



Chapter 9

The Education Specific part of the Curriculum for

MASTER OF SCIENCE (MSc) IN ENGINEERING PRODUCT DEVELOPMENT AND INNOVATION

Curriculum 2015, Version 1.1

Applicable to students admitted February 2015 onwards

The curriculum is divided into general provisions (Chapters 1-8), a programme specific part (Chapter 9) and the module descriptions for the subjects studied for each programme. Students should familiarise themselves with all three parts in order to acquire a full overview of the rules that apply throughout the study programme.

§1 Job Profiles

Master of Science in Engineering (Product Development and Innovation) is a graduate engineering programme, which combines engineering with social science. A strong engineering background with real integration of marketing, management and business development aspects linking up to an assessment of new technologies creates a perfect background for educating project managers, who can take care of a part of or the entire product development process.

The program applies to candidates from either product-oriented bachelor programmes or manufacturing-oriented programmes wanting to follow a graduate program that combines a deeper scientific based specialisation within engineering with market-oriented study.

The study programme has a strong global focus and is carried out in an international study environment.

Product Development and Innovation (PDI) graduates are qualified to obtain jobs within:

- Development of business opportunities as entrepreneurs or intrapreneurs based on competencies within a particular specialisation.
- Management of cross functional projects in global distributed networks requiring skills in an analytical as well as a leadership approach to complex structures.
- Academia as ph. d. student and further career within the university as a researcher.

The graduate students can specialise within the profiles **Product Value Creation** or **Global Supply Chain Development**

The profile **Product Value Creation** more specifically qualifies graduates to:

- Obtain jobs in the area of integrated product development and design
- Manage product development processes in a global context, where design as well as production may be done in distributed global networks.
- Leading innovation processes which result in new business opportunities in the global market place.
- Create value in products and services, where unique features are integrated into the products based on experience design.
- Take on Product Management, where technical knowledge, organizational understanding and competencies in marketing are needed at a high international level.

The profile **Global Supply Chain Development** more specifically qualifies graduates to:

- Take jobs in the area of planning and managing manufacturing processes in distributed global supply chains
- Take jobs as global supply chain managers
- Identify the global business opportunities and implement these
- Identify, select and implement suppliers in the global supply chain in a way that optimises the entire chain.
- Plan and carry out sourcing activities in a global, intercultural context
- Optimise global supply chains.

§2 The Competency Profile of the Study Programme

The competence profile for Master of Science in Engineering (Product Development and Innovation) (PDI) is based on the Danish Qualification Framework, and the study programme is structured in accordance with the education concept 'The Engineering Education Model of the University of Southern Denmark' (DSMI).

The PDI graduates are qualified to identify, understand and solve complex problems within the field of engineering, based on a scientific grounding. Furthermore, the students will gain knowledge of, practical skills in, and general competencies in project management and consequently be qualified to participate in cross functional scientific research projects, which involve drawing up and communicating new analyses and models for solving the given problems.

The PDI graduates possess research-based knowledge of theories and methods, which enable them to identify, understand, discuss and reflect on scientific problems within the areas of organisational processes, globalization and market oriented processes as well as on the impact of technological innovation on business development.

The PDI graduates have skills based on a scientific grounding, enabling them to evaluate and choose from different scientific theories, methods and tools and will therefore be able to apply existing models to analysing and solving problems or setting up new models within Product Development and Innovation, Globalization and Entrepreneurship, Technology and Project Management, Experience Design or Global Supply Chain Design.

The PDI graduates possess competencies enabling them to professionally and in a cross-functional context participate in or lead projects. The graduates will also be able to communicate the results to colleagues as well as to non-specialists. These common competencies are acquired thanks to the problem and project oriented structure of the study programme, which trains the students to reflect on their own role and at the same time to be able to take independent responsibility for own learning, personal development and specialisation.

The Master of Science in Engineering (Product Development and Innovation) will have competencies within the following more specific domains:

- Analysing the total value chain of the product development process, from market analysis, product design and manufacturing to market Introduction and sales, in order to make an overall assessment of the phases of the process.
- Acquisition of new knowledge in relevant engineering and business fields and ability to perform engineering and business tasks connected to generating new business opportunities with a deep understanding of local and global internationalisation processes.
- Planning, implementing and management of complex innovation projects within new or existing companies.
- Analysing the organisational structures with respect to global product development, production and sourcing activities.
- Clear communication, as well as ability to negotiate in English in technical as well as in business spheres.
- Application of relevant theories with all their associated tools to analyse and predict the outcome of real-life competitive business cases that are driven by technological change and industrial shakeouts.

- Application of scientific methods and tools for technology analysis such as technology mapping, patent examination, citation analysis and technology scenarios, and discovery driven planning.
- Application of scientific methods and tools for market analysis such as quantitative surveys, customer analysis, and qualitative analysis such as focus groups and in-depth interviews.
- Application of new theories on innovation and change, including emerging paradigms such as user-driven innovation, open innovation and market forecasting for new markets and businesses.

The MSc (Eng) in PDI will also have gained knowledge, skills and competencies on a high international level within one of the two specializations:

The graduate in **Product Value Creation** will have special knowledge, skills and competences on a high international level within:

- Design anthropology of experience. Understanding the factors that come into play when we experience a product, service, interface, event or environment and being able to implement unique values in the design of the product. Understanding what constitutes an experience and developing ways to empathize with other people's experiences of design. This requires a thorough understanding of user needs, and students learn techniques of generative human centred enquiry, for example contextual research methods, as a way to inspire new design concepts.
- Experience design change management. The business of designing for experiencing includes the particular challenge of experience design within an organizational context and how to tie an organisation's vision, strategies and brand to experience design.

The graduate in **Global Supply Chain Development** will have special knowledge, skills and competences on a high international level within:

- Identification of what the strategic and the non-strategic components are and how to use appropriate sourcing methods.
- Selection of suppliers and supplier performance
- Interpreting the cultural complexities for offshore sourcing, and the associated implications of these processes for the organisation, processes and people skills.
- Designing the whole value chain, from assessing market needs to launching the product onto the market, including how to bring sourcing into the early phases of the product development process.
- Setting up design criteria for and developing the global supply chain network as well as managing the network supplies.

The study programme for MSc (Eng) in Product Development and Innovation also qualifies the graduate to apply for a relevant research programme (PhD).



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THE GRADUATE WITH AN ACADEMIC PROFILE IN PRODUCT VALUE CREATION WILL HAVE ACQUIRED ...	PDCPR01 (1.Sem.)	PDCMT (1.sem.)	PDCGLO2 (1.sem.)	PDCVCD (1.sem.)	PDCXBD1 (1.sem.)	PDCMPD (2.sem.)	PDCGLO1 (2.sem.)	PDCPR02 (2.sem.)	PDCGLO3 (3.sem.)	PDCOI (3.sem.)	PDCXBD2 (3.sem.)	PDCPR03 (3.sem.)	PDCMTTC (3.sem.)
THE FOLLOWING COMPETENCES													
Analysing the total value chain of the product development process, from market analysis, product design and manufacturing to market Introduction and sales, in order to make an overall assessment of the phases of the process.		X		X									X
Acquisition of new knowledge in relevant engineering and business fields and ability to perform engineering and business tasks connected to generating new business opportunities with a deep understanding of local and global internationalisation processes.			X				X		X				
Planning, implementing and management of complex innovation projects within new or existing companies.			X							X			
Analysing the organisational structures with respect to global product development, production and sourcing activities.						X							
Clear communication, as well as ability to negotiate in English in technical as well as in business spheres.	X	X						X				X	
Application of relevant theories with all their associated tools to analyse and predict the outcome of real-life competitive business cases that are driven by technological change and industrial shakeouts.		X											X
Application of scientific methods and tools for technology analysis such as technology mapping, patent examination, citation analysis and technology scenarios, and discovery driven planning.			X				X		X				
Application of scientific methods and tools for market analysis such as quantitative surveys, customer analysis, and qualitative analysis such as focus groups and in-depth interviews.			X										
Application of new theories on innovation and change, including emerging paradigms such as user-driven innovation, open innovation and market forecasting for new markets and businesses.										X			

<p>Design anthropology of experience. Understanding the factors that come into play when we experience a product, service, interface, event or environment and being able to implement unique values in the design of the product. Understanding what constitutes an experience and developing ways to empathize with other people's experiences of design. This requires a thorough understanding of user needs, and students learn techniques of generative human centred enquiry, for example contextual research methods, as a way to inspire new design concepts.</p>					X						X		
<p>Experience design change management. The business of designing for experiencing in-cludes the particular challenge of experience design within an organizational context and how to tie an organisation's vision, strategies and brand to experience design.</p>					X						X		

THE GRADUATE WITH AN ACADEMIC PROFILE IN GLOBAL SUPPLY CHAIN DEVELOPMENT WILL HAVE ACQUIRED ...	PDCPR01 (1.Sem.)	PDCMT (1.sem.)	PDCGLO2 (1.sem.)	PDCVCD (1.sem.)	PDCDGS (1.sem.)	PDCMPD (2.sem.)	PDCGLO1 (2.sem.)	PDCPR02 (2.sem.)	PDCGLO3 (3.sem.)	PDCOI (3.sem.)	PDCSGS (3.sem.)	PDCPR03 (3.sem.)	PDCITMC (3.sem.)
THE FOLLOWING COMPETENCES													
Analysing the total value chain of the product development process, from market analysis, product design and manufacturing to market Introduction and sales, in order to make an overall assessment of the phases of the process.		X		X									X
Acquisition of new knowledge in relevant engineering and business fields and ability to per-form engineering and business tasks connect-ed to generating new business opportunities with a deep understand-ing of local and global internationalisation processes.			X				X		X				
Planning, implementing and management of complex innovation pro-jects within new or ex-isting companies.			X							X			
Analysing the organisational structures with respect to global product development, produc-tion and sourcing activities.						X							
Clear communication, as well as ability to negotiate in English in tech-nical as well as in business spheres.	X	X						X				X	
Application of relevant theories with all their associated tools to analy-se and predict the outcome of real-life competitive business cases that are driven by technological change and industrial shakeouts.		X											X
Application of scientific methods and tools for technology analysis such as technology mapping, patent examination, citation analysis and technology scenarios, and discovery driven planning.			X				X		X				
Application of scientific methods and tools for market analysis such as quantitative surveys, customer analysis, and qualitative analysis such as focus groups and in-depth interviews.			X										
Application of new theories on innovation and change, including emerging paradigms such as user-driven innovation, open innovation and market forecasting for new markets and businesses.										X			
Identification of what the strategic and the non-strategic components are and how to use appropriate sourcing methods.					X						X		

Selection of suppliers and supplier performance.					X						X		
Interpreting the cultural complexities for offshore sourcing, and the associated implications of these processes for the organisation, processes and people skills.					X						X		
Designing the whole value chain, from assessing market needs to launching the product onto the market, including how to bring sourcing into the early phases of the product development process.					X						X		
Setting up design criteria for and developing the global supply chain network as well as managing the network supplies.					X						X		



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§3 The Subject Columns of the Study Programme

The competencies are acquired by studying the topics in the subject columns listed below, during the study programme. Scientific methods as well as personal competencies are an integrated part of the covered topics.

Product Development and Innovation Processes

- The product development process
- The role of technology in innovation
- Organising for innovation
- Manufacturing optimisation in product development
- Design for environment
- Product and process platform design
- Open innovation and new markets

Globalisation and Entrepreneurship/Intrapreneurship

- Business development
- Business model concepts and basic business forms
- Theories of globalisation processes
- Globalisation, culture and innovation
- International entrepreneurship and innovation

Technology and Project Management

- Theories of technological change
- Linking technological change to industrial evolution
- Methods of technological change
- Management of Technology
- Project and programme management
- Portfolio management
- Methods and models for assessing project management systems

Experience Design

- Unique values in the product design
- Theories in understanding user needs and experiences
- Methodologies of contextual design research and analysis
- Experience design within an organisational context
- The link between an organisation's vision and brand to experience design

Global Supply Chain Design

- Strategic and non-strategic components
- Appropriate sourcing methods
- Selection of suppliers and supplier performance
- Off shoring
- Value chain design
- Sustainable Supply chains

§4 The Profiles of the Study Programme:

The graduate students can specialize within the profiles **Product Value Creation** or **Global Supply Chain Development**.

The themes of the semesters are the same for both profiles.

Semester	Themes
4	Thesis
3	Market and Value Creation (Study abroad)
2	Innovation in a global world
1	Technological Change and Management

§5 The Structure and Modules of the Study Programme (by academic profile and background)

Product Value Creation (for PDI Bachelor undergraduates)

Semester	Modules																													
4. semester	Master Thesis PDCTH																													
3. semester	Globalization and Entrepreneurship 3 PDCGLO3					Experience design 2 PDCXBD2					Open Innovation PDCOI					Project 3 (PDCPRO3) and elective courses (10 ECTS) or In-company Period (PDCINCO)*														
2. semester	Project 2 PDCPRO2										Modularization and Platform Design PDCMPD					Globalization and Entrepreneurship 1 PDCGLO1					Theories and Methods of Technological change PDCTMTC					Elective				
1. semester	Project PDCPRO1					Value Chain Design and organization PDCVCD					Management of Technology PDCMT					Globalization and Entrepreneurship 2 PDCGLO2					Experience design 1 PDXBD1					Elective				
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

*) Choose between Project3 (5 ECTS) and electives (10 ECTS) OR In-company Period (15 ECTS)

Product Value Creation for non PDI Bachelor undergraduates

Semester	Modules																													
4. semester	Master Thesis PDCTH																													
3. semester	Project PDCPRO2 and elective course (5 ECTS) or In-company Period (PDCINCO)*										Open Innovation PDCOI					Globalization and Entrepreneurship 3 PDCGLO3					Experience design 2 PDCXBD22									
2. semester	Fundamentals in Operation and Supply Chain Management PDCFOS					Statistics for product development and innovation PDCSTA					Modularization and Platform De- sign PDCMPD					Globalization and Entrepreneurship 1 PDCGLO1					Theories and Methods of Tech- nological change PDCTMTC					Elective				
1. semester	Project PDCPRO1					Market Research PDCMR					Management of Technology PDCMT					Globalization and Entrepreneurship 2 PDCGLO2					Experience design 1 PDCXBD1					Elective				
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

*) Choose between Project 2 (10 ECTS) and elective (5 ECTS) OR In-company Period (15 ECTS)

Global Supply Chain development (for PDI Bachelor undergraduates)

Semester	Modules																													
4. semester	Master Thesis PDCTH																													
3. semester	Globalization and Entrepreneurship 3 PDCGLO3					Strategic Global Sourcing PDCSGS					Open Innovation PDCOI					Project 3 (PDCPRO3) and elective courses (10 ECTS) or In-company Period (PDCINCO)*														
2. semester	Project 2 PDCPRO2										Modularization and Platform Design PDCMPD					Globalization and Entrepreneurship 1 PDCGLO1					Theories and Methods of Technological change PDCTMTC					Elective				
1. semester	Project PDCPRO1					Value Chain Design and Organization PDCVCD					Management of Technology PDCMT					Globalization and Entrepreneurship 2 PDCGLO2					Design of Global Supply Chain Networks PDCDGS					Elective				
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

*) Choose between Project3 (5 ECTS) and electives (10 ECTS) OR In-company Period (15 ECTS)

Global Supply Chain development for non PDI Bachelor undergraduates

Semester	Modules																													
4. semester	Master Thesis PDCTH																													
3. semester	Project PDCPRO2 and elective course (5 ECTS) or In-company Period (PDCINCO)*										Globalization and Entrepreneurship 3 PDCGLO3					Strategic Global Sourcing PDCSGS					Open Innovation PDCOI									
2. semester	Product Development and Innovation PDCPDI										Modularization and Platform Design PDCMPD					Globalization and Entrepreneurship 1 PDCGLO1					Theories and Methods of Technological change PDCTMTC					Elective				
1. semester	Project PDCPRO1					Market Research PDCMR					Management of Technology PDCMT					Globalization and Entrepreneurship 2 PDCGLO2					Design of Global Supply Chain Networks PDCDGS					Elective				
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

*) Choose between Project 2 (10 ECTS) and elective (5 ECTS) OR In-company Period (15 ECTS)

§6-12 Profile: Product Value Creation

§6 Description of the 1st Semester – Profile Product Value Creation for Bachelors of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Technological Change and Management

VALUE ARGUMENT

The courses on first semester will build a theoretical framework on the basic product development skills the students has achieved from his bachelor education

The 1st semester introduces the students to profile courses. The profile courses discuss value creation and how unique features can be integrated in physical products. The teaching is strongly related to the research area of experienced design.

The students gain knowledge and techniques of human-centred research in experience design and extend the strategic experience design approach across the entire value network. Designing a stakeholder-focused value co-creation process from a strategic perspective is one of the main issues which are covered in the profile courses.

The central courses which form the common area between the profiles link the specialisation of the profile to the general business and product development processes in a global context.

There will be a discussion of the many complex issues involved in globalisation processes in forming an understanding of Globalization and Entrepreneurship.

The 1st semester develops the understanding of how technology and product development are linked together in order to create successful business opportunities. The focus is on management of technology and innovation from a more general engineering management perspective. The aim is development of a solid theoretical foundation as well as critical insight into the practical problems of value creation and value capture in technology-intensive business environments.

In this semester the students have the opportunity to develop skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives a strong basis for developing the foundation of the business development process.

COMPETENCY GOALS

The competence goals for the 1st semester **Product Value Creation** are as follows:

- Being able to understand and use techniques of human-centred research in experience design
- Being able to explain theories in design anthropology, especially those that focus on experience
- Being able to understand, evaluate and use the theories in the field of technology management
- Being able to understand the many complex issues involved in globalisation processes with special attention to business and consumer culture.
- Being able to understand and describe how globalisation affects business cultures, strategies and alters consumer practices

- Being able to identify and map all activities within the firm and analyse them using a basic organizational and strategic management framework
- Being able to Understand the role of value creation and strategy within an organization

MODULES

The 1st semester contains the following modules:

Constituent modules:

PDCPRO1 – Project (5 ECTS)

PDCVCD- Value Chain Design and Organization (5ECTS)

PDCMT – Management of Technology (5 ECTS)

PDCGLO2 – Globalization and Entrepreneurship 2 (5 ECTS)

PDCXBD1 – Experienced Based Designing 1 (5 ECTS)

Elective modules, 5 ECTS, such as:

PDCAPM – Advanced Product Modelling (5 ECTS)

PDCPPM – Project Portfolio Management (5 ECTS)

PDCDFE- Design for Environment (5 ECTS)

PDCXPEP – Prototyping as a tool in the entrepreneurial process (5 ECTS)

9266212 – Market Ethnography (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§7 Description of the 1st Semester – Profile Product Value Creation for students with other background than Bachelor of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Technological Change and Management

VALUE ARGUMENT

The 1st semester introduces the students to profile courses. The profile courses discuss value creation and how unique features can be integrated in physical products. The teaching is strongly related to the research area of experienced design.

The students gain knowledge and techniques of human-centred research in experience design and extend the strategic experience design approach across the entire value network. Designing a stakeholder-focused value co-creation process from a strategic perspective is one of the main issues which are covered in the profile courses.

The central courses which form the common area between the profiles link the specialisation of the profile to the general business and product development processes in a global context.

There will be a discussion of the many complex issues involved in globalisation processes as the second step in forming an understanding of Globalization and Entrepreneurship.

The 1st semester develops the understanding of how technology and product development are linked together in order to create successful business opportunities. The focus is on management of technology and innovation from a more general engineering management perspective. The aim is development of a solid theoretical foundation as well as critical insight into the practical problems of value creation and value capture in technology-intensive business environments. The 1st semester also deals with how data from market research analysis can be used in the product development process.

In this semester the students have the opportunity to develop skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives a strong basis for developing the foundation of the business development process.

COMPETENCY GOALS

The competence goals for the 1st semester Product Value Creation are as follows:

- Being able to understand and use techniques of human-centred research in experience design
- Being able to explain theories in design anthropology, especially those that focus on experience
- Being able to understand, evaluate and use the theories in the field of technology management
- Being able to understand the many complex issues involved in globalisation processes with special attention to business and consumer culture.
- Being able to understand and describe how globalisation affects business cultures and strategies and alters consumer practices
- Getting insight into the most important types of market research techniques and into the ways market research analysis could be used by key decision-makers and managers involved in the product development and innovation process.
- Being able to use combinations of more advanced quantitative and qualitative data collection and analysis techniques by focusing on both primary and secondary data.

MODULES

The 1st semester contains the following modules:

Constituent modules:

PDCPRO1 – Project (5 ECTS)

PDCMR – Market Research (5 ECTS)

PDCMT – Management of Technology (5 ECTS)

PDCGLO2 – Globalization and Entrepreneurship 2 (5 ECTS)

PDCXBD1 – Experienced Based Design 1 (5 ECTS)

Elective modules, 5 ECTS, such as:

PDCPPM – Project Portfolio Management (5 ECTS)

PDCDFE – Design for Environment (5 ECTS)

PDCXPEP – Prototyping as a tool in the entrepreneurial process (5 ECTS)

9266212 – Market Ethnography (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§8 Description of the 2nd Semester – Profile Product Value Creation for Bachelors of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Innovation in a Global World

VALUE ARGUMENT

The 2nd semester introduces the students to fundamental disciplines of the study programme, such as courses in product architecture and technological change processes. These courses provide the students with the foundation for coping with the profile courses in the 3rd semester. The course Globalisation and Entrepreneurship 1 continues the track from the previous semester.

This semester gives the student foundational skills in and understanding of the legal aspects as well as business aspects of global entrepreneurship. The students are given an opportunity to develop their skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. Thereby the students are given a strong basis for further development of the business opportunity. The student can choose among continuing the track from 1st semester, (entrepreneurship or deeper research activities), or changing track to the other option.

The elective courses offered will give the student a chance to build up the necessary competencies in specific areas as an important support to the profile courses.

COMPETENCY GOALS

The competency goals for the 2nd semester are as follows:

- Being able to understand and apply relevant theory, models, concepts and methods within, structuring of products as well as technological change processes and business development in global environments.
- Being able to define relevant research problems within the central subject areas such as technological change processes. This course is dedicated to introducing the Science Theory at master level as an add-on linking the special topic of the study programme to competencies acquired by the students at bachelor level.
- Being able to integrate relevant theoretical sources when answering research problems
- Being able to apply the gained knowledge to real-life cases
- Being able to present findings and structure presentations, and shaping research based assignments.

MODULES

The 2nd semester contains 5 of the following modules:

Constituent modules:

PDCMPD – Modularization and Platform Design, (5 ECTS)
PDCGLO1 – Globalization and Entrepreneurship1, (5 ECTS)
PDCTMTC – Theories and Methods of Technological Change (5 ECTS)
PDCPRO2- Project 2 (10ECTS)

Elective modules, 5 ECTS, such as:

PDCQM – Quality Management (5 ECTS)
PDCPPM - Project Portfolio Management (5 ECTS)
PDCAPM – Advanced Product Modelling (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§9 Description of the 2nd Semester – Profile Product Value Creation for students with other background than Bachelor of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Innovation in a Global World

VALUE ARGUMENT

The 2nd semester introduces the students to some of the fundamental disciplines of the study programme. Because the master programme study appeals to candidates from quite different Bachelor programmes, bridging courses will be run for the students. This means that the master study programme for these students will be in alignment with the main objectives of the PDI courses and the students from different bachelor programmes will be able to communicate across the specializations and disciplines. For the profile Product Value Creation, the bridging course covers operation management and supply chain management as well as statistics for Product Development and Innovation.

Furthermore, several basic courses in product architecture and technological change processes are offered. These courses provide the students with the foundation for coping with the courses defined as profile courses in 3rd semester.

The elective courses offered give the student a chance to build up the necessary competencies in specific areas as an important support to the profile courses. If the student already has any of these competencies at a bachelor level, one of the other electives for this semester can be taken instead.

COMPETENCY GOALS

The competency goals for the 2nd semester are as follows:

- Being able to understand and apply relevant theory, models, concepts and methods within value chain design, statistics, structuring of products as well as technological change processes and business development in global environments.
- Being able to define relevant research problems within the central subject areas such as technological change processes. This course is dedicated to introducing the Science Theory at master level as an add-on linking the special topic of the study programme to competencies acquired by the students at bachelor level.
- Being able to integrate relevant theoretical sources when answering research problems
- Being able to apply the gained knowledge to real-life cases
- Being able to present findings and structure presentations, and shaping research based assignments.

MODULES

The 2nd semester contains 6 of the following modules:

Constituent modules:

PDCFOS – Fundamentals in Operation and Supply Chain Management (5 ECTS)

PDCSTA – Statistics for Product Development and Innovation (5 ECTS)

PDCMPD – Modularization and Platform Design, (5 ECTS)

PDCGLO1 – Globalization and Entrepreneurship¹, (5 ECTS)

PDCTMTC – Theories and Methods of Technological Change (5 ECTS)

Elective modules, 5 ECTS, such as:

PDCQM – Quality Management (5 ECTS)

PDCPPM-Project Portfolio Management (5 ECTS)

PDCAPM – Advanced Product Modelling (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§10 Description of the 3rd Semester – Profile Product Value Creation for Bachelors of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Market and Value Creation

VALUE ARGUMENT

In this semester the student will continue to develop the competencies within the chosen profile on basis of mandatory as well as on elective courses.

The profile course Experience design 2, Staging Change focuses on the particular challenge of experience design to evoke transformation at different scales of change: individuals, systems, organizations and society. Drawing upon theories of behavioural and organizational change, students explore how the design process can be applied in order to understand, prototype and sustain meaningful change. Introducing current techniques in transformation design, the course challenges students to design tools, processes, or strategies that encourage change at the personal to the social levels.

In this semester the students have the opportunity of further developing skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives a strong basis for further development of the business opportunity. The student can choose among continuing the track from 2nd semester (entrepreneurship or deeper research activities), or change track to the other option.

The central courses which form the common area between the profiles link the specialisation of the profile to the general business and product development processes in a global context. The course Globalization and entrepreneurship 3 integrates internationalization theories, models of globalization, entrepreneurship and new digital business models. The course hence constitutes a foundation for understanding international efforts of firms as well as the new global market conditions in which new products are developed, introduced and consumed. The course, Open Innovation, provides an insight into the literature on open innovation, inter-organisational relations and market analyses. These particular themes are especially relevant in situations where a firm is operating in markets that are new. The course therefore combines new theories of innovation, entrepreneurship and market analysis.

COMPETENCY GOALS

The competence goals for the 3rd semester Product Value Creation are as follows:

- Understanding the theories in designing for change
- Being able to facilitate experiences that move people towards desirable outcomes
- Being able to identify why and explain how the company establishes, develops, maintains, and controls inter-organisational relationships for value creation
- Being able to describe and evaluate the main managerial decisions regarding collaborative relationships with other organisations
- Understanding the premises of open innovation and the implications for the management of innovation
- Being able to describe and outline a market analysis for a new market
- Being able to identify global market opportunities and threats for business strategy and product development
- Being able to analyse and assess new digital and global business models - e- and m-commerce
- Being able to assess the impact of globalisation trends for business establishment and strategy

- Being able to analyse the consequences of particular globalization effects on SME's
- Being able to identify and suggest implementations of strategy changes for businesses
- Being able to identify significant legal problems when establishing international businesses or enterprises
- Being able to identify and describe the main legal aspects of doing international business transactions

MODULES

The 3rd semester contains the following modules:

Constituent modules are:

PDCPRO3 – Project (5 ECTS)*

PDCOI – Open Innovation (5 ECTS)

PDCGLO3 – Globalization and Entrepreneurship 3 (5 ECTS)

PDCXBD2 – Experienced Based Designing 2 (5 ECTS)

Elective modules, 10 ECTS, such as:

PDCAPM – Advanced Product Modelling (5 ECTS)

PDCPPM – Project Portfolio Management (5 ECTS)

PDCDFE – Design for Environment (5 ECTS)

9266212 – Market Ethnography (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

PDCXBDP – Experience Based Designing Masterclass(5 ECTS)

PDCXPEP – Prototyping as a tool in the entrepreneurial process (5 ECTS)

PDCINCO – In-company Period (15 ECTS)

*) Students may choose to replace PDCPRO3 (5 ECTS) and 2 elective modules (10 ECTS) with PDCINCO (In-company Period).

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§11 Description of the 3rd Semester – Profile Product Value Creation for students with other background than Bachelor of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Market and Value Creation

VALUE ARGUMENT

In this semester the student will continue to develop the competencies within the chosen profile on basis of mandatory as well as on elective courses.

The profile course Experience design 2, Staging Change focuses on the particular challenge of experience design to evoke transformation at different scales of change: individuals, systems, organizations and society. Drawing upon theories of behavioural and organizational change, students explore how the design process can be applied in order to understand, prototype and sustain meaningful change. Introducing current techniques in transformation design, the course challenges students to design tools, processes, or strategies that encourage change at the personal to the social levels.

In this semester the students have the opportunity of further developing skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives strong requirements for further development of the business opportunity. The student can choose among continuing the track from 1st semester (entrepreneurship or deeper research activities), or change track to the other option.

The central courses which form the common area between the profiles link the specialisation of the profile to the general business and product development processes in a global context. The course Globalization and entrepreneurship 3 integrates internationalization theories, models of globalization, entrepreneurship and new digital business models. The course hence constitutes a foundation for understanding international efforts of firms as well as the new global market conditions in which new products are developed, introduced and consumed. The course, Open Innovation, provides an insight into the literature on open innovation, inter-organisational relations and market analyses. These particular themes are especially relevant in situations where a firm is operating in markets that are new. The course therefore combines new theories of innovation, entrepreneurship and market analysis.

COMPETENCY GOALS

The competence goals for the 3rd semester Product Value Creation are as follows:

- Understanding the theories in designing for change
- Being able to facilitate experiences that move people towards desirable outcomes
- Being able to identify why and explain how the company establishes, develops, maintains, and controls inter-organisational relationships for value creation
- Being able to describe and evaluate the main managerial decisions regarding collaborative relationships with other organisations
- Understanding the premises of open innovation and the implications for the management of innovation
- Being able to describe and outline a market analysis for a new market
- Being able to identify global market opportunities and threats for business strategy and product development

- Being able to analyse and assess new digital and global business models - e- and m-commerce
- Being able to assess the impact of globalisation trends for business establishment and strategy
- Being able to analyse the consequences of particular globalization effects on SME's
- Being able to identify and suggest implementations of strategy changes for businesses
- Being able to identify significant legal problems when establishing international businesses or enterprises
- Being able to identify and describe the main legal aspects of doing international business transactions

MODULES

The 3rd semester contains the following modules:

Constituent modules are:

PDCPRO2 – Project (10 ECTS)*

PDCOI – Open Innovation (5 ECTS)

PDCGLO3 – Globalization and Entrepreneurship 3 (5 ECTS)

PDCXBD2 – Experienced Based Designing 2 (5 ECTS)

Elective modules, 5 ECTS, such as

PDCAPM – Advanced Product Modelling (5 ECTS)

PDCPPM – Project Portfolio Management (5 ECTS)

PDCDFE – Design for Environment (5 ECTS)

9266212– Market Ethnography (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

PDCXBDP – Experience Based Designing Masterclass (5 ECTS)

PDCINCO – In-company Period (15 ECTS)

PDCXPEP – Prototyping as a tool in the entrepreneurial process (5 ECTS)

*) Students may choose to replace PDCPRO2 (10 ECTS) and 1 elective module (5 ECTS) with PDCINCO (In-company Period, 15 ECTS).

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§12 Description of the 4th Semester – Profile Product Value Creation regardless of academic background

SEMESTER THEME

Master's Thesis

VALUE ARGUMENT

The Master's thesis concludes the Master's programme

The thesis project is a working process that documents the student's competencies attained during his/her work on a course-relevant and interdisciplinary subject

COMPETENCY GOALS

The competence goal for the 4th semester Product Value Creation is as follows:

- Accounting for relevant skills based on the highest level of international research within the subject area of the PDI programme

MODULES

The 4th semester contains the following module:

Constituent module is:

PDCTH – Master Thesis (30 ECTS)

§13-19 Profile: Profile Global Supply Chain Development

§13 Description of the 1st Semester – Profile Global Supply Chain Development for Bachelors of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Technological Change and Management

VALUE ARGUMENT

The 1st semester introduces the students to profile courses. The profile courses discuss:

- how to design differentiated supply chain networks based on product and market characteristics.
- development of supply chain network relationships ensuring sustainable business processes
- how to link the product design to the Supply Chain in order to generate a competitive advantage for the total Value Chain
- how a company competes in the market place
- how to build a supporting Supply Chain that support the companies' overall market strategy.

The central courses which form the common area between the profiles link profile to the general business and product development processes in a global context.

There will be a discussion of the many complex issues involved in globalisation processes as forming an understanding of Globalization and Entrepreneurship.

The 1st semester develops the understanding of how technology and product development are linked together in order to create successful business opportunities. The focus is on management of technology and innovation from a more general engineering management perspective. The aim is development of a solid theoretical foundation as well as critical insights into the practical problems of value creation and value capture in technology-intensive business environments.

In this semester the students have the opportunity of developing skills and insight within the actual research area or, as another option, developing the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives strong requirements for developing the foundation of the business development process.

COMPETENCY GOALS

The competence goals for the 1st semester Global Supply Chain Development are as follows:

- Being able to explain how market strategies interact with supply chain strategies
- Being able to explain the different supply chain network strategies
- Obtaining awareness of the different distribution strategies
- Being able to describe the total cost elements within the different supply chain network options
- Being able to explain the cost, responsiveness, organizational and cultural implications of local vs. off-shore supply chain network designs
- Being able to decide when to design a Lean vs. Agile vs. Lean/agile supply chain network
- Being able to understand, evaluate and use the theories in the field of technology management
- Being able to understand the many complex issues involved in globalization processes with special attention to business and consumer culture.

- Being able to understand and describe how globalization affect business cultures and strategies and alters consumer practices
- being able to identify and map all activities within the firm and analyse them using a basic organizational and strategic management framework
- being able to understand the role of value creation and strategy within an organization

MODULES

The 1st semester contains the following modules:

Constituent modules are:

PDCPRO1 – Project (5 ECTS)

PDCMT – Management of Technology (5 ECTS)

PDCGLO2 – Globalization and Entrepreneurship 2 (5 ECTS)

PDCDGS – Design of Global Supply Chain Networks (5 ECTS)

PDCVCD – Value Chain Design and Organization (5 ECTS)

Elective modules equivalent of 5 ECTS, such as:

PDCSSC – Sustainability in Global Supply Chains (5 ECTS)

PDCPPM – Project Portfolio Management (5 ECTS)

PDCXPEP – Prototyping as a tool in the entrepreneurial process (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§14 Description of the 1st Semester - Profile Global Supply Chain Development for students with other background than Bachelor of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Technological Change and Management

VALUE ARGUMENT

The 1st semester introduces the students to profile courses. The profile courses discuss:

- how to design differentiated supply chain networks based on product and market characteristics.
- development of supply chain network relationships ensuring sustainable business processes
- how to link the product design to the Supply Chain in order to generate a competitive advantage for the total Value Chain
- how a company competes in the market place
- how to build a supporting Supply Chain that supports the companies' overall market strategy.

COMPETENCY GOALS

The competence goals for the 1st semester Global Supply Chain development are as follows: the central courses which form the common area between the profiles link profile to the general business and product development processes in a global context.

There will be a discussion of the many complex issues involved in globalisation processes as the second step in forming an understanding of Globalization and Entrepreneurship.

The 1st semester develops the understanding of how technology and product development are linked together in order to create successful business opportunities. The focus is on management of technology and innovation from a more general engineering management perspective. The aim is development of a solid theoretical foundation as well as critical insights into the practical problems of value creation and value capture in technology-intensive business environments.

The 1st semester also deals with how data from market research analysis can be used in the product development process.

In this semester the students have the opportunity of developing skills and insight within the actual research area or, as another option, developing the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives strong requirements for developing the foundation of the business development process.

COMPETENCY GOALS

The competency goals for the 1st semester Global Supply Chain Development are as follows:

- Being able to explain how market strategies interact with supply chain strategies
- Being able to explain the different supply chain network strategies
- Obtaining awareness of the different distribution strategies
- Being able to describe the total cost elements within the different supply chain network options
- Being able to explain the cost, responsiveness, organizational and cultural implications of local vs. off-shore supply chain network designs
- Being able to decide when to design a Lean vs. Agile vs. Lean/agile supply chain network
- Being able to understand, evaluate and use the theories in the field of technology management

- Being able to understand the many complex issues involved in globalization processes with special attention to business and consumer culture.
- Being able to understand and describe how globalization affect business cultures and strategies and alters consumer practices
- Getting insight into the most important types of market research techniques and into the ways market research analysis could be used by the key decision-makers and managers involved in the product development and innovation process.
- Being able to use combinations of more advanced quantitative and qualitative data collection and analysis techniques by focusing on both primary and secondary data.

MODULES

The 1st semester contains the following modules:

Constituent modules are:

PDCPRO1 – Project (5 ECTS)

PDCMR – Market Research (5 ECTS)

PDCMT – Management of Technology (5 ECTS)

PDCGLO2 – Globalization and Entrepreneurship 2 (5 ECTS)

PDCDGS – Design of Global Supply Chain Networks (5 ECTS)

Elective modules equivalent of 5 ECTS, such as:

PDCSSC – Sustainability in Global Supply Chains (5 ECTS)

PDCPPM – Project Portfolio Management (5 ECTS)

PDCXPEP – Prototyping as a tool in the entrepreneurial process (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§15 Description of the 2nd Semester – Profile Global Supply Chain Development for Bachelors of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Innovation in a Global World

VALUE ARGUMENT

The 2nd semester introduces the students to more fundamental disciplines of the study programme.

Furthermore, basic courses in product architecture and technological change processes will be offered. The understanding gained from these courses provides the students with the foundation for coping with the courses defined as profile courses in the 3rd semester.

The course Globalisation and entrepreneurship¹ continues the track from last semester. This semester gives the student foundational skills in and understanding of the legal aspects as well as business aspects of global entrepreneurship. The students are given the opportunity of developing skills and insight within the actual research area further or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. Thereby the students are given a strong basis for further development of the business opportunity. The student can choose among continuing the track from 1st semester (entrepreneurship or deeper research activities), or change track to the other option.

The electives offered will give the students a chance to build up the necessary competencies in specific areas as an important support to the profile courses.

COMPETENCY GOALS

The competency goals for the 2nd semester are as follows:

- Being able to understand and apply relevant theory, models, concepts and methods within, structuring of products as well as technological change processes and business development in global environments.
- Being able to define relevant research problems within the central subject areas such as technological change processes. This course is dedicated to introducing the science theory at master level as an add-on linking the special topic of the study programme to competencies acquired by the student at bachelor level.
- Being able to integrate relevant theoretical sources when answering research problems
- Being able to apply the gained knowledge to real-life cases
- Being able to present findings and, structure presentations, as well as shaping research-based assignments.

MODULES

The 2nd semester contains 5 of the following modules:

Constituent modules:

PDCMPD – Modularization and Platform Design (5 ECTS)

PDCGLO1 – Globalization and Entrepreneurship (5 ECTS)

PDCTMTC – Theories and Methods of Technological Change (5 ECTS)

PDCPRO2- Project 2 (10 ECTS)

Elective modules equivalent of 5 ECTS, such as:

PDCQM – Quality Management (5 ECTS)

PDCPPM- Project Portfolio Management (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§16 Description of the 2nd Semester - Profile Global Supply Chain Development for students with other background than Bachelor of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Innovation in a Global World

VALUE ARGUMENT

The 2nd semester introduces the students to more fundamental disciplines of the study programme. Because the master programme appeals to candidates from quite different bachelor programmes, bridging courses will be run for the students. This means that the master programme for these students will be in alignment with the main objectives of the PDI courses and the students from different bachelor programmes will be able to communicate across the specializations and disciplines. For the profile Global Supply Chain Development the bridging course covers product development and innovation in order to give the student a basic understanding of the values from the other profile.

Furthermore, basic courses in product architecture and technological change processes will be offered. The understanding gained from these courses provides the students with the foundation for coping with the courses defined as profile courses in the 2nd and 3rd semesters.

The electives offered give the students a chance to build up the necessary competencies in specific areas as an important support to the profile courses. If the students already have these competencies at bachelor level, one of the other electives for this semester can be taken instead.

COMPETENCY GOALS

The competency goals for the 2nd semester are as follows:

- Being able to understand and apply relevant theory, models, concepts and methods within product development and innovation, structuring of products as well as technological change processes and business development in global environments.
- Being able to define relevant research problems within the central subject areas such as technological change processes. This course is dedicated to introducing the science theory at master level as an add-on linking the special topic of the study programme to competencies acquired by the student at bachelor level.
- Being able to integrate relevant theoretical sources when answering research problems
- Being able to apply the gained knowledge to real-life cases
- Being able to present findings and, structure presentations, as well as shaping research-based assignments.

MODULES

The 2nd semester contains 5 of the following modules:

Constituent modules:

PDCPDI – Product Development and Innovation (10 ECTS)
PDCMPD – Modularization and Platform Design (5 ECTS)
PDCGLO1 – Globalization and Entrepreneurship (5 ECTS)
PDCTMTC – Theories and Methods of Technological Change (5 ECTS)

Elective modules equivalent of 5 ECTS, such as:

PDCQM – Quality Management (5 ECTS)
PDCPPM – Project Portfolio Management (5 ECTS)

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§17 Description of the 3rd Semester – Profile Global Supply Chain Development for Bachelors of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Market and Value Creation

VALUE ARGUMENT

In this semester the student will continue to develop the competencies within the chosen profile on basis of mandatory as well as on elective courses.

The profile course, Strategic Global Sourcing, discusses how to develop a global sourcing strategy that effectively increases the competitive advantage of a Company by evaluating the sourcing options from a global perspective, and how these options are directly linked to the Product Design and demand patterns.

In this semester the students have the opportunity of further developing skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives a strong basis for further development of the business opportunity. The student can choose among continuing the track from 1st semester (entrepreneurship or deeper research activities), or change track to the other option.

The central courses which form the common area between the profiles link the specialisation of the profile to the general business and product development processes in a global context. The course Globalization and entrepreneurship 3 integrates internationalization theories, models of globalization, entrepreneurship and new digital business models. The course hence constitutes a foundation for understanding international efforts of firms as well as the new global market conditions in which new products are developed, introduced and consumed. The course, Open Innovation, provides an insight into the literature on open innovation, inter-organisational relations and market analyses. These particular themes are especially relevant in situations where a firm is operating in markets that are new. The course therefore combines new theories of innovation, entrepreneurship and market analysis.

COMPETENCY GOALS

The competence goals for the 3rd semester Global Supply Chain Development are as follows:

- Obtaining awareness of the different sourcing strategies
- Being able to conduct supplier selection
- Understanding the importance of supplier segmentation
- Obtaining knowledge of making a contract and execute negotiations
- Understanding the different elements within SRM
- Being able to Identify why and explain how the company establishes, develops, maintains, and controls inter-organisational relationships for value creation
- Being able to describe and evaluate the main managerial decisions regarding collaborative relationships with other organisations
- Understanding the premises of open innovation and the implications for the management of innovation
- Being able to describe and outline a market analysis for a new market
- Being able to identify global market opportunities and threats for business strategy and product development
- Being able to analyse and assess new digital and global business models - e- and m-commerce

- Being able to assess the impact of globalisation trends for business establishment and strategy
- Being able to analyse the consequences of particular globalization effects on SME's
- Being able to identify and suggest implementations of strategy changes for businesses
- Being able to identify significant legal problems when establishing international businesses or enterprises
- Being able to identify and describe the main legal aspects of doing international business transactions

MODULES

The 3rd semester contains the following modules:

Constituent modules are:

PDCPRO3 – Project3 (5 ECTS)*

PDCOI – Open Innovation (5 ECTS)

PDCGLO3 – Globalization and Entrepreneurship 3 (5 ECTS)

PDCSGS – Strategic Global Sourcing (5 ECTS)

Elective modules equivalent of 10 ECTS, such as:

PDCPPM – Project Portfolio Management (5 ECTS)

PDCSCS – Supply Chain Simulation (5 ECTS)

PDCSSC – Sustainability in Global Supply Chains (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

PDCINCO – In-company Period (15 ECTS)

PDCMSP – Modeling and simulation of production service systems (5 ECTS)

*) Students may choose to replace PDCPRO3 (5 ECTS) and 2 elective modules (10 ECTS) with PDCINCO (In-company Period, 15 ECTS).

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§18 Description of the 3rd Semester - Profile Global Supply Chain Development for students with other background than Bachelor of Science in Engineering (Product Development and Innovation)

SEMESTER THEME

Market and Value Creation

VALUE ARGUMENT

In this semester the student will continue to develop the competencies within the chosen profile on basis of mandatory as well as on elective courses.

The profile course, Strategic Global Sourcing, discusses how to develop a global sourcing strategy that effectively increases the competitive advantage of a Company by evaluating the sourcing options from a global perspective, and how these options are directly linked to the Product Design and demand patterns.

In this semester the students will have the opportunity of further developing skills and insight within the actual research area or, as another option, develop the competencies in entrepreneurship in a more practical way, supported by a team of supervisors. The course description gives strong requirements for further development of the business opportunity. The student can choose among continuing the track from 1st semester (entrepreneurship or deeper research activities), or change track to the other option.

The central courses which form the common area between the profiles link the specialisation of the profile to the general business and product development processes in a global context. The course Globalization and entrepreneurship 3 integrates internationalization theories, models of globalization, entrepreneurship and new digital business models. The course hence constitutes a foundation for understanding international efforts of firms as well as the new global market conditions in which new products are developed, introduced and consumed. The course, Open Innovation, provides an insight into the literature on open innovation, inter-organisational relations and market analyses. These particular themes are especially relevant in situations where a firm is operating in markets that are new. The course therefore combines new theories of innovation, entrepreneurship and market analysis.

COMPETENCY GOALS

The competence goals for the 3rd semester Global Supply Chain Development are as follows

- Obtaining awareness of the different sourcing strategies
- Being able to conduct supplier selection
- Understanding the importance of supplier segmentation
- Obtaining knowledge of making a contract and execute negotiations
- Understanding the different elements within SRM
- Being able to identify why and explain how the company establishes, develops, maintains, and controls inter-organisational relationships for value creation
- Being able to describe and evaluate the main managerial decisions regarding collaborative relationships with other organisations
- Understanding the premises of open innovation and the implications for the management of innovation
- Being able to describe and outline a market analysis for a new market
- Being able to identify global market opportunities and threats for business strategy and product development
- Being able to analyse and assess new digital and global business models - e- and m-commerce

- Being able to analyse the consequences of particular globalization effects on SME's able to assess the impact of globalisation trends for business establishment and strategy
- Being able to identify and suggest implementations of strategy changes for businesses
- Being able to identify significant legal problems when establishing international businesses or enterprises
- Being able to identify and describe the main legal aspects of doing international business transactions

MODULES

The 3rd semester contains the following modules:

Constituent modules are:

PDCPRO2 – Project (10 ECTS)*

PDCOI – Open Innovation (5 ECTS)

PDCGLO3 – Globalization and Entrepreneurship 3 (5 ECTS)

PDCSGS – Strategic Global Sourcing (5 ECTS)

Elective modules equivalent of 5 ECTS, such as:

PDCPPM – Project Portfolio Management (5 ECTS)

PDCSCS – Supply Chain Simulation (5 ECTS)

PDCSSC – Sustainability in Global Supply Chains (5 ECTS)

PDCMSP – Modeling and simulation of production service systems (5 ECTS)

9481002 – Marketing and Culture (5 ECTS)

PDCINCO – In-company Period (15 ECTS)

*) Students may choose to replace PDCPRO2 (10 ECTS) and 1 elective module (5 ECTS) with PDCINCO (In-company Period, 15 ECTS).

CONTEXT

The constituent modules will align the student to the main objectives of the PDI programme. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

§19 Description of the 4th Semester – Profile Global Supply Chain Development re-
gardless of academic background

SEMESTER THEME

Master's Thesis

VALUE ARGUMENT

The Master's thesis concludes the Master's programme.

The thesis project is a working process that documents the student's competencies attained during his/her work on a course-relevant and interdisciplinary subject

COMPETENCY GOALS

The competence goal for the 4th semester Global Supply Chain Development is as follows:

- Accounting for course relevant skills based on the highest level of international research within the subject area of the PDI programme

MODULES

The 4th semester contains the following module:

Constituent module is:

PDCTH – Master's Thesis (30 ECTS)

§20 Qualifying Degrees for Admission

20.1 Qualifying degrees

Based on 20.2 – 20.4 the university has assessed that the below degrees qualify for admission to Master of Science in Engineering (Product Development and Innovation). The list is not exhaustive.

Following degrees qualify for admission to the academic profile *Product Value Creation*

- BSc in Engineering (Product Development and Innovation) – University of Southern Denmark (automatic claim for admission)
- BSc in Engineering (Innovation and Business) – University of Southern Denmark
- Business Development Engineer (BDE) – Aarhus University
- BEng in Integrated Design (Integreret Design) – University of Southern Denmark
- BEng in Mechanical Engineering (Maskinteknik) – University of Southern Denmark
- BEng in Interaction Design (Interaktivt Design) – University of Southern Denmark

Following degrees qualify for admission to the academic profile *Global Supply Chain Development*

- BSc in Engineering (Product Development and Innovation) – University of Southern Denmark (automatic claim for admission)
- BEng in Global Management and Manufacturing – University of Southern Denmark
- BEng in Manufacturing and Management (Produktionsteknik) – University of Southern Denmark

20.2 Level and content of qualifying degrees

Qualifying bachelor and professional bachelor degrees in the scientific and technical area where the level and content of the scientific and technical courses correspond to a bachelor of science in engineering degree or a bachelor of engineering degree in the subject area of the MSc in Engineering (Product Development and Innovation) programme.

20.3 Academic content of qualifying degree

MSc in Engineering (Product Development and Innovation) admits applicants with a bachelor degree or a professional bachelor degree in product development and innovation cf. 20.2 provided that the degree covers:

Subject knowledge	Extent
Broad introduction to the product development process	no less than 30 ECTS
Thorough introduction to CAD systems, materials and manufacturing processes	no less than 20 ECTS
Broad introduction to engineering subjects such as robotics, sensors, electronics and project management	no less than 25 ECTS
Introduction to business processes	no less than 15 ECTS

20.4 Additional courses

Should the applicant's degree fail to meet the requirements mentioned in 20.1 - 20.3, it is possible to acquire the necessary skills through additional courses offered at the University of Southern Denmark. The extent of additional courses cannot exceed 15 ECTS.

Additional courses have to be taken after admission to the programme. The courses can be taken during the first two semesters of the programme and must be passed by the end of the first year of study. Additional courses are restricted to courses offered by the University of Southern Denmark as summer courses or parallel to the first year of the master programme.

20.5 Admission with a foreign degree

Applicants with a bachelor degree or professional bachelor degree from a foreign university who meet the requirements of §20.2 and §20.3 are eligible for admission subject to an academic assessment and comparison of whether the applicant's academic qualifications correspond to those of qualifying Danish degree.

20.6 Possible exemptions

Applicants whose bachelor degree or professional bachelor degree fails to meet the terms stated in 20.1 – 20.5 are not eligible for admission.

Applicants who do not hold a bachelor degree or a professional bachelor degree but who have the academic qualifications equivalent thereto are eligible for admission should their qualifications, based on an academic assessment and comparison, correspond to those of a qualifying Danish degree.

Two-year transitional arrangement regarding additional courses:

Completed and passed additional courses, i.e. single courses from existing bachelor programmes, may be included in the application for admission until 31 August 2016.

§21 Language Requirements

English Language Skills

Native English speaking applicants or applicants with a bachelor degree taught exclusively in English do not have to provide evidence of their English language skills.

Non-native English speaking applicants from a country within the European Union or the EEA are not required to pass an IELTS or a TOEFL test, if they can demonstrate knowledge of English corresponding with English at B level, as a minimum.

Applicants from a country outside the European Union or the EEA, however, must pass an IELTS or a TOEFL test with a minimum result of 6.5 in the IELTS test or a minimum result of 88 in the TOEFL test.

§22 External Examiners and Study Board

The study programme belongs under the Academic Study Board of the Faculty of Engineering and the Danish corps of external examiners for engineering education.

§23 Entry into Force and Amendments

1. Approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering 20th August 2010.
2. The 2012 curriculum is unaltered from the September 2011 (version 1) curriculum approved by Approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering 13rd May 2011.
3. Amendments approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering on 13 November 2012 (Version 1.1).
4. Amendments approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering on 23 June 2014 (Version 1.1).
5. Curriculum 2014 approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering on 10 October 2014 (Version 1.0).
6. Curriculum 2015 approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering on 12 November 2014 (Version 1.0).
7. Amendments approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering on 24 September 2015 (Version 1.1).