

## **Chapter 9**

### **The programme specific part of the curriculum**

## **Bachelor of Engineering in Global Management and Manufacturing (GMM)**

### **Curriculum 2014, Version 1.0**

Applicable to students admitted September 2014 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 profile**

### **A GMM engineer will be qualified for the following jobs:**

The jobs will primarily be in the private sector for goods and services but also jobs in public organisations are within the frame.

### **Typical job possibilities:**

#### **International business development**

Defining business projects and implementation plans for global business development in tight connection to optimising the total value and supply chain.

#### **Key account managers**

Management of relationships to few but heavy customers in business to business

#### **Expats**

Expatriation from a parent company to subsidiaries, for engineering, management and business jobs.

#### **International logistic network organising**

Designing and building up the system for flow of goods from raw materials to customer. Optimising the value chain to maximise efficiency and reduce cost.

#### **Distribution and transport management.**

Management of a part of the supply chain from manufacturing/warehouse to customers in the most cost efficient and less time consuming way.

#### **Outsourcing and sourcing management**

Purchase and procurement, assessment of suppliers and make or buy analysis.

#### **Engineers/managers in virtual networks**

Product or business development in a global context either in customer relations or internally

#### **Manufacturing strategies and systems**

Developing of concepts for manufacturing systems in a globalisation process. Evaluating the level of automation according to the level of qualification and cost of labour. Establishing of operations in a multicultural context.

**Production management**

Management of production facilities in different cultures

**Process analysis and improvement**

Allocation of the correct processes for the purpose and evaluating the possibilities for improvement.

**International organisational corporation**

Manage international corporation within: Employer and employee organisations, public organisations like foreign ministries special areas like: Environmental aspects, health and safety etc.

## §2 Competence profile

### Knowledge:

1. Have a global view of business development in markets of supply and demand.
2. The process of acquiring companies.
3. Designing the product to the market considering positioning, segmentation, marketing parameters and customer awareness in different cultures.
4. In-depth knowledge about the strategic Global Supply Chain Networks, their elements, how they are inter connected and the context in which they operate.
5. Detailed knowledge about establishing, organizing and managing manufacturing processes and assets.
6. Thorough knowledge about different company aspects in pollution, health and safety and tacit factors to consider.
7. Have a deep and wide knowledge about international trading legal aspects in laws, conventions, bilateral agreements, regions conditions, governmental influences etc.
8. Have a deep and wide knowledge of Supply Chain and Operations Management, warehouse management, procurement, sourcing, distribution and ERP-systems in a global, inter-group and local context.
9. Have a profound knowledge about the company's internal and external accounting, financing and control systems.
10. Have a broad knowledge about economical evaluation of countries macro-economic situation in investment and establishing aspects.
11. Broad knowledge of different labour market systems.
12. Project management in cross cultural environments.

### Skills:

1. Able to assess, calculate and propose operational investment possibilities in different markets and countries.
2. Able to manage and carry out Due Diligence activities
3. Able to communicate in business English and have knowledge of international topics
4. Able to plan "Product to Market" activities
5. Able to plan and accomplish changes in companies including the organization in relation to up- or down scaling the manufacturing facilities in respect to technological processes, atomization, cost level and climatically conditions.
6. Able to identify, obtain and process needed data and information for analyzing and improving business systems

### Competences:

1. Capable to navigate, negotiate and being respected on all levels in an international organization

2. Optimize or design the Value Chain for supplying the Product/service to Customer creating the best earning and conditions for the company. Including allocation of the individual elements of the value chain to locations for a total optimization of the flow of materials and information
3. Able to handle expatriation including the culture differences respectfully protect themselves and others against culture clashes in the management of subordinates.
4. Manage projects in international companies at different organizational levels based on a holistic approach and firm economical insight.



### GMM – qualification matrix

MATRIX OF COMPETENCES GMM-PROGRAMME	GX-BAS1	GX-SET1	GX-BAS2	GX-SET2	GX-BAS3	GX-SET3	GX-IBL	GX-MAA2	GX-SET4	Expert in teams	X-ERP1	X-ORG	X-QUM	X-STM	X-MAM	Industrial Training	Final Project
	1st semester		2nd semester		3rd semester		4th semester			5th semester – Study abroad semester					6th semester		7th semester
Knowledge:																	
K1		■		■		■	■		■								
K2				■													
K3	■	■			■	■				■			■		■		
K4		■		■		■			■			■		■			
K5	■	■	■	■	■	■			■				■				
K6			■														
K7		■				■	■										
K8		■		■		■			■		■						
K9					■		■			■							
K10		■				■			■								
K11		■															
K12		■		■		■			■								
Skills:																	
S1	■	■	■	■	■	■	■	■	■							■	■
S2				■												■	■
S3	■	■	■	■	■	■	■	■	■							■	■
S4	■	■	■	■	■	■	■	■	■							■	■
S5	■	■	■	■	■	■	■	■	■							■	■
S6	■	■						■	■		■					■	■
Competences:																	
C1	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■
C2	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■
C3				■						■		■				■	■
C4		■		■	■			■	■			■				■	■

## §3 The constitutional skill columns

### The skill columns

The GMM engineer's qualifications are built up in the courses during the education by working with elements from six skill columns. The elements are linked together during the semesters in semester themes around the semester project and theoretical lectures.

Before finalising the education it will be possible to practice and go more deeply in the specific areas.

The skill columns are:

- Supply Chain Management
- International qualifications
- Materials and processes
- Economy
- Basic Engineering skills
- Personal and learning skills

### The skill column: Supply Chain Management

The purpose of this skill column is to give the students deep knowledge of the Supply Chain and each of the single element of which it consists. The knowledge is both in the strategic and operational level, for students to be able to develop/design/redesign and connect the elements, forming effective global value chains. Evaluation and choice of product, manufacturing, flow and distribution strategies to form cost effective and customer satisfying networks is of great importance in this skill column.

The program will focus at analytical techniques, models and tools that address a wide range of manufacturing and logistics issues.

The skill column includes the following elements:

- Business, logistics and operations
- Bill of materials, process and assembly charts
- Manufacturing, assembly, processes, flow, layout, capacity
- Perspective in global supply network
- Supply chain planning and control
- Production planning, concepts and MRP-system
- Transport of goods and products
- Inventory and finance
- Inventory fundamentals
- Information for inventory management – forecasting
- Inventory systems
- Independent demand ordering
- Order quantity
- Suppliers and supply network design
- Purchasing selection of suppliers and making agreements
- Purchasing procedures and planning and control
- Planning and scheduling of manufacturing resources
- Tactical and strategically production plans
- Master scheduling, short term scheduling

- Materials requirements planning
- Enterprise resource planning, theory, usage and system structure
- Flow of sales, purchase and manufacturing orders
- Facility location models, infinite set approach, feasible set approach, scoring models, transportation models using linear programming
- Just in Time Manufacturing,
- Optimised Production Technology
- Lean Thinking Management, Lead Time Management.
- Quick Response Manufacturing
- Decoupling points

### **The skill column: International qualifications**

The purpose of that skill column is to give the student knowledge about how international business is operating and the terminology, to be able to communicate with business people on the international platform, the basic knowledge about international bodies, regions, organisations, international legislation, trading and transportation over borders, the global cash-flow for trading and investments, modern electronic business facilities and their influence on the procedures and organisations. Important international laws and conventions for trading, transportation, product liability, disputes, jurisdiction and enforcement.

Carrying out Due Diligence by acquisitions

Company ethics in environmental pollution, health and safety, as well as bribes.

### The skill column includes the following elements:

- The internationalisation process
- International business institutions
- The political environment
- The legal environment
- The economic environment
- The technological environment
- The international socio cultural environment
- International strategic issues
- International marketing
- International accounting and finance
- Due Diligence activities by acquisitions
- Inter company trading and transfer pricing
- International transportation in supply chain and distribution
- E-business and its influence on the strategy and the organisation
- Reverse auctions
- Customer Relations Management (CRM)
- International product development in the business to business chain
- Virtual teams and configuration of international organisations.
- Classic and contemporary integration theories
- EU from a political and economic point of view
- Institutions and policy making processes in EU
- Impact of monetary and economic unions on business
- Comparison of different region bodies (ASEAN, Mercosur etc.)
- Cross border risk management
- International jurisdiction and enforcement



- The Haag Convention for goods
- Rome convention for damages
- CISG
- Important company laws in EU, US, China etc
- Product liability
- Resolution of disputes, arbitration etc.
- International competition laws
- International transportation laws
- UCC
- Globalisation and strategy

### **The skill column: Materials and Processes**

The purpose of that skill column is give the student knowledge about industrial design parameters to choose conventional as well as advanced materials and capability to assess and choose the correct materials for the application according to the functional demands, durability and cost. To be able to choose the right manufacturing processes according to design, technology and cost. Shaping of the materials and to create products. Quality management and failure prevention in manufacturing.

The skill column includes the following elements:

- Design specifications
- An overview of engineering materials and processes
- Material structures – forming and shaping
- Stresses and strains
- Material test methods
- Mechanical properties of materials
- Phase diagrams and heat treatment of metals
- The Fe-C diagram
- Casting and moulding processes
- Bulk deformation processes
- Sheet forming processes
- Joining processes
- Surface modification for wear resistance
- Criteria's for choosing materials
- Capacity planning and detailed manufacturing lay-outs
- Work study techniques
- Warehouse, assembly and packaging techniques
- Quality planning and control
- Cost of quality
- Failure prevention and recovery
- TQM
- Six sigma
- SPC
- ISO 9000

### **The skill column: Economy Management Accounting and Financial Accounting**

The purpose of that skill column is to give the student knowledge about local and global management accounting. Management accounting place focus on internal reporting and is an integrated part of manage-

ment. It is controlling and reporting the financial information as well as other types of information, that are intended primarily to assist managers in fulfilling the goals for the organisation.

Financial accounting also place focus on external reporting and provides information to shareholders, creditors, and others, who are outside an organization. It provides the scorecard by which a company's past performance is evaluated. It is directed by authoritative guidelines, which differ across countries.

The skill column includes the following elements:

**Management Accounting:**

- The accountant's role in the organisation
- Costing systems
- Traditional cost allocation and activity-based costing
- Income effects of alternative stock-costing methods
- Cost-volume-profit relationships
- Determining how costs behave
- Relevant information for decision making
- Pricing, target costing and customer profitability analysis
- Capital investment decisions
- Motivation, budgets and responsibility accounting
- Alternative financing methods
- Flexible budgets, variances and management control
- Measuring yield, mix and quantity effects
- Control systems, performance measurement and transfer pricing
- Accounting for just-in-time systems
- Strategic management accounting

**Financial Accounting**

- Introduction to accounting
- Measuring and reporting financial position and performance
- Accounting for limited companies
- Measuring and reporting cash flows
- Analysing and interpreting financial statements
- Reporting the financial results of groups of companies
- Reporting additional measures of performance

**The skill column: Basic Engineering skills**

Basic Engineering skills cover a range of general competences which are basic knowledge or tools to be used in the field of a GMM Engineer. This area includes Business English, Statistics, Technical drawings and IT-skills

The skill column includes the following elements:

- Advanced usage of word processing and spreadsheets
- System analysis and design
  0. Structured analysis technique used for description of business systems
  1. Plan, structure and design of relational business databases
  2. Database theory
  3. Physical database development
- Statistics
  0. Descriptive statistics

1. Probability calculations
2. Stochastic variables
3. Probability distribution
4. Point estimation
5. confident interval
6. Hypothesis test
7. Regression analysis
8. Statistical methods in market analysis
9. Statistical methods in machine capabilities
- Computer Aided design
  0. 2D and 3D sketches and models for manufacturing specifications
  1. Adaptive features, parts and subassemblies
  2. Stress analysis in simple mechanical product designs
  3. Geometric, surfaces, tolerances, calculations and dimensioning
  4. International standards for technical drawings
- Business English
  0. Communicative skills in general, written and oral proficiency
  1. Theoretical understanding of the rules of English grammar.
  2. Improve fluency and vocabulary
  3. Improve linguistic standard of business reports

### **The skill column: Personal and Learning Qualifications**

The students must, during their study period, go through a personal development which will lead towards own responsibility for studying. They must improve within oral and written communication as well as within the ability to co-operate and function as a part of a team. It is of great importance for GMM students to be able to fit in and work as members / managers in cross cultural project organizations and be able to take part of the planning and organisation of projects. A well developed intuition and adaptability is a necessary for the GMM students to form a viable cross border co-operation.

For most parts of this skill, there will be no separate teaching or courses. It will be an integrated part of most activities during the programme.

The skill column includes the following elements:

#### **Learning Qualifications**

- Determine personal study technique
- Reading technique, including reading in depth
- note technique
- Search of information and literature
- Evaluate sources of information
- Absorption of knowledge
- Reflection
- Creativity and generation of ideas
- Evaluate personal result from learning sessions
- Plan personal learning

#### **Personal Qualifications**

- Oral / Written presentation in order to transmit and interpret knowledge and ideas
- Participate in teamwork, cross cultural / interdisciplinary
- Understand the different team roles and how they interact
- Evaluate own / others behaviour in connection with team work

- Ability to supervise, direct and guide individuals and groups in the completion of tasks and fulfilment of goals
- Plan, formulate and solve independent tasks
- Enter / be part of discussions
- Developed intuition and adaptability in cross cultural connections
- High level of independence to adapt changes in environment

**§4 GMM – Semester Themes**

Semester	Semester Theme
7	<b>Final Project</b>
6	<b>Internship</b>
5	<b>Specialization / International semester</b>
4	<b>International Business Improvement</b>
3	<b>Manufacturing in a Global View</b>
2	<b>Global Establishment, Inventory and Distribution Management</b>
1	<b>Designing the Global Corporation</b>

## §5 Course organization

Semester	Modules																													
7	<b>GX-PRO7</b> <b>Final Project</b>																													
6	<b>GX-IPK</b> <b>Industrial Engineering Training</b>																													
5	Optional Course	Optional Course	Optional Course	Optional Course	<b>F-EIT5</b> <b>Experts in teams</b>																									
4	<b>GX-IBL International Business Law</b>	<b>GX-MAA2 Managerial Accounting 2</b>	<b>GX-SET4</b> <b>Internal Business Improve</b> Supply Chain Management 4, Lean Management, Semester project, Theory of Science																											
3	<b>GX-BAS3</b> <b>Basic Applied Science 3</b> Material and Processes3, Managerial Accounting 1										<b>GX-SET3</b> <b>Global Manufacturing - semester theme 3</b> Supply Chain Management 3, International Qualifications 3																			
2	<b>GX-BAS2</b> <b>Basic Applied Science 2 - GMM module</b> Materials and processes2, IT2, Cad1, Company environment										<b>GX-SET2</b> <b>Global Establishment, Inventory and Distribution - GMM module-semester theme 2</b> Project Management, Supply Chain Management 2, Due Dilligence, International Qualifications 2																			
1	<b>GX-BAS1</b> <b>Basic Applied Science 1</b> Materials and Processes1, Statistics										<b>GX-SET1</b> <b>Semester theme 1</b> International Qualifications and Organisation1, Supply Chain Management 1, IT1, Business English 1																			
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

Furthermore, the programme includes workshop training for students who lack basic practical skills related to the BEng programme.

## **§6 Description of 1st semester**

### **VALUE ARGUMENTATION**

The overall objective of the semester is to give the students a holistic approach to the field of a GMM - engineer. The semester project will give the students a general basic understanding of the organisation and logistic value chain of the manufacturing company. The semester project focuses on the design and planning of a worldwide manufacturing company and covers business development in the perspective of product features and market aspects as well as the understanding and evaluation of the consequences in globalisation.

In connection with the project, the students are given lessons within the subject of materials and processes, technical drawings, statistics, IT-Qualifications, international qualifications and organisation, supply chain management, and business English.

### **COMPETENCE GOALS**

The student

- will have a broad view of international business and globalisation processes.
- understand important engineering elements in operational establishment
- will have a basic knowledge of multicultural aspects in business and establishments.
- will have a fundamental understanding of organisational and controlling systems
- will understand the basic terminologies used in global and local companies
- will understand fundamental properties of engineering materials and the principles of manufacturing processes
- will have a fundamental understanding of statistics inside science, market analysis and manufacturing capabilities
- apply business English in oral and written assignments
- will be able to work as an efficient team member I multicultural teams.
- will be able to use advanced features of word processes and spreadsheets when documenting engineering work

### **SEMESTER STRUCTURE**

GX-SET1 – Semester theme (20 ECTS)

GX-BAS1 – Basic Applied Science 1 (10 ECTS)

The modules are compulsory and together with the GX-SET2 – Semester theme (20 ECTS) on 2nd semester they constitute the first year examination. The first year examination must be passed before starting the third semester.

## **CONTEXT**

Students entering the GMM program will all be qualified at an intermediate level in Math, Physics and English but might have quite different educational / cultural backgrounds. In order to provide the students with good basics for entering the program the following are integrated in the 1st semester:

- Semester starts with one week of intensive Business English to speed up the proficiency of the students' language level and get familiar with common terms used in the study.
- To align the level of the students varying competences using Word Processing and Spread Sheets when writing reports, they follow a beginner / intermediate course during the first part of the semester.
- One day of teambuilding activities giving insight in team roles, behaviour and conflicts.
- A careful introduction to the program / semester with focus on structure, courses, teamwork and exams. Also the e-learning system will be introduced.
- Extra focus in supervision of groups in order to make sure students get familiar to working in groups and handle conflicts
- The semester itself is structured from the idea that it presents and touches most of the elements of the program giving students a better understanding what to expect during study and afterwards the employment. Built in is company visits and guest lecturing of older or graduated GMM students in order to increase the understanding of the GMM identity as early as possible. Also the experience within proper study technique is passed on this way.
- Courses carry on from the students intermediate level combining their previous knowledge with the engineering field of the GMM program

The semester structure will be in two modules:

The module GX-BAS1 includes the two courses: 1)statistics and 2)material and processes. These will give the student the basic knowledge and qualifications for the further study and for the project work as well.

The module GX-SET1 includes the project work in teams and the courses: International qualifications and organisation, IT-qualifications, supply chain management and business English.

This module will give the student the basic knowledge about how to work in teams and according to the project model concept, develop a product and to find the positioning of it. To find market information and to do a market segmentation. Assess the marketing plan and its parameters.

Design a factory lay-out and choose processes for a specific product. Assess and develop the supply chain and the value chain in total. Find alternative value chains in a global perspective and to optimise.

The wide knowledge from this project work will be the basis for further educational work during the coming semesters.



## §7 Description of 2nd semester

### VALUE ARGUMENTATION

The overall objective of the semester is to give the students a fundamental knowledge in carrying out Due Diligence activities and a deeper and more detailed level of understanding of certain parts of the logistic value chain. The focus will be on inventory, distribution, purchasing and transportation of goods.

Working on a project while receiving lectures that supports technical and management theories will give the students both a theoretical and practical approach within the semester subjects.

Concerning the main subjects: Due Diligence, inventory and distribution management, the focus will be on both strategic considerations and methods of control and physical arrangements as well.

The students will also gain basic knowledge of external logistics and will be able to perform a systematic evaluation in choosing and planning the transportation of goods within the supply chain.

In order for the students to be able to describe and improve business and information systems, the semester will contain both theory and practice in basic understanding of system analysis and design of information structure.

For planning of worldwide establishment of operations the students will get a general and how to protect, environmental knowledge and also health and safety aspects in labour conditions.

The semester will create a deeper knowledge for the students on the project model and how to create efficient teams.

### COMPETENCE GOALS

The student will

- be able to evaluate greenfield operations in comparison to acquisitions.
- be able to plan and manage complete Due Diligence project
- be able to plan and schedule the individual Due Diligence activities in an acquisition.
- understand inventory fundamentals and be able to see inventory in its overall context and interactions with company activities and the overall supply chain
- get a fundamental understanding of purchasing, sourcing, and management of suppliers
- be able to plan warehouses and facilities at workspace level, using knowledge of assembly, packaging-and warehouse technique.
- be able to take care of occupational health and safety and environmental regulations when
- planning business solutions as well as showing high ethic responsibility
- be able to understand the importance of basic planning data and their connection to planning of technology, logistic and economy
- perform planning and calculation of transportation within the supply chain

- understand the basics of project management and effective teamwork. Chapter 9 of the Curriculum for BEng in Global Management and Manufacturing, Study Start September 2012, Version 1.0 15 Approved by the Academic Study Board at the Faculty of Engineering on November 18th 2009
- be able to use CAD software for 2D and 3D drawings, interpret geometric tolerances on dimension measures.
- achieve a high level of communicative skills, especially in written business English
- be able to perform structured analysis and documentation of business processes and information systems as preparation for design of business databases.
- understand the basic nature of ERP-systems

## **SEMESTER STRUCTURE**

GX-SET2 – Global Establishment, Inventory and Distribution - GMM modul-semester tema 2 (20 ECTS)

GX-BAS2 – Basic Applied Science 2 - GMM module (10 ECTS)

Both modules are compulsory.

GX-SET2 – Global Establishment, Inventory and Distribution is furthermore a part of the First Year Examination. Together with both modules GX-SET1 – Design of the Global Corporation and GX-BAS1- Basic Applied Science 1, it has to be passed in order to carry on to the third semester of the GMM program.

## **CONTEXT**

In relation to the students admission requirements and different educational background the second semester carry on aligning and supporting primarily concerning the team work skills, proper study technique and understanding the identity of the GMM-program. This is done integrating:

- Extra focus in GX-SET2 supporting the team work providing personal supervision as required and defining each student's specific team profile incl. strength and weaknesses.
- Contribution towards the understanding of the program identity and study technique based on meetings with older or graduated students.

The semester structure will be in two modules:

The module GX-BAS2 Basic Applied Science includes the courses: System analysis and design, computer aided design, material and process technology and Company Environment.

This will give the student knowledge for the project work and a platform for the further semesters and a part of the GMM engineers technical skills profile.

Subjects as: Capacity planning, standard times based on studies, creation of factory lay-outs, warehouse operations, packaging operations, functional diagrams, business data bases, international standards for technical drawings, tolerances in technical drawings and company environmental aspects, will be covered during these courses.

The module GX-SET2 includes the project work in teams and the courses: Supply chain management, project management, international qualifications and Due Diligence.

This module will give the students' knowledge, on the basis of a known product and manufacturing processes, about how to plan a warehouse with focus on both the strategic and the operational level. Dimensioning and control of inventory will be a part of the project. Project management will include: Efficient teamwork, situation analysis, project elements, planning and follow-up, financing and contracts for projects. Due Diligence as single activities and the overall planning will be trained in the project.

## §8 Description of 3rd semester

### SEMESTER THEME

Manufacturing in a global view

### VALUE ARGUMENTATION

This semester will focus on the total value chain for physical products to the market, and give special attention to the part of the supply chain where the physical manufacturing of products takes place. During this semester the student will build on the subjects from 1st and 2nd semester to complete some of the major subjects in manufacturing and business in a broader view.

Working on the semester project while receiving lectures, that supports technical and management theories, will give the students both a theoretical and practical approach within the semester subjects.

Topics covered includes; how to describe a total and complete manufacturing concept, establishing manufacturing facilities including all major direct and indirect aspects, how to analyse a product and its business and to develop a manufacturing strategy, and propose alternative complete manufacturing concepts including alternative locations.

### COMPETENCE GOALS

The student will

- Gain knowledge about high-level strategic decisions will lead to a range of lower operational decisions.
- Be able to evaluate the effect of different strategic and operational decisions in depth, using the principles of international managerial accounting
- Know about different aspects of process planning.
- Gain deeper technical knowledge of important fundamental manufacturing processes and how to set up systems to control the quality. Supportive functions like preventive maintenance systems will also be taken into consideration.
- Know about the principle for planning and scheduling of manufacturing capacity by the use of MRP and ERP.
- Be able to work with the flow of information within the supply chain, both upstream and downstream focussing on the usage of modern information and communication technology.
- Know about the different modern communication technologies influencing the business development, the way they are used and how they influence the organisation.
- Gain knowledge about the regions - first of all the European Community, and use more detailed analysis, than in the first semester - how they are designed, the political basis and how they influence doing business.

### SEMESTER STRUCTURE

GX-BAS3 – Basic Applied Science 3 (10 ECTS)

GX-SET3 – Global Manufacturing - semester theme 3 (20 ECTS)

Both modules are compulsory.

## CONTEXT

The semester structure will be in two modules:

**The module GX-BAS3 Basic Applied Science** includes the courses Managerial accounting 1 and Material and Processes 3, which will give the student knowledge for the project work and a platform for the further semesters and a part of the GMM engineers technical skills profile.

The students will gain knowledge on management and cost accounting fundamentals and the interpretation of accounting information, and the effect on how a business is run from a financial perspective.

The essential tools with which a process for producing a product can be chosen and sized will be presented, and exemplified. Special attention is given to the quality aspect of production including various tools and techniques.

**The module GX-SET3 Semester theme** includes the project work in teams and the courses Supply Chain Management 3 and International qualifications 3.

These courses will support the project work. The students will be introduced to manufacturing on strategic, tactical and operational level and will focus on the topics of MRP and ERP and various improvement programs.

In international qualifications the focus is on the use of Information and Communication

Technologies (ICT) in the downstream activities of the international firm and on research and development activities in the supply chain

## §9 Description of 4th semester

### SEMESTER THEME

International business improvement

### VALUE ARGUMENTATION

The overall objective of the semester is to give the student more knowledge in a wider perspective for international business and supplies within supply chain management, economical aspects and international business law. During the project work the student will learn about the relationship between the strategy of a business area and the manufacturing strategy.

The student will also get knowledge about Lean thinking in manufacturing aspects. Furthermore the student will get knowledge about science theory.

Working in a project while receiving lectures that supports international business, technical, management and manufacturing theories will give the students both a theoretical and practical approach within the semester subjects.

The project will be about a real life problem in corporation with a company.

### COMPETENCE GOALS

After the semester the student will:

- Be able to analyse the manufacturing strategy and the performance of the Supply Chain.
- Be able to identify complex problems within the Supply Chain and establishing ways of finding solutions.
- Be able to improve operations management
- Structuring a project work and issuing the relevant reporting systems.
- Be able to analyse flow in the manufacturing process
- Be able to analyse the relevant financial figures
- Be able to identify bottlenecks
- Be able to cooperate on different levels in a company
- Transfer gained knowledge into improvement suggestions
- Be able to manage a project of improvement
- Be an active member of a project team
- Have knowledge of practical work in a real business environment
- Be able to investigate and establish a network of manufacturing sites, domestic and international.
- Be able to calculate the best location for international manufacturing facilities.
- Be able to establish a basic distribution system.

- Be able to select and organise a manufacturing facility according to one out of different manufacturing philosophies
- Be able to do an analysis and to develop a manufacturing lay out according to the LEAN manufacturing concept.
- Be able to use various improvement programmes.
- Be able to use the SCOR model for analysis and improvement of the supply chain
- Be able to explain the LEAN-concept
- Be able to evaluate the LEAN-concept in comparison to other manufacturing concepts
- Be able to analyse and develop a manufacturing lay out according to the LEAN manufacturing concept
- Be able to investigate, calculate and establish a LEAN project in a manufacturing environment
- Get a fundamental knowledge of the history of modern science and its development, as well as helps the student to discern the most central positions, terms and explanation models within science.
- Get the ability to distinguish between science and pseudo-science, as well as the knowledge of what it takes to make this distinction.
- Get knowledge how to discern objectivism from subjectivism within the scientific society.
- Be able to relate to engineering and science as a whole in a more reflective manner.
- Apply and evaluate alternative internal and external price setting methods
- Prepare standard costs and draw up and analyse variance analysis
- Draw up and analyse flexible budgets and overhead analysis
- Perform segment reporting and decentralization
- Apply basic techniques of strategic management accounting including balanced scorecard
- Estimate and analyse quality and business processes
- Managing constraints, life-cycle costing and supply chain management
- Knowledge of financial transactions
- Knowledge of harmonization and international accounting standards
- Provide information to shareholders, creditors and other outside the organization
- Prepare financial statements
- Analyse and interpret financial statements
- To describe the legal disputes likely to arise in international transactions
- To identify the legal issues dealt with in cross-border trade
- To suggest solutions to the standard problems encountered
- To carry out basic office-level legal risk management

## **SEMESTER STRUCTURE**

GX-IBL – International Business Law (5 ECTS)  
GX-MAA2 – Managerial Accounting 2 (5 ECTS)  
GX-SET4 – Internal Business Improve (20 ECTS)

The three modules are compulsory.

## **CONTEXT**

The semester will be divided into three modules:

**GX-SET4:** Including:      The semester project  
   Supply Chain Management  
   Lean Management  
   Science theory

The courses will support the project work in analysing a business/supplying/manufacturing problem including the right data-research, concluding and suggesting solutions for the problem, optimizing, the supply chain and manufacturing set up in supporting the strategy of the company.

### **GX-MAA2:**

The module will give the student knowledge about accounting and financing in different countries as well as knowledge about standard cost systems.

### **GX-IBL:**

The module will give the student knowledge about juridical aspects in international trading and business development.



## **§10 Description of 5th semester**

### **SEMESTER THEME**

Semester theme: Specialization/International semester

The students can choose between studying, by the academic study board, preapproved courses in a foreign university during the semester or to do the semester in The University of Southern Denmark as below.

### **VALUE ARGUMENTATION**

The students should develop an understanding of working together with students from other programmes in the project Experts in Teams. As a part of the project work, elements of Innovation and Entrepreneurship as well as preparation and use of market analysis will be in.

To form their own profile, the students will have the opportunity to choose optional courses inside their areas of special interests and inside the GMM profile.

### **COMPETENCE GOALS**

The students will after the semester be able to:

- participate in a group in such a way that it can form a quorum, handle and solve conflicts and identify and describe interdisciplinary problems
- prepare problem statements in connection with interdisciplinary projects
- set up and follow a project plan with milestones, detailed timetable and project delimitation
- describe and delimit an interdisciplinary project subject, divide it into parts and define the boundaries between the disciplines
- acquaint themselves with other academic disciplines in an interdisciplinary group and apply this knowledge in the joint project work in order to think through realisable solutions for specific problems in the project
- choose, apply and document models and tools from theory to solve the assignment
- document results and consequences of the suggested solution, especially regarding the interdisciplinary subjects
- reflect on own experiences with interdisciplinary collaboration with a view to future interdisciplinary collaboration.
- describe important elements in a company's innovation and product policy
- describe the use of market analysis and its results
- analyse an actual business or manufacturing situation in respect to outsourcing or off shoring.
- do the logistical set-up for an outsourcing or an off shoring project
- optimise a specific part of the value chain.
- define the manufacturing strategy.

- propose and design the manufacturing set-up, depending of the cost level, labour qualifications, culture and other international aspects.
- calculate the economical consequences of a proposed outsourcing or off shoring project.
- make a short management report of the project.

#### **SEMESTER STRUCTURE**

F-EIT5 – Experts in Teams (10 ECTS)

Electives equivalent to 20 ECTS

The module F-EIT5 is compulsory.

## §11 Description of 6th semester

### SEMESTER THEME

Internship

6th semester is constituted by the Internship. The Internship emphasizes the practical and professional dimensions of the bachelor of engineering study programme and as such constitutes a central part of the programme.

During the semester, focus will be on the practical use of the competencies acquired in the programme so far, an expansion of the students understanding of business and connecting theory, practice and experience.

The practical execution of the internship is described in the Faculty internship concept, available on the Faculty homepage.

### VALUE ARGUMENTATION

- The student is trained in communication with companies. The student can use this competence when looking for a company for the final project and in future job search and career development.
- The student develops his competencies by participating in the daily running of business and projects and develops his skills in the practical use of known theory.
- The student acquires valuable knowledge about the human element in the workplace.

### COMPETENCE GOALS

To expand the student's understanding of business, develop the student's creativity, independence and interpersonal skills as well as developing the student's competencies in the following areas:

- Communication with companies when looking for a job
- Experience in transforming the core theories of the study programme into practical, feasible projects.
- Experience in acquiring knowledge during the completion of projects
- Understanding the organizational, economic, social and occupational conditions of a company.
- Gaining insight into the social and administrative environments, including the communication and cooperation between co-workers at different levels as well as administrative routines and regulations.
- Experience in presenting results, orally and in writing, to groups of recipients with different occupation, education and background

### SEMESTER STRUCTURE

GX-IPK – Industrial Engineering Training (30 ECTS)

The module is compulsory.

## §12 Description of the 7th semester

### SEMESTER THEME

Final Project

During the 7th semester, the student writes the final project. The project is written in cooperation with a company and gives the student an opportunity to demonstrate his or her skills in finding an independent, experimental solution to a practical problem associated with the central subjects of the program.

### VALUE ARGUMENTATION

By working on a larger project with the support of a faculty counselor and a counselor from the company, the student has the opportunity to acquire knowledge on and experience in professional problem solving.

### COMPETENCE GOALS

By working on the final project, the student expands his knowledge on the principles and theories of the engineering profession and strengthens his or her skills in professional and creative problem solving in relation to complex engineering problems. In writing the project, the student's competencies in managing a complex, professional project is enhanced including the ability to:

- to organise the analytical process in relation to a complex problem
- to assess and prioritize a set of problem solving strategies
- to appraise the economic consequences in selecting a solution
- to phrase and define a problem
- to plan time and resources
- to unite theory and practice in solving a specific problem
- to communicate the knowledge and results achieved
- to be critical and reflective regarding the work process as well as the solution

### SEMESTER STRUCTURE

GX-PRO7 – Final Project (30 ECTS)

The module is compulsory.

### **§13 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 18th November 2009.
2. 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 10 April 2014.
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 27 January 2015.