXTENT AND EXPECTED WORKLOAD

Since it is a 30 ECTS project module the expected workload is 900 hours for the student.

EXAM

EXAMS

Name of exam	Global implementation
Type of exam	Oral exam based on a project
ECTS	30

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Global implementering
Module code	M-OM-K3-1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Harry Boer

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

GLOBAL IMPLEMENTATION

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge obtained in the 1st and 2nd Semester

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Holds knowledge of analytical and experimental methods for analysis of advanced engineering tasks.
- Understands the connection between theory and practice.

SKILLS

- Is able to solve complex business problems by applying advanced management engineering theory, methods and tools.
- Is able to evaluate and choose among potentially relevant theories, concepts and methodologies applied in the analysis and solution design of a practical business engineering problem.
- Is able to develop solution alternatives and evaluate consequences of solution alternatives and make a well-informed choice based on that.
- Is able to evaluate the relevance and limitations of the theories, concepts, methods and tools actually applied in the project.

COMPETENCES

- Is able to analyze 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.

TYPE OF INSTRUCTION

The project 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 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.

The total workload of the semester has to be equivalent to 30 ECTS. For further information about the organization of the module please see the Joint Programme Regulations.

EXTENT AND EXPECTED WORKLOAD

Since it is a 25 ECTS project module the expected workload is 750 hours for the student.

EXAM

EXAMS

Name of exam	Global implementation
Type of exam	Oral exam based on a project
ECTS	25

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Global implementering
Module code	M-OM-K3-2
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	25
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Harry Boer

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

PROJECT ORIENTED STUDY IN AN EXTERNAL ORGANISATION

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge obtained in the 1st and 2nd Semester

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Holds knowledge of analytical and experimental methods for analysis of advanced engineering tasks.
- Understands the connection between theory and practice.

SKILLS

- Is able to solve complex business problems by applying advanced management engineering theory, methods and tools.
- Is able to evaluate and choose among potentially relevant theories, concepts and methodologies applied in the analysis and solution design of a practical business engineering problem.
- Is able to develop solution alternatives and evaluate consequences of solution alternatives and make a well-informed choice based on that.
- Is able to evaluate the relevance and limitations of the theories, concepts, methods and tools actually applied in the project.

COMPETENCES

- Is able to analyze 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.

TYPE OF INSTRUCTION

The project 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 semester is completed as a project-oriented stay in a company where the student is included in the company's daily work and carry out independent project work on an industrial problem relevant for the company. Concurrent to the work in the company, the student makes a project report, which is evaluated after the ending of the internship. A project-oriented stay in a company has to be approved by the study board.

EXTENT AND EXPECTED WORKLOAD

Since it is a 30 ECTS project module the expected workload is 900 hours for the student.

EXAM

EXAMS

Name of exam	Project Oriented Study in an External Organisation
Type of exam	Oral exam based on a project
ECTS	30

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Projektorienteret forløb i en virksomhed
Module code	M-OM-K3-6
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Harry Boer

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

PROJECT ORIENTED STUDY IN AN EXTERNAL ORGANISATION

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge obtained in the 1st and 2nd Semester

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Holds knowledge of analytical and experimental methods for analysis of advanced engineering tasks.
- Understands the connection between theory and practice.

SKILLS

- Is able to solve complex business problems by applying advanced management engineering theory, methods and tools.
- Is able to evaluate and choose among potentially relevant theories, concepts and methodologies applied in the analysis and solution design of a practical business engineering problem.
- Is able to develop solution alternatives and evaluate consequences of solution alternatives and make a well-informed choice based on that.
- Is able to evaluate the relevance and limitations of the theories, concepts, methods and tools actually applied in the project.

COMPETENCES

- Is able to analyze 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.

TYPE OF INSTRUCTION

The project 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 semester is completed as a project-oriented stay in a company where the student is included in the company's daily work and carry out independent project work on an industrial problem relevant for the company. Concurrent to the work in the company, the student makes a project report, which is evaluated after the ending of the internship. A project-oriented stay in a company has to be approved by the study board.

EXTENT AND EXPECTED WORKLOAD

Since it is a 25 ECTS project module the expected workload is 750 hours for the student.

EXAM

EXAMS

Name of exam	Project Oriented Study in an External Organisation
Type of exam	Oral exam based on a project
ECTS	25

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Projektorienteret forløb i en virksomhed
Module code	M-OM-K3-7
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	25
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Harry Boer

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

MASTER'S THESIS

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Has attained thorough understanding of a broad range of theoretical and experimental methods within the area of specialization.

SKILLS

- Is able to apply scientific methods to solve a wide variety of problems within the field of advanced operations management.
- Is able to participate in and/or lead projects within the field of advanced operations management.

COMPETENCES

- Is able to work independently with a project on a specific problem within their field of interest on the highest possible level within their specialization.
- Is able to conduct technological development and research, and solve complex problems using scientific methods.
- Can plan, execute and report an extensive individual research project within an agreed time frame.
- Can take part in both discipline-specific and interdisciplinary cooperation to solve complex problems.
- Is able to compare and critically evaluate the results of the project in relation to existing knowledge and accepted theories within the subject area.
- Is able to communicate a balanced view of the results and conclusions of the project in well-organized written and oral presentation.
- Is competent to solve new and complicated technical problems.

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.

EXTENT AND EXPECTED WORKLOAD

Since it is a 30 ECTS project module the expected workload is 900 hours for the student.

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	30
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale
Module code	M-OM-K4-1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen, Harry Boer

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

ORGANISATION ANALYSIS AND DESIGN

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Account for theories and their paradigmatic underpinning on the design of industrial and professional service organisations
- Describe the impact of corporate and operations strategies, technologies and (competitive) environments on the design of such organisations

SKILLS

- Identify organizational design problems in industrial and professional service organization
- Operationalize these problems and collect relevant information concerning the industrial/competitive, strategic, technological, and organization design aspects describing these problems
- Analyse, evaluate and (re)design organisational designs in their contexts
- Apply concepts and theories to cases and (real-life) examples.

COMPETENCES

- Visualize in, for example, exercises and cases of:
    - The paradigms in organisation theory
    - The principles of organisation design, including division and coordination of labour, and the impact of key contextual characteristics (including strategy, technology and environment) on organisation design parameters
    - Decision making, and the role of power, politics, control and conflicts in organisations
    - The similarities and differences between designing and managing start-ups, mature, expert-based, innovative, diverse, networked and virtual organisations
    - The needs, challenges, dilemmas, dualities and paradoxes in combining exploration and exploitation.
- Take the lead in diagnosing and solving problems in organization designs of various types of industrial and professional service companies

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Organisation Analysis and Design
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Organisationsanalyse og design
Module code	M-OIM-K1-1
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Harry Boer

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

OPERATIONS DEVELOPMENT AND STRATEGY

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- A coherent and profound understanding of how and why operations globalise, including an in-depth knowledge of the associated theories and strategies
- Insight into the strategic analysis and synthesis of global operations footprints including the understanding of; the strategic situation; the process of globalisation; and the theory-based conceptualisation of operations strategy
- Knowledge of strategic configuration of operations, including structures and infrastructures, the extended operations system and strategic capabilities
- Knowledge about strategic innovation in an operations system context.

SKILLS

- Developed skills to evaluate different options and argue for specific choices for strategic design of global operations systems and operations development strategies, including recognising of competitive opportunities, configuring operations capabilities, organisational processes and organisational designs
- Developed relevant skills to apply theories and methods to the improvement and reorganisation of global operations
- Developed skills to identify and implement options for reorganisation and improvements in the context of global operations.

COMPETENCES

- Be able to discuss the complex of problems associated with globalisation of operations to outline the different paths and strategies a company may choose
- Develop abilities to craft and implement relevant operations strategies.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

PREREQUISITE FOR ENROLLMENT FOR THE EXAM

- Hand-in of written assignment

EXAMS

Name of exam	Operations Development and Strategy
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale

Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Global produktionsudvikling og -strategi
Module code	M-OIM-K1-3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Wæhrens

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

INNOVATION AND CHANGE MANAGEMENT

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st Semester of the Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Understand the role of technology, and various forms of innovation and change (including incremental/radical, business process redesign/continuous improvement, product/process/position/paradigm, business model) in established and emerging businesses
- Understand the characteristics and drivers of innovation and change, as well as the practical means of handling them in a business context
- Understand the range, scope and complexity of challenges related to the management of technology, innovation and change
- Understand organizing for and management/leadership of innovation and change, including aspects of culture, power and politics, enablers of and barriers to change, factors of innovation success and failure

SKILLS

- Describe, analyze and redesign innovation and change management processes
- Identify and analyze the field of innovation and change management including the value position of stakeholders; customers, suppliers and other network partners
- Design, evaluate and audit the innovative and change capabilities of a business organization
- Apply principles of business model innovation and risk management to suggest redesign and improvement of business models

COMPETENCES

- Realize and implement innovation- and change management initiatives, including the design, implementation and execution (management/leadership) of innovation and change management projects in companies, supply chains and networks, as well as relating practical innovation and change management experiences to conceptual understanding of innovation leadership and change management

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Innovation and Change Management
Type of exam	Written or oral exam
ECTS	5

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Innovations- og forandringsledelse
Module code	M-OIM-K2-1
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Gertsen, Lassen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

GLOBAL BUSINESS PERFORMANCE

2023/2024

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

This module is based on knowledge gained on the 1st Semester of the Operations and Innovation Management programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Understand various perspectives and theories that inform the formation and functioning of contemporary extended enterprise which consist of the focal company and its suppliers
- Understand complexity management principles and tool kits based on systems science and systems methodology
- Account for various orientations of companies' operations systems (technology, innovation, cost, quality, flexibility) and can explain how these orientations affect performance management and control
- Understand risk types (both internal and external) and their impacts in extended enterprises
- Understand the principles of value stream costing, using value stream mapping and business process re-engineering
- Understand and can explain value engineering, target costing and chained target costing in cooperation between the focal company and its 1st, 2nd, etc. tier suppliers
- Understand total cost of ownership (TCO), differentiated on the basis of product-/supplier type, techniques in the form of 'Monetary-based method' (Activity Based Cost Systems), 'Cost-ratio/value-based method' and 'Mathematical programming decision model'
- Understand and can explain supply chains financial and non-financial performance and its sensitivity as a function of the market and selected divide between push and pull operations
- Understand and can explain conflicting and colliding cases of Lean and the company's financial management and reporting, as well as possible solutions, including financial reporting that complies with Lean's seven waste categories

SKILLS

- Conduct analysis and evaluation of operations performance in the context of extended enterprises
- Use tools and techniques for measuring and managing performance of activities that cross both geographical and organizational boundaries
- Initiate performance improvement programs and their implementation in contemporary extended enterprises

COMPETENCES

- Identify and diagnose problems with performance management systems in contemporary extended enterprises
- Conceive appropriate performance management system designs
- Take responsibility for implementation and control of operations performance management systems in contemporary extended enterprises

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Global Business Performance
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Præstationsmåling og -vurdering af globale forretningsprocesser
Module code	M-OIM-K2-2
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Jesper Hemdrup Kristensen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

CAPITA SELECTA OPERATIONS AND INNOVATION MANAGEMENT

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Have an advanced understanding of (a) selected “hot” operations and/or innovation management concept(s), such as for example business models/business model innovation; user-driven, supplier-driven, networked or open innovation; smart work, technologies or products; agile manufacturing systems or supply chains; globalization of production networks; sustainable production systems; fuzzy front-end innovation; or manufacturing servitization, and in particular:

- The role of processes, technologies and systems, people and organization in the development, implementation and deployment/marketing of such concepts.
- The relationships between these elements.
- Their effects on operations/innovation and business performance.
- The prerequisites for the successful development, implementation and deployment/marketing of the concept(s).
- The dynamic interactions between operations systems characteristics and innovations of, or related to, operations systems.

SKILLS

- Be able to perform a structured literature search and analysis.
- Be able to develop a literature review in the form of a state-of-the-art report on the operations and/or innovation concept(s) addressed in the module.
- Be able to map, analyze and propose a change/improvement of the operations and/or innovation system of a manufacturing or service firm, based on and through the lens of the focal concept(s).

COMPETENCES

- Demonstrate the understanding and skills acquired through exemplifying and/or applying the concept(s) studied as part of the module in exercises, cases or real-life situations.

TYPE OF INSTRUCTION

The module is carried out as an individual or small group project, and aimed at performing in-depth literature study, which is delivered in the form of an extensive literature review on a topic approved by the supervisor. If organized as a small group project, the project is carried out in a group
with normally no more than two members. The student(s) organize and coordinate the project themselves in collaboration with the supervisor.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Capita selecta Operations and Innovation Management
Type of exam	Written or oral exam

ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Udvalgte kapitler i Operations og Innovationsledelse
Module code	M-OM-K3-3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Harry Boer

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

RESEARCH DESIGN AND -COMMUNICATION

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- Different types of research problems
- The design requirements of high-quality scientific research, using two chief methodologies and underlying variants:
  - Case research, including the design of traditional case studies, action research/collaborative research and studies based on design theory/design thinking.
  - Survey research, including the design of questionnaires and research using external databases.
- Epistemological positions in engineering/management research, including:
  - The role of epistemology in engineering/management research.
  - The most important epistemological approaches.
  - Challenges related to inter- and transdisciplinary research.
- The typical acceptance criteria conferences and journals have for papers/presentations and articles, respectively.

SKILLS

- Design high-quality and publishable scientific research (details: below).
- Design high-quality conference papers, presentations and journal articles.

COMPETENCES

- Designing a research project in terms of developing/choosing and accounting for:
  - The research problem(s) and its relevance
  - Hypotheses, propositions, research model, analytical framework.
  - Operationalization of the research constructs.
  - Data collection methods, sources and storing.
  - Data validation methods.
  - Data analysis methods and criteria.
  - Research limitations, including unit of analysis and its context, and method(s)
  - Research schedule and contingency plan
- Identifying outlets (conferences, journals) and developing a communication plan.
- Designing high-quality conference papers, journal articles and other forms of communication, including presentations and working papers.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Research Design and -Communication
Type of exam	Written or oral exam

ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Forskningsdesign og –kommunikation
Module code	M-OM-K3-4
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Lassen

ORGANISATION

Education owner	Master of Science (MSc) in Engineering (Management Engineering)
Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science

UNDERSTANDING ENTREPRENEURSHIP

2023/2024

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

- The students will acquire an understanding of entrepreneurship concepts and theories, methods and tools.
- The student must understand theories of the entrepreneurial role at a personal, organisational as well as societal level.

SKILLS

- The student must be able to analyse entrepreneurial problems by using relevant theory, methods and tools
- The students must be able to use theory in analysing entrepreneurial challenges at the personal and organisational level.

COMPETENCES

- The student must be able to select and use various relevant theoretical perspectives, methods and tools in relation to the planning and engaging in entreneurial business development processes.

TYPE OF INSTRUCTION

The teaching is organized in accordance with the general form of teaching. Please see the programme cirruculum §17.

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS course module the expected workload is 150 hours for the student.

EXAM

EXAMS

Name of exam	Understanding Entrepreneurship
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Entreprenørskabsforståelse
Module code	M-EE-K1-4
Module type	Course

Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Nielsen

ORGANISATION

Study Board	Study Board of Production
Department	Department of Materials and Production
Faculty	The Faculty of Engineering and Science