Unfold your talent
VIA University College

Curriculum

Programme section

Bachelor of Engineering in Materials Science

For students enrolled in August 2018 and after

Transition for students enrolled August 2017.

Updated 30 June 2020

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1 Introduction

In accordance with the Diploma Engineering Education programme, the purpose of the diploma engineering programme is to qualify students to, nationally and internationally, carry out the following business functions;

- Transpose technical research results as well as scientific and technical knowledge to practical use in development tasks and in solving technical problems within the field of interest
- Critically acquire new knowledge within relevant engineering areas
- Independently solve common engineering task
- Plan, implement and manage technical and technological facilities, including being able to involve social, economic, environmental, sustainability and occupational health consequences in the solution of technical problems
- Participate in collaborative and managerial functions and contexts at a qualified level with people who have different educational, linguistic and cultural backgrounds

In addition, the education must qualify students to participate in further studies.

VIA Engineering, endeavours to work in accordance with a common DNA for all engineering courses. The DNA contains a description of what especially characterizes the engineering programmes at VIA, as well as what to expect from a graduate from our engineering programmes.

At VIA Engineering, we are practice- and project oriented and focused on the surrounding world. These goals are achieved in the form of qualified graduates obtained through targeted education, relevant research and development as well as cooperation and ongoing dialogue and mentor arrangement with the business community. The programmes at VIA Engineering will qualify the graduates to perform practice- and development-oriented business functions.

English-language programmes and international admission is a characteristic of our engineering programmes. This profile creates a unique opportunity to educate students who can act in a Danish context in an increasingly global market. Our lecturers have a broad practical experience, and they understand how to Anchor the theory in practice through laboratory work, company visits and projects for and in collaboration with companies.

To ensure the usefulness of the content of the programme, the principles of the CDIO education concept are applied, ensuring that the individual courses are continuously reviewed, evaluated and developed.

2 Identity of the programme

The purpose of the Materials Science Engineering Programme at VIA is to enable the graduates to work within the areas of Material Science and Product design/development, sustainability and CSR, Innovation and giving them the opportunity to specialize in 1) Textile 2) Plastics.Furthermore, the graduates will develop competences enabling them to work as project managers both nationally and internationally within the Material Science, Product Design, Product Development or Innovation area,

The purpose of the programme is primarily achieved by:

- Making project work an essential part of the course in which the technical elements of the programme are integrated VIA problem solving focusing on use-oriented and practical engineering work. In the project work, it is also important that the students develop technical, methodical, communicative and personal competences.

- The student methodical, communicative and personal competences is a key development area in the Mentor arrangement
- Collaboration with research environments and companies in connection with the courses and through the mentor arrangement.
- Offering an international study environment, in which parts of the programme can takes place abroad and were all courses are carried out in English for both Danish and foreign students. Few electives can be in Danish for both Danish and foreign student as additional options.
- Using the student's mentor arrangement and internship actively to exchange knowledge and experience between VIA and the profession.
- Obtaining application and practice-oriented competences by using VIA Horsens and VIA Designs laboratories, workshops and library facilities.

3 Structure and content

The programme is organized as an ordinary full-time higher education. For students who complete the programme without an individually organized course sequence, the programme build-up, structure and progression, including tests, will be as indicated in the table at the end of this section.

The official duration of the degree programme is 3½ years, divided into 7 semesters corresponding to 210 ECTS credits. New students are enrolled once a year in August.

The scope of each course and project is documented in ECTS credits (European Credit Transfer System). 1 ECTS credit corresponds to 27.5 hours of standard study activity for a student and one study year equals 60 ECTS credits.

The reading of the study material requires English on level B in order to complete the programme.

The programme consists of:
- Compulsory courses and projects
- Elective courses
- Mentor arrangement and Internship
- Bachelor Project
- Workshop practice

A semester consists of 3-6 courses as delimited courses. One course can have a volume of 5 – 10 ECTS credits and a project can have a volume of 5-20 ECTS credits.

Some compulsory courses can be taught in collaboration with AU Herning or VIA Engineering Horsens. The course at AU Herning or VIA Engineering Horsens must be approved by the Materials Science Engineering coordinator in order to secure the relevance and an increase of the technical level. Physically the course in collaboration with AU Herning can take place at AU Herning. Physically the course in collaboration with VIA Engineering can either take place in Horsens like joint Innovation weeks, or in a combination with online learning and being present in Horsens once in a while.

The topics, volume, learning objectives and tests of the courses are described in this curriculum. For a more detailed description of the individual courses, the valid course descriptions are available on VIA's web site or on Study net.

There are three workshop courses during the two first semesters aligned to the study programme.

The programme is structured as illustrated below:

Semester Theme	Course	Course	Course	Course/ Project	Project	
7. semester Elective course/ Specialisation	Elective course	Elective course	BPR 1 Bachelor Project (speciality)			
6. semester Elective course/ Specialisation	MET5 Specialty Technology module 5	MET6 Specialty Future material Module 6	Elective course	TOC1 Theory of Science	SEP 6 Semester Project (Open project within speciality)	
5. semester Internship	INP1 Engineering Internship (speciality)					
4. semester Business-oriented Innovation	MET4 Material Science Module 4	STR1 Business development and Strategic Management	LOG1 Logistics, purchasing and out/insourcing.	PRO1 Project Management	INN1 Innovation (innovation week and Innovation)	SEP4 Semester project Innovation and Business development
3. semester Future materials	ECO1 Economy	CHE2 Applied chemistry Dying, Printing Chromotology	MET3 Material technology processes and Production management	PHY2 Physics, Electronics and thermo dynamics (module 2)	SEP 3 Semester project Future material	
2. semester Quality/CSR and Sustainability	GRA1 Graphics communication	MET2 Material technology module 2	PHY1 Statistics and Mechanics of materials (module 1)	QSE 1 QHSE Management, CSR and sustainability	SEP2 Semester project Quality/CSR and sustainability	
1. semester Innovation and development	MAT1 Mathematics	STA1 Statistics	MET1 Material technology module 1	CHE1 Basic Chemistry module 1	SSE1 Study Skills for Engineering Students	SEP1 Semester project Innovation and Development

4 Compulsory courses of the programme, 1st – 4th semester

All courses and projects on the first four semesters are compulsory.

Each of the four first semesters contains a semester project that represents 5-10 ECTS credits. The overall purpose of the semester project is to tie the subjects of the semester together to a unified whole. Study techniques, Project Management, Project methodology, science theory, research methodology and teamwork will be introduced throughout the programme in connection with the semester projects.

The content of Project management within the 4 semesters is equal to 5 ECTS workload, included in the projects.

Each semester has a theme in such a way that knowledge and skills are acquired through the courses and the competences are acquired and tested in the projects – problembased learning.

1st semester: Innovation and Development
2nd semester: Quality/CSR and sustainability
3rd semester: Future materials
4th semester: Business-oriented Innovation

4.1 1st semester: Innovation and Development

Topics
- Mathematics (MAT1)
- Statistics (STA1)
- Material Technology Module 1 (MET1)
- Basic Chemistry Module 1 (CHE1)
- Study skills for engineering students (SSE1)
- Innovation and Development incl. study skills, Semester project (SEP1)

Volume
30 ECTS credits

The learning objectives of the courses (knowledge, skills and competences) and test form are given in Appendix 2. Courses offered by AU are regulated in their curriculum.

Course purpose:

Mathematics – AU (MAT1)
AU curriculum
Statistics- AU (STA1)
AU curriculum
Material Technology Module 1 (MET1)
The main purpose is for the students to become familiar with the basics about materials relevant for material engineering. A thorough introduction to the subject area of materials science is offered aiming to guide students toward material selection, design and quality assessment. The main purpose is furthermore to supply the students with a solid background knowledge on the main classes of materials and on their properties. The student will learn: * fundamentals of materials behavior * a confident approach to materials and their properties * differences in the characteristics and properties of the various material types * exploitation of the acquired technical background in controlling the material properties and perfor-mance according to the final application * materials selection on basis of material properties and processing technologies to fulfil design and application requirements
Basic Chemistry Module 1 (CHE1)
The main purpose of the course is for students to * increase their knowledge and understanding of chemical concepts and models * acquire the necessary background for the understanding of the structure and properties of molecules and crystalline solids * acquire the necessary competence for making simple calculation on chemical equations * acquire basic chemical understanding of polymerization of textile and plastics.

* acquire the necessary background for understanding requirement for handling of chemicals in the industry. Through theoretical and practical exercises, students will acquire understanding of product analyses as well as technical texts used within the area of chemistry
Study Skills for Engineering Students (SSE1)
To develop the student's basic skills and competences for the excellent performance of study and project related activities that are required in the process of working towards an engineering degree.
Innovation and Development incl. study skills, Semester project (SEP1)
The purpose of the project is for students * To gain knowledge and understanding of the concept of innovation as well as of development processes and methods. * To use the theory acquired through the other courses of the semester o Students should be able to apply their knowledge of materials science, chemistry, mathematics as well as drawing & graphics communication to a specific develop-ment task which forms the basis for the project. * To develop participants' ability to work problem- and project-oriented. * To work interdisciplinary in a project, which must contain elements of all 1st semester sub-jects. * To develop participants' ability to systematic solve problems in collaboration with a project group, as well as documenting the project process and results in a report.

Number of tests and test forms. For detailed information and requirements see appendix 2.

Mathematics (MAT1)	5 ECTS	Written examination, 3 hours Internal censor. 7-point scale Reexamination: As ordinary
Statistics (STA1)	5 ECTS	Home assignment, 14 days. No censor 7-point scale Re-examination: Oral, 20 minutes
Material Technology Module 1 (MET1)	5 ECTS	Written examination, 4 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.
Basic Chemistry Module 1 (CHE1)	5 ECTS	Written examination, 4 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.
Study Skills for Engineering Students (SSE1)	5 ECTS	Passed/Not passed 80% attendance Minimum three tests (written or oral) passed Re-evaluation: Written assignment
Innovation and Development incl. study skills, Semester project (SEP1)	5 ECTS	Oral project examination External censor 7-point scale

		Reexamination: Special requirements – see appendix 2.

4.2 2nd semester: Quality CSR and sustainability

Topics
- Graphics communication (GRA1)
- Material Technology Module 2 (MET2)
- Statistics and Mechanics of Materials Module 1(PHY1)
- QHSE management, CSR and sustainability (QSE1)
- Quality/CSR and sustainability, Semester project (SEP2)

Volume
30 ECTS credits

The learning objectives of the courses (knowledge, skills and competences) and test form are given in Appendix 2

Course purpose:

Graphics communication (GRA1)
* Acquire a number of skills in using graphic production methods that will enable them to communicate in a professional and interdisciplinary context using relevant IT tools. * Acquire skills in using the computer program Illustrator and Photoshop and should learn how to work with simple modeling using a 3D CAD-system. * Acquire skills in sketching * Prepare of presentation material for a concept or a physical product.
Material Technology Module 2 (MET2)
The main purpose is for the students to become more experienced with the basics about materials relevant for material engineering. An expansion on the area of materials science is offered aiming to further guide students toward material selection, design and quality assessment. The main purpose is furthermore to supply the students with a solid background knowledge on the main classes of materials and on their properties at an more advanced level.
Statistics and Mechanics of Materials Module 1 (PHY1)
The course should give the students basic knowledge about Statics and Mechanics of Materials.
QHSE management, CSR and sustainability (QSE1)
* To gain knowledge and understanding of QHSE management * To gain knowledge and understanding of sustainable production and CSR methods and tools used to secure sustainable production
Quality/CSR and sustainability, Semester project (SEP2)
* To use the theory acquired through the other courses of the semester, students should be able to apply their knowledge of materials technology, Quality, physics as well as environ-mental aspects and CSR to a specific sustainable product development assignment that forms the basis of the CSR project. * To develop participants' ability to work problem- and project-oriented within the area of Quality, CSR or sustainability. * To work interdisciplinary in a project, which must contain main elements of all 2nd semester subjects. * To further develop participants' ability to systematic solve problems in collaboration with a project group, as well as documenting the project process and results in a report.

* To strengths the participants' ability to systematic reflect over the collaboration in the team and own contribution. * The purpose is further more for the student to do extensive research based on a specific problem proposed to them.

Number of tests and test forms. For detailed information and requirements see appendix 2.

Graphics communication (GRA1)	5 ECTS	Written examination, 2 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.
Material Technology Module 2 (MET2)	5 ECTS	Written examination, 4 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.
Statistics and Mechanics of Materials Module 1(PHY1)	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
QHSE management, CSR and sustainability (QSE1)	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Quality/CSR and sustainability, Semester project (SEP2)	10 ECTS	Oral project examination External censor 7-point scale Reexamination: Special requirements – see appendix 2.

4.3 3rd semester: Future materials

Topics
Economy (ECO1)
Applied chemistry, Dying, Printing Chromotology (CHE2)
Material Technology Processes and Production Management (MET3)
Physics, Electronics and Thermodynamics (PHY2)
Future material, Semester project (SEP3)

Volume
30 ECTS credits

The learning objectives of the courses (knowledge, skills and competences) and test form are given in Appendix 2

Course purpose:

Economy (ECO1)

The main purpose with this course is that the student must understand basic Business economics It is further the purpose to ensure that the students general understand how a company's financial management is structured including ability to understand the financial statement for a small company and make a interpretation what the figures show. Last it is also the purpose that the student must be familiar with making small budgets, cost price calculation and investment calculations.4
Applied chemistry, Dying, Printing Chromotology (CHE2)
The main purpose is for the students to become able to apply the concepts and models learned when taking the Chemistry 1 course using an independent and critical approach. Through the course, students will acquire knowledge of scientific methods and concepts of chemistry specially in relation to the textile and the composite industry within the area of drying, printing from a chemical and more practical point of view. By studying and analyzing descriptions of content, properties and fabric and material components, students should become able to understanding the expected chemical reaction in dying, printing and other relevant reaction in relation to the use of the polymers including toxic compounds impact on substances and materials and perform chemical toxicological assessments. Students should acquire knowledge of commonly used color theory as well as the coloring systems applied by the industry. Students should be able to perform colorimetric. The course will cover additional topics as well, e.g. topics of an everyday relevance or of current interest.
Material Technology Processes and Production Management (MET3)
The main purpose is for the students to become more experienced with the basics about manufacturing methods relevant for material engineering. Students should acquire basic knowledge of the manufacturing of commonly used materials and the student should be introduced to basic manufacturing processes with a focus on the plastic and textile industries.
Physics, Electronics and Thermodynamics (PHY2)
The course should give the students basic knowledge about Dynamics, Electric Direct-Current Circuits, and Thermodynamics
Future material, Semester project (SEP3)
* To gain knowledge and understanding of innovative materials and technologies and apply development processes and methods. * To use the theory acquired through the other courses of the education program and the skills gained during the previous projects, students should be able to apply their knowledge of materials, technologies, innovation development processes and methods, sustainability and environmental matters, academic writing, graphical documentation to a specific development assignment which forms the basis for the Future Materials Project. * To develop participants' ability to work problem- and project-oriented. Date: August 1st 2018 * To work interdisciplinary in a project, which must contain main elements of all 4th semester subjects. * To further develop participants' ability to systematic solve problems in collaboration with a project group, as well as documenting the project process and results in a report. * To strengths the participants' ability to systematic reflect over the collaboration in the team and own contribution. * The purpose is further more for the student to do extensive research related to technologies functional to manufacture the specific future materials proposed to them.

Number of tests and test forms. For detailed information and requirements see appendix 2.

Economy (ECO1)	5 ECTS	Written examination, 4 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.
Applied chemistry, Dying, Printing Chromotology (CHE2)	5 ECTS	Oral examination, 20 minutes Internal censor.

		7-point scale Reexamination: As ordinary
Material Technology Processes and Production Management (MET3)	5 ECTS	Individual mini project Internal censor. 7-point scale Reexamination: As ordinary
Physics, Electronics and Thermodynamics (PHY2)	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Future material, Semester project (SEP3)	10 ECTS	Oral project examination External censor 7-point scale Reexamination: Special requirements – see appendix 2.

4.4 4th semester: Business-oriented Innovation

Topics
Materials Science Module 4 (MET4)
Business Development and Strategy Management (STR1)
Logistics, Purchasing and out/insourcing (LOG1)
Project management (PRO1)
Innovation (Innovation week and innovation) (INN1)
Innovation and Business development, Semester project (SEP4)

Volume
30 ECTS credits

The learning objectives of the courses (knowledge, skills and competences) and test form are given in Appendix 2

Course purpose:

Materials Science Module 4 (MET4)
This course focuses on Material Science mainly within the field of textile and plastics to give the student the basic foundation on these matters on a high level combined with relevant chemistry. The main purpose is therefore to raise the bar on the key engineering area between textile area plastics and chemistry related to the area. The main purpose of the course is to supply the students with an extended overview of this fundamental class of textile and plastics materials including properties, applications and key areas in the field. Materials and technological processes will be covered with a particular emphasis on understanding the impact for textiles processing as well as plastic processes.
Business Development and Strategy Management (STR1)
The purpose of this course is for the students to gain and apply knowledge on business development, management and strategy theory, tools and planning processes in an organizational context.
Logistics, Purchasing and out/insourcing (LOG1)
The main purpose with this course is that the student must understand basic Logistics, Purchasing and Make/Buy analysis The purpose is that the student understand logistics concepts and its basic elements including the companies logistics task. The student must understand the relationship between logistics and supply chain management, sourcing consideration
Project management (PRO1)

The purpose of the course is for students to acquire skills that make them able to manage and participate in projects. Students should acquire knowledge of the rules that apply to being part of such projects in order to become skilled project participants as well as project managers. In addition, students should acquire knowledge of documentation, planning, management and control tools used for project management purposes. The purpose of the course is therefore to give students the theoretical background required to work as a project managers and participants.
Innovation (INO1)
Innovation is integral to business success in the 21st century and in this course, students will explore the innovator's mind-set and apply innovation processes to solve real-world problems. Students will be introduced to creativity, creative thinking, innovation theory and methods, and the primary learning experience will be hands-on going through the different phases of the innovation process. Innovation is not only getting a good idea, but also actually turning that idea into products or services that can be sold and make a profit in a highly competitive global market.
Innovation and Business development, Semester project (SEP4)
* to gain knowledge and understanding of innovative idea development and business processes and methods and to improve their understanding of the concept of innovation. * To use the theory acquired through the other courses of the education program and the skills gained during the previous projects, students should be able to apply their knowledge of materials, technologies, academic writing, graphical documentation, innovation develop-ment processes and methods to a business model assignment on a specific innovative idea that forms the basis of the Innovation and Business Development Project. * To develop participants' ability to work problem- and project-oriented. * To work interdisciplinary in a project, which must contain elements of all 4th semester sub-jects. * To further develop participants' ability to systematic solve problems in collaboration with a project group, as well as documenting the project process and results in a report. * To strengths the participants' ability to systematic reflect over the collaboration in the team and own contribution. * The purpose is further more for the student to do extensive research based on a specific problem proposed to them.

Number of tests and test forms. For detailed information and requirements see appendix 2.

Materials Science Module 4	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Business Development and Strategy Management (STR1)	5 ECTS	Oral examination, 20 minutes External censor. 7-point scale Reexamination: As ordinary
Logistics, Purchasing and out/insourcing (LOG1)	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Project management (PRO1)	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Innovation (INO1)	5 ECTS	Written examination – multiple choice test. 20 minutes Passed/not passed Internal censor

Innovation and Business development, Semester project (SEP4)	5 ECTS	Oral project examination External censor 7-point scale Reexamination: Special requirements – see appendix 2.

5 Mentor arrangement from 4th semester

The mentor arrangement is an arrangement where the students are entering in an arrangement with a private or public company from the 4th semester and onwards. The goal is to place the student in the mentor company in periods during the 4th to 7th semester.

On the 4th and 6th semester the student will make his/hers semester project in and for the mentor company. On the 5th semester the student with have their internship in the mentor company – see section 6 for further details. On the 7th semester the student will make his/hers final dissertation project in and for the mentor company

The overall purpose with the mentor arrangement is to give the student maximum real company experience and insight into practical engineering work while being a student. The goal is to increase the students personal competence in a real company employment situation as well as balancing the students theoretical competences with experience for a applying the theories in practice.

The mentor company will designate a mentor for the student who will act as a normal employer, with normal following up on work related competence as well as on the development of the more personal competence. The student will act as a mentee and will be located in the mentor company during the different periods as a normal employee. The student will work on their project but also participate in the daily routines in the mentor company like department meetings etc.

The student will not receive any payment for the mentor arrangement only during the internship – see section 6 for the Internship. The company can choose to support the student with transport cost in excess of normal transport.

The student is responsible for finding a mentor company, which must be approved by VIA. The student will have a supervisor from VIA.

If it is not possible for a student to find a mentor company then VIA will help with relevant projects on the respective semesters.

If the student wishes to go aboard then the mentor company can either support this if they have relations in the given country or in the mentor arrangement. The mentor arrangement can always be ended from both sides if special circumstances occur.

6 Internship, 5th semester

DM-INP1

The internship comprises a semester of 30 ECTS credits and is placed time wise on the 5th semester of the programme. As a general rule the internship period is paid and takes place either in a private or in a public company in Denmark or abroad.

The purpose of the internship is for the student to acquire insight into practical engineering equivalent to the work of an engineering assistant, combined with the integrated application of the concepts, methods and techniques of the applied disciplines acquired in the first four semesters.

The student is responsible for finding an internship, which must be approved by VIA, who will attach a supervisor to the intern. If the student is in a mentor arrangement then the internship will take place in the mentor company. The duration of the internship must have a period of minimum 20 weeks full-time work.

The student prepares a plan for the internship programme with a corresponding assignment formulation, in cooperation with the company.

The basis for the assessment of internship is a continuous report from the student to VIA, a feedback from the internship company, as well as a presentation where the supervisor can ask detailed questions about the internship content.

If the internship is interrupted before the end of the internship period, the supervisor must, in consultation with the head of programme, assess whether the internship has had a duration and content sufficient for passing the internship.

The internship is assessed passed/not passed.

7 Elective courses and semester project, 6th – 7th semester

On 6th and 7th semester, it is possible to select elective courses. Apart from elective courses targeted selected specialisations, a number of relevant elective courses are offered on the Materials Science Engineering Programme. The potential elective course might be a combination of courses at VIA Herning, AU Herning and VIA Horsens. Descriptions of the elective courses offered by other Universities or VIA programmes are regulated by their curriculums.

VIA Engineering can cancel an elective course if too few students have selected a specific course. The affected students will have to reselect among the electives.

It is also possible to choose relevant elective courses offered by VIA's other programmes and from AU Herning, except courses, which consists of study material which the student has had earlier on in the programme. Selecting courses from other programmes must be approved by a Material Science coordinator in order to secure the relevance and an increase of the technical level.

Physically the elective course in offered by AU Herning can take place at AU Herning or at VIA Design in Herning. Physically the course offered by other programmes from VIA Engineering can either take place in Herning or Horsens or in a combination with online learning and being present in Horsens once in a while.

On Materials Science Engineering programme some of the elective courses are included in the following specialisations:

Textile
Plastics

VIA Engineering can cancel a specialisation if less than 5 students have selected the specialisation due to lack of expected value due to few students. The affected students will have to reselect the specialization.

A specialisation consists of 2 elective courses (MET 5 + MET6 10 ECTS credits), 4th and 6th semester project (15 ECTS credits) and bachelor project (20 ECTS credits), in total 45 ECTS credits.

The elective courses in the 6th semester is supported with a compulsory course in Theory of Science to prepare the student for the bachelor project.

The Open project on the 6th semester can be a pre-project for the bachelor project. The open project is a compulsory course on the 6th semester. The intent with the 6th semester project is to support the learned theory from the elective courses by means of a practice based project, consisting of the development and manufacturing of a product, laboratory assignments etc. preferable in the mentor company. Furthermore, the use of elements of advanced project methods is also included in the semester project.

Course/Topics	**Volume**	**Number of tests**
Semester project (SEP6)	10 ECTS	1 oral exam based on project work, internal censor

7.1 Elective courses

On the Materials Science Engineering Programme, the following elective courses are as minimum available:

Course purpose:

Technology - Module 5 - MET5	Semester
This course focuses on technology in relation to high performance textile materials relevant in a specialist engineering industry. High performance textiles represent one of the most dynamic sectors of the international textile industry as well in technical/industrial textiles as in everyday textile products including apparel and interior textiles. The main purpose of the course is to supply the students with an extended overview of the technology and the technology change for giving high performance materials their properties for the given application. . The technological and technical processes will be covered with a particular emphasis on textiles for specific purposes such as protective textiles, medical textiles, interior textiles, sport textiles, textiles in cars etc. The student will learn: - fundamentals of technology and technics in the textile industry - a confident approach to the technology for high performance textile materials and their properties - differences in technologies and technics for the various advanced textile materials types - exploitation of the acquired technical and technological background in assessing the material properties and performance according to the final application - selection of technology for the change of material properties and processing technics to fulfil design and application requirements	6
Future Materials - Module 6 – MET6	
This course focuses on high performance textile materials relevant in a specialist engineering industry. High performance textiles represent one of the most dynamic sectors of the international textile and clothing industry. The main purpose of the course is to supply the students with an extended overview of this fundamental class of textile materials including properties, applications and key developments in the field. Materials and technological processes will be covered with a particular emphasis on textiles for specific purposes such as protective textiles. The student will learn: - fundamentals of high-performance textile materials behavior - a confident approach to high performance textile materials and their properties - differences in the characteristics and properties of the various advanced textile materials types - exploitation of the acquired technical background in assessing the material properties and	6

performance according to the final application - materials selection on basis of material properties and processing technologies to fulfil design and application requirements	
Fluid Mechanics and heat transfer – FMT1	
This course aims to enable the students to design their own flow system. The students will get at basic understanding of basic pipe system components and learn how to make basic calculations in order to design a system including selection of pumps and heat exchangers. This course encompasses fundamental topics within Fluid Mechanics and Heat Transfer. Topics include: Bernoulli´s equation, pressure loss in pipes, pump selection, design of pipe systems, heat transfer mechanisms, heat conduction and thermal networks, forced convection, heat exchangers.	6
Global Management – AU Course	
AU Curriculum	6
Other AU elective	
To be determined when AU decides which courses are available	6 +7
Open Material Technology Subject – OPN1	
The main purpose with this course is to introduce the student to material selection or material technology in a selected area that is outside of the curriculum. The main purpose is for the students to aquire deep knowledge about a selected material area on their own and analyze the selected area by themselves on a self-produced project statement.	7
Operation Mangement and Quality – OMQ1	
The main purpose of this course is to give the student a basic understanding of business activities in relation to operation and quality in operation as well as the ability to establish and evaluate simple assembly lines including necessary documentation. The ongoing globalization of the companies' business activities and the technological progress in terms of improving products/services, information systems and manufacturing processes have paved the way for new business opportunities, but also resulted in an intense global competition. Hence, companies have the opportunities and needs to enhance the effectiveness and efficiency of the operation and quality activities. The above opportunities and needs combined with the fact that both companies and the business context, in which companies collaborate, entail a high level of complexity. Hence, when accomplishing and especially improving the operation and quality processes, the involved employees face complex challenges. Handling such challenges calls for an ability to apply suitable analytical methods/tools to achieve the necessary knowledge and thereby make deliberate decisions.	7
Open Sustainability subject – OSS1	
The main purpose with this course is to give the student to deep insight into sustainability considerations when looking at a replacement product and process on a selected given project within their field of specialization. The students should be able to use the following theories and systems acquire deep knowledge on a selected area of interest on their own within the following area: Material selection frameworkProcess selectionCES Edupack or HIGGS indexSimple LCA analysisPrioritization matrix on the TBL concept or other relevant factors.Processing issues.	7

Number of tests and test forms. For detailed information and requirements see appendix 2.

Technology - Module 5 - MET5	5 ECTS	Written examination, 4 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.

Future Materials - Module 6 – MET6	5 ECTS	Oral examination, 20 minutes External censor. 7-point scale Reexamination: As ordinary
Fluid Mechanics and heat transfer – FMT1	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Global Management – AU Course AU Curriculum	5 ECTS	Oral examination with preparation. Internal censor 7-point scale
Open Material Technology Subject – OPN1	5 ECTS	Written - Mini project Internal censor. 7-point scale Reexamination: As ordinary
Operation Mangement and Quality – OMQ1	5 ECTS	Written - Mini project Internal censor. 7-point scale Reexamination: As ordinary
Open Sustainability subject – OSS1	5 ECTS	Written - Mini project Internal censor. 7-point scale Reexamination: As ordinary

7.2 Specialisation: Textile

This specialty aims to give students knowledge of the materials and processes used in both traditional and modern fashion and textile production. Students will equally acquire theoretical knowledge of materials used within the specialty such as yarns and fibers as well as synthetic fibers and natural fibers. Workshops and projects in the lab will teach students how to analyze and assess the properties and quality level of materials as well as what materials may be used for.

In addition to basic knowledge of processes and materials, students will also be introduced to new materials, new types of fibers like sustainable fibers, surface treatments and e-textiles so as to be able to consider the options available in future textile production.

Knowledge and understanding of materials and processes will make it possible for students to take part in product development work.

Topics
Technology module 5 (MET5)
Future materials Module 6 (MET6)
6th semester project (SEP6): Open project in the area of Textile in the mentor company.
Bachelor project (BPR1): Project in the area of Textile in the mentor company

7.3 Specialisation: Plastics

Throughout the last century, materials such as metal, wood, glass, clay, cotton and wool have been replaced by polymers due to the tailor-made characteristics and the low price. Nowadays, polymers are included in so many products that it would practically be impossible to avoid getting into contact with them in some form or

other. But how are products containing polymers produced? How to produce a Cola bottle? How can and should a 100 m long windmill wing be manufactured in order to resist winds and changing weathers?

The keywords for this specialisation are:
Thermoplastics
Thermoset
Biodegradable and Sustainable Plastics
Design and development of future polymers
Semester project about plactics
Collaboration with companies within the plastics industry

Topics
Technology module 5 (MET5)
Future materials Module 6 (MET6)
6th semester project (SEP6): Open project in the area of Plastics in the mentor company.
Bachelor project (BPR1): Project in the area of Plastics (Polymers and Composites) in the mentor company

Students, having completed one of these specialisations, are entitled to add the specialisation on the diploma.

8 Practical Workshops

Workshop courses are practice-related courses (No ECTS). The courses are conducted during the first two semesters. There are three courses:

DM-VER1 (1st Semester): Metal and Wood laboratory work
DM-VER2: (2nd Semester) Material laboratory and Chemistry
DM-VER3: (2nd Semester) Knitting, Sewing and Print laboratory work

The learning objectives of the courses (knowledge, skills and competences) and test form are given in Appendix 2

9 Bachelor Project

DM-BPR1

The programme is concluded with a bachelor project (BPR1) which constitutes 20 ECTS credits of the total 210 ECTS credits of the programme and is finalized with a test. The bachelor project can be commenced on 6th semester project (SEP6) being a preproject for the bachelor project.

The Bachelor project must demonstrate individual self-critical reflection within the chosen subject, and must document the student's ability to apply engineering theories and methods. In addition, the bachelor project must reflect the student's ability to express himself/herself professionally and structured within his/her subject.

One of the prerequisites for being admitted to the bachelor project is that the student is considered to be ready for the exam, as BPR1 must be the last exam on the programme.

The Bachelor project is prepared in collaboration with the mentor company meaning individual projects. If two mentee are in the same company then the student can have a group project. However the head of programme may exceptionally dispense with this rule in case of extraordinary circumstances.

The Bachelor project comprises an independent experimental, empirical and/or theoretical examination of a practical problem formulation related to the core subjects of the programme.

The project must be documented in the form of a project report and process report comprising outline of solution, calculations, drawings, etc. If the report is a group assignment, it must be clear who wrote which sections in the report.

The students are examined in the project by an oral test/group test with individual assessment according to the learning objectives described under section 1.The basis for the exam is the bachelor project. It is a prerequisite for participation in the exam that the bachelor project is handed in within the stipulated deadline, and meets the project requirements described.

The examination may take place at the earliest when all the other tests of the programme, including internship test, have been passed. The examination is assessed on the 7-point scale and with the participation of external examiner.

Bachelor project within Speciality area (BPR1)	20 ECTS	1 oral exam based on the bachelor project report., external censor

10 Exam rules applicable only for Bachelor of Engineering in Materials Science Engineering

According to the Curriculum for VIA Engineering Joint regulations the following rules further apply on top of the rules given in section 8.1 Test forms and assessment.

As some exams are taken on AU Herning specify emphasis is on the following rules.
The student are automatically enrolled for the ordinary exam and re exam if they have failed the ordinary exam even if AU have other procedure. VIA study administration will contact AU stating that all relevant students are to be enrolled in the ordinary exam. VIA study administration will contact AU stating that all relevant students are to be enrolled in the reexam for the specific courses. Students will also be informed about that.
The students are informed that VIA considered them as automatically enrolled for the ordinary exam and relevant potential reexam even if AU states otherwise to their students.

11 Title and issue of diploma

Graduates who have completed the studies under this curriculum + the joint regulations for VIA Engineering are entitled to use the title Bachelor of Engineering in Material Science and Product Design.

Furthermore, it is possible to obtain the following specialisations:
- Textile
- Plastics
- Others from time to time

Upon completion of the programme, VIA University College issues a diploma indicating title, programme, and specialisation if relevant. Furthermore, the diploma contains information about the number of ECTS credits of the individual elements, the result of the grades obtained, as well as the subjects of the interdisciplinary projects and the bachelor project. In addition, the admittance level on which the graduate was admitted to the programme is noted.
Should the education be discontinued, proof of passing study units is issued.

12 Appendix 1: Transition for students enrolled in August 2017

Transition for class DM17 (enrolled August 2017) to new study structure from 3rd Semester

Semester Theme	Course	Course	Course	Course/ Project	Project	
7. Elective course/ Specialisation	Elective course	Elective course	BPR 1 Bachelor Project (speciality)			
6. Elective course/ Specialisation	MET5 Specialty Technology Module 5	MET6 Specialty Future material Module 6	Elective course	Quality Management & Statistics	SEP 6 Semester Project (Open project within speciality)	
5. Internship	INP1 Engineering Internship (speciality)					
4. Business-oriented Innovation	MET4 Material Science Module 4	STR1 Business development and Strategic Management	LOG1 Logistics, purchasing and out/insourcing.	PRO1 Project Management	INN1 Innovation (innovation week and Innovation)	SEP4 Semester project Innovation and Business development
3. Future materials	ECO1 Economy	CHE2 Applied chemistry Dying, Printing Chromotology	MET3 Material technology processes and Production management	TOC1 Theory of Science & Academic Writing	SEP 3 Semester project Future material	
2. Quality/CSR and Development	Physics		Material technology Module 2	Chemistry Module 2	SEP2 Semester project CSR & Sustainable Production	
1. semester Innovation and development	Mathematics Statistics		Material Science Module 1	Chemistry Module 1	Drawing & Graphics Comm. Module 1	SEP1 Semester project Innovation and Development

Electives for class DM17 – students enrolled August 2017.

Technology - Module 5 - MET5	Semester
This course focuses on technology in relation to high performance textile materials relevant in a specialist engineering industry. High performance textiles represent one of the most dynamic sectors of the international textile industry as well in technical/industrial textiles as in everyday textile products including apparel and interior textiles. The main purpose of the course is to supply the students with an extended overview of the technology and the technology change for giving high performance materials their properties for the given application. . The technological and technical processes will be covered with a particular emphasis on textiles for specific purposes such as protective textiles, medical textiles, interior textiles, sport textiles, textiles in cars etc. The student will learn: - fundamentals of technology and technics in the textile industry - a confident approach to the technology for high performance textile materials and their properties - differences in technologies and technics for the various advanced textile materials types - exploitation of the acquired technical and technological background in assessing the material properties and performance according to the final application - selection of technology for the change of material properties and processing technics to fulfil design and application requirements	6
Future Materials - Module 6 – MET6	
This course focuses on high performance textile materials relevant in a specialist engineering industry. High performance textiles represent one of the most dynamic sectors of the international textile and clothing industry. The main purpose of the course is to supply the students with an extended overview of this fundamental class of textile materials including properties, applications and key developments in the field. Materials and technological processes will be covered with a particular emphasis on textiles for specific purposes such as protective textiles. The student will learn: - fundamentals of high-performance textile materials behavior - a confident approach to high performance textile materials and their properties - differences in the characteristics and properties of the various advanced textile materials types - exploitation of the acquired technical background in assessing the material properties and performance according to the final application - materials selection on basis of material properties and processing technologies to fulfil design and application requirements	6
Global Management – AU Course	
AU Curriculum	6
Open Material Technology Subject – OPN1	
The main purpose with this course is to introduce the student to material selection or material technology in a selected area that is outside of the curriculum. The main purpose is for the students to aquire deep knowledge about a selected material area on their own and analyze the selected area by themselves on a self-produced project statement.	6
Operation Mangement and Quality – OMQ1	
The main purpose of this course is to give the student a basic understanding of business activities in relation to operation and quality in operation as well as the ability to establish and evaluate simple assembly lines including necessary documentation.	7

The ongoing globalization of the companies' business activities and the technological progress in terms of improving products/services, information systems and manufacturing processes have paved the way for new business opportunities, but also resulted in an intense global competition. Hence, companies have the opportunities and needs to enhance the effectiveness and efficiency of the operation and quality activities. The above opportunities and needs combined with the fact that both companies and the business context, in which companies collaborate, entail a high level of complexity. Hence, when accomplishing and especially improving the operation and quality processes, the involved employees face complex challenges. Handling such challenges calls for an ability to apply suitable analytical methods/tools to achieve the necessary knowledge and thereby make deliberate decisions.	
Open Sustainability subject – OSS1	
The main purpose with this course is to give the student to deep insight into sustainability considerations when looking at a replacement product and process on a selected given project within their field of specialization. The students should be able to use the following theories and systems acquire deep knowledge on a selected area of interest on their own within the following area: Material selection frameworkProcess selectionCES Edupack or HIGGS indexSimple LCA analysisPrioritization matrix on the TBL concept or other relevant factors.Processing issues.	7
Fluid Mechanics and heat transfer – FMT1	
This course aims to enable the students to design their own flow system. The students will get at basic understanding of basic pipe system components and learn how to make basic calculations in order to design a system including selection of pumps and heat exchangers. This course encompasses fundamental topics within Fluid Mechanics and Heat Transfer. Topics include: Bernoulli´s equation, pressure loss in pipes, pump selection, design of pipe systems, heat transfer mechanisms, heat conduction and thermal networks, forced convection, heat exchangers.	7

Number of tests and test forms. For detailed information and requirements see appendix 2.

Technology - Module 5 - MET5	5 ECTS	Written examination, 4 hours Internal censor. 7-point scale Reexamination: The school can decide that the re-examination can be oral.
Future Materials - Module 6 – MET6	5 ECTS	Oral examination, 20 minutes External censor. 7-point scale Reexamination: As ordinary
Fluid Mechanics and heat transfer – FMT1	5 ECTS	Oral examination, 20 minutes Internal censor. 7-point scale Reexamination: As ordinary
Global Management – AU Course AU Curriculum	5 ECTS	Oral examination with preparation. Internal censor 7-point scale
Open Material Technology Subject – OPN1	5 ECTS	No examination, Mini project Internal censor. 7-point scale Reexamination: As ordinary
Operation Mangement and Quality – OMQ1	5 ECTS	No examination, Mini project Internal censor. 7-point scale

		Reexamination: As ordinary
Open Sustainability subject – OSS1	5 ECTS	No examination, Mini project External censor. 7-point scale Reexamination: As ordinary

13 Appendix 2: Courses Materials Science Engineering Programme

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
MET1	Material Science module 1	5	The student has to * Classify the different materials by their atomic structure * Identify material structure, in order to explain the properties of the material. * Account for the basic methods of characterization * Explain the applications and uses for the materials * Describe the processing of the materials	Upon completing the course, the student has acquired basic skills to: * Select a suitable material for a specific application * Identify the material structure, in order to explain the properties of the material. * Predict and asses material performance * Argue for experiments and tests on materials * Account for economic and environmental aspects	Students should acquire basic competences to: * Account for the used materials in the main material classes * Explain the differences between the types of materials * Assess and reflect the material properties and applications * Assess the type of experiments/measurements to know the materials properties * Explain material selection on basic level for different Product development	Requirements for attending examination 4 mandatory assignments handed in before deadline and accepted. Type of examination: 4 hours written examination. Examination counts for 100% of the final grade. Internal censor Allowed tools: Course literature according to the course description Personal notes Laptop Calculator Re-examination Re-examination can be held as oral exam 40 min preparation with 20 individual oral examination upon a subject found by draw.
CHE1	Chemistry module 1	5	The students has to: * Describe the atomic structure * Account for the periodic table and how it can be used * Explain the intramolecular forces and the physical and chemical properties of a	After completion of the course, the student will be able to * Account for chemical problems using a qualitative and quantitative approach. * Perform calculations	Students should acquire competences in: * Processing chemical information like safety datasheet from different sources * Explaining chemical reactions and knowledge using the right terminology	Requirements for attending examination Minimum 5 mandatory assignments handed in before deadline and accepted. Type of examination: 4 hours written examination. Examination counts for

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			molecule (compo-nent) * Prepare calculations based on simple chemical problems: o Stoichiometric relation-ships and calculations of quantities in a chemical re-action o Redox and Acid/base re-action (strong acid/base re-actions) o Chemical equilibrium, in-cluding the law of chemical equilibrium as well as shifts in quality and quantity o Chemical kinetics and ca-talysis like reaction rate cal-culations and calculation on the required activation en-ergy level. * Account for: o Organic molecules and their functional groups o Organic polymers and some polymerizations meth-ods * Execute experiments and analyze the outcome of the experiment	based on chemical prob-lems using a qualitative as well as a quantitative ap-proach. * Explain the intramolecular forces and the physical and chemical properties of a molecule (component) * Evaluate functional groups of polymers and their mean-ing for the properties of the polymers. * Execute experiments and analyze the outcome of the experiment * Write and use a safety datasheet and handling the chemicals safely	* Applying methods to cal-culate stoichiometry, kinet-ics and equilibrium of a chemical reaction * Explain the functional group of polymer, in order to predict their properties	100% of the final grade. Internal censor Allowed tools: Course literature according to the course description Personal notes Laptop Calculator Re-examination Re-examination can be held as oral exam 40 min prepa-ration with 20 individual oral examination upon a subject found by draw.
SEP1	Innovation and development project - 1. semester	5	Upon completion of the pro-ject, students should be able to: * Explain the relationship between design and mate-rial choice in relation to the product application	Students who complete the project acquire skills in: * Compile a project descrip-tion * Initial analyses and de-scription of a product, in-cluding the design of the product and the se-lection of	After the project, students should be able to: * Work interdisciplinary in a project that will contain ele-ments of all the 1st semes-ter's subject areas. * Make a problem analysis	Requirements for attending examination Course assignment handed in before deadline and ac-cepted. Report format The project report should

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			* Perform simple calculations for structural issues * Account for the design of a specific product in terms of structure, properties, selection of materials and use * Record and process data and observations * Analyze, assess and communicate research results orally and in writing * Obtain and use information on materials from different sources * Present prototype development orally and in writing using terminology appropriate in a professional as well as an everyday context * Demonstrate initial knowledge of innovation and development methods * Identify and account for basic innovation issues of relevance to a development project/task * Put the professional knowledge acquired into perspective and apply it both in relation to the project as well as in relation to other subjects and projects	materials * Acquire initial understanding of innovation and product development methods and concepts including the use of idea generating tools * Perform calculations on simple structures and materials. * Acquire knowledge of the correlation between design and properties of materials as well as knowledge of the use of products in an everyday life and technological context. * Compile a technical report * Communication orally as well as in writing and documentation of the project process	* Describe a problem (problem formulation), as well as action plan (total project description) * Conduct a product development process through the analyzing phase and description of a product, including design of the project and the selection of material. * Perform calculation on simple structures and materials. * Document the result in a project report and accompanying attachments (Appendix) * Describe the project process in a process report * Formulate the reports in a concise, accurate and clear language * Present orally and state the reasons for selected solutions and methods used * Gain an understanding of the group work form and solving a specific task in collaborate with a group of fellow students	provide a written presentation of the innovation process, the develop-ment process and the product solution developed • Students must hand the project Report and Process Report in WISE flow • In addition, students could include prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. • Report structure and method: (should follow the Guideline for preparing project report, MI 2017, VIA and Lessons in Scientific Methodology light/project methodology on the project Web) <u>Type of examination:</u> Oral examination. At the exam, students must deliver an oral group presentation of their project work followed by and individual assessment and join assessment part. Students are given only one overall mark for the Project report, the Process report and their oral presentation. The reports carries a weight of 60% and the presentation carries a weight of 40%. The assessment of both the written reports as well as

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						the oral presentation is based on the 7-point grading scale. The duration of the oral group presentation is approximately 10 minutes pr. student, followed by 20 minutes individual assessment pr. student and in the end a join assessment of 10 min pr. student. After the assessment grade assessment is followed and individual feedback is given to each student 15 min pr. student all together. External censor The Project and the Process report plus optional prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. must be handed in on time. <u>Allowed tools:</u> Personal notes Laptop <u>Re-examination</u> Re-examination: Any re-exam will take place in the same way as the ordinary exam. If the student receive a grade below 2 then the teacher will evaluate if the student can improve on the

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						project one time or if the student must make a new report. The re-exam and handing in of improved or new project will follow the general timeframe for reex-amination of projects in En-gineer-ing. If the student receives a grade below 2 on an im-proved project or if the stu-dent delivers in the project after the improvement pe-riod have exceeded then the student must have a new assignment. If the student choice not to deliver in the project or par-ticipate in the ordinary exam then the student must have a new assignment for the project. <u>Engineering timeframe:</u> Students who failed a se-mester project in January or June must attend an infor-mation meeting on the last Friday in June. At this meeting, the students will get information on spe-cific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students at the individual semesters. Based on the feedback, the students have received after

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						the ordinary exam, they must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
SSE1	Study skills for engineering students	5	The student should be able to * Explain the study activity model, CDIO, SOLO taxonomy, VIA Engineering's DNA * Differentiate between different learning styles and identify own preferred learning style * Explain the strengths and weaknesses of Problem-Based Learning (BPL) * Outline the stages of team development * Identify a project report and a process report and describe the content of the typical main sections of each * Explain the phases of a project (problem analysis, project description, problem solving, docu-mentation)	The student should be able to: * Apply good study techniques for planning, reading and note-taking in an intentional manner * Prepare and deliver oral presentations * Communicate correctly also taking target audience and cultural differences into consideration * Write a project report and a process report for the semester project following the VIA Engineering guidelines * Teambuilding and conflict handling * Explain and apply the elements of a project description * Use reflection in the process report to increase learning	The students should be able to: * Reflect on active learning and how take responsibility for own learning * Analyse and apply team dynamics such as communication, motivation, decision-making and conflict resolution.	

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			* List the features of academic and technical writing and understand the concept of plagiarism * Define the characteristics of reliable sources (source criticism) * Outline cultural traits that can influence team work in a project			
QSE1	Management, CSR and Sustainability	5	The students is expected to reach a stage where he/she can analyze different QHSE management set up and apply the different quality tools on relevant issues within the industry. Through the course, students will acquire knowledge of development methods and concepts within sustainable production and CSR. * By analyzing and describing the production process and the selection of materials for a specific product, the students will acquire knowledge and understanding of environmental and ethical correlations in a product's life cycle. * Students will acquire knowledge of the correlation between production and materials as well as of the use and disposal of products.	Students who complete the project acquire broad skills in: * ISO 9001, ISO 14001 and EMAS * Use SPC, Capability CpK and other different statistic tools for continuous surveillance * Understand and calculate COPQ as a mean to control cost of quality * Use P-FMEA to prevent Quality issues in the production set up * Use House of Quality as a tool in the design phase to translate customer requirement to product characteristics. * Product characteristics, products standards and testing of these * Use CAPA tools for Corrective and Preventive actions. * Design Supplier evaluation	The student is expected to have gained enough knowledge to be able to work with QHSE Management or quality control after specific training within the field of preference. * Make ISO instructionParticipate in internal audit * Set up Quality control systems * Set up supplier evaluation and assessment procedures * Participate in FMEA and tools like QFD * Make and calculate COPQ * Knowledge about specific product and supplier standard. * Use CAPA tools * Calculate process Capability etc. * Show competence for accounting environmental correlations of a product's life cycle * Demonstrate knowledge of	<u>Requirements for attending examination</u> <u>Type of examination:</u> Individual oral examination based upon a subject found by draw. 20 minutes preparation time. Internal censor <u>Allowed tools:</u> Personal notes Laptop Calculator <u>Re-examination</u> Same as ordinary

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
				and supplier assessment * Knowledge about supplier standards like PPAP * Account environmental correlations of a product's life cycle * Demonstrate knowledge of legislation, standards and labelling schemes that apply to the area of sustainable production * Identify and account ethical issues in a product's life cycle * Prepare calculations based on environmental issues * Account the selection of materials in the context of sustainability * Obtain skills in literature search and use information on materials from different sources * Demonstrate knowledge of development methods used within the area of sustainable production	legislation, standards and labelling schemes that apply to the area of sustainable production * Identify and account ethical issues in a product's life cycle * Demonstrate competence in preparing calculations based on environmental issues * Show competence in account for the selection of materials in the context of sustainability * Obtain skills in literature search and use information on materials from different sources * Demonstrate competence in knowledge of development methods used within the area of sustainable production	
MET2	Material Science module 2	5	Students should gain a broad knowledge of: * main materials classes * correlation between materials structure and properties * processing of materials * basic methods of characterization	Upon completing the course the student is expected to acquire broad skills to: * select a suitable material for a specific application * identify and describe material structure	Students should acquire basic competences in: * being familiar with the commonly used materials within each materials class, especially within metals, polymers, composites, wood and textiles	Requirements for attending examination Minimum 5 mandatory assignments handed in before deadline and accepted. Type of examination: 4 hours written examination. Examination counts for 100% of the final grade.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			* familiar and interesting materials * applications and uses Content Module 2 (2nd semester) * Phase Diagrams * Phase Transformations * Types and Applications of Materials o Metal Alloys o Polymers o Composites o Wood o Textiles * Synthesis, Fabrication and Processing of Materials – Overview * Thermal Properties * Economical, Environmental and Societal Issues in Materials Science and Engineering	* identify and explain the relation between material structure and properties * predict and determine material performance * carry out experiments and tests on materials applying common test methods * account for economical and environmental aspects	* recalling materials structures * assessing and considering materials properties and applications * researching and analyzing materials characteristics * being familiar with different test methods for measuring the properties of materials * performing independently a number of different measurements/experiments for the purpose of deter-mining the properties of materials * selecting and substantiating the choice of specific solutions/materials for the development of a product Furthermore the students should be capable of seeking, validating and implementing additional knowledge within the subject on their own hand.	Internal censor <u>Allowed tools:</u> Course literature according to the course description. Personal notes, laptop and calculator. <u>Re-examination</u> Re-examination will be held in the same way as the ordinary exam or as oral exam .
GRA1	Graphics Communication	5	Upon completion of the course, students will be able to use a number of tools and graphic presentation methods and will be familiar with how to use such tools and methods for visualizing and presenting a concept or product. Students will acquire knowledge within the following main areas:	After completion of the course, the student will be able to account for * Coloring and rendering a 3D model * Preparing an exploded view illustration for the purpose of visualizing the assembly of a product. * Preparing a video clip using Mechanism Design or Animation of a 3D CAD	Students should acquire competences in: * Basic competence in how to present a subject or project in a semi professional manner * Make free hand sketches	<u>Requirements for attending examination</u> None <u>Type of examination:</u> 2 hours written examination. Examination counts for 100% of the final grade. Internal censor Evaluation of individual assignment last day of the lectures. In the CAD-project

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			* Coloring and rendering a 3D model so as to make its visual quality very similar to the quality of the final product. * Preparing an exploded view illustration for the purpose of visualizing the assembly of a product. * Preparing a video clip using Mechanism Design or Animation of a 3D CAD model. * Make sketches * Preparing presentation material based on a simple 3D-CAD model * Preparing documentation. For presentation purposes, students may apply a number of IT tools such as: * Adobe Photoshop * SketchUp * Adobe Illustrator * Adobe Acrobat Pro	model. * Make sketches * Preparing presentation material based on a simple 3D-CAD model * Preparing documentation. Via different tools or free hand sketching: * Adobe Photoshop * SketchUp * Adobe Illustrator * Adobe Acrobat Pro		the student should demonstrate ability to create 3D parts, combine the parts in assemblies and create 2D drawings for documentation of products. Allowed tools: Course literature according to the course description Personal notes Laptop Re-examination
SEP2	Quality/CSR & Sustainability Project	10	Through the project, students will acquire knowledge of development methods and concepts within Quality, sustainable production and CSR. * By analyzing and describing the production process and the selection of materials for a specific product, the students will acquire knowledge and understanding of environmental and	Students who complete the project acquire broad skills in: * Applying general knowledge on Quality, CSR and sustainability on a chosen subject. * Obtain skills in identifying and accounting for quality, environmental and CSR issues of relevance to a development project	After the project, the students should have received the following competences in relation to knowledge and applied science: * Work interdisciplinary in a project that will contain elements of all the 2nd semester's subject areas. * Have gained competences for making a structure pro-	Requirements for attending examination Course assignment handed in before deadline. Type of examination: Oral examination At the exam, students must deliver an oral group presentation of their project work followed by and individual assessment and join assessment part.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			ethical correlations in a product's life cycle. * Students will acquire knowledge of the correlation between production and materials as well as of the use and disposal of products. * Students will be trained to perform calculations of the environmental impact. * Students will aquire basic knowledge in how to perform in-depth research and testing of materials, and it is expected that they will provide innovative solutions to the specific problem. * In addition, students will gain knowledge in how a product is manufactured. * Students should be able to communicate and document the results of the development project orally as well as in writing.	* Identify and account for the different issues related to a development project * Put professional knowledge acquired into perspective both in relation to the project as well as in relation to other subjects and projects. * Develop skills in creating a technical based report using scientific methodology methods presented on the Project Web * Develop the orally communication skills as well as in writing and documentation of the project process	ject report based on scientific method-ology methods given by the project Web. * Show competence for accounting quality and environmental correlations of a product's life cycle * Obtain skills in literature search and use information on materials from different sources * Demonstrate competence in knowledge of development methods used within the area of sustainable production * Demonstrate competence in putting professional knowledge acquired into perspective both in relation to the project as well as in relation to other subjects and projects.	Students are given only one overall mark for the Project report, the Process report and their oral presentation. The reports carries a weight of 60% and the presentation carries a weight of 40%. The assessment of both the written reports as well as the oral presentation is based on the 7-point grading scale. The duration of the oral group presentation is approximately 10 pr. Student, followed by 20 minutes individual assessment pr student and in the end a join assessment of 10 min pr. student. After the assessment grade assessment is followed and individual feedback is given to each student 15 min pr. student all together. Examination counts for 100% of the final grade. <u>Report format</u> The project report should provide a written presentation of sustainable and CSR methods and tools used to secure sustainable production. * Students must hand the project Report and Process Report in WISE flow as stated in the guideline on

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						the Project Web * Report structure and method: (should follow the Guideline on the Engineering Project Web) * Report length etc. - (should follow the Guideline on the Engineering Project Web) * In addition, students could include prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. The Project and the Process report plus optional prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. must be handed in on time. External censor <u>Allowed tools:</u> Personal notes Laptop <u>Re-examination</u> Re-examination: Any re-exam will take place in the same way as the ordinary exam. If the student receive a grade below 2 then the student can improve on the project one time and delivery in the approved project for a new exam before or

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						in the beginning of the next semester. If the student receives a grade below 2 on an improved project or if the student delivers in the project after the improvement period have exceeded then the student must have a new assignment. If the student choice not to deliver in the project or participate in the ordinary exam then the student must have a new assignment for the project. <u>Engineering timeframe:</u> Students who failed a semester project in January or June must attend an information meeting on the last Friday in June. At this meeting, the students will get information on specific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students at the individual semesters. Based on the feedback, the students have received after the ordinary exam, they must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
MET3	Material technology processes and production management module 3	5	Students should acquire basic practical knowledge of significant manufacturing processes: Students should gain a broad knowledge within textile and plastics of: * main materials process related to the two main area * correlation between processing methods and properties * processing of materials * applications and uses * how commonly used materials and typical products are manufactured. Within the textile and plastics area knowledge is required in * Non-cutting and cutting processes in general * Commonly used assembly processes for plastic products * Characteristic textile processes (spinning, weaving, knitting, sewing, tufting, coloring and finishing, etc.) * Characteristic plastic in relation to processes – MFI,	Upon completing the course the student is expected to acquire broad skills to: * to be able to identify, choose and recommend appropriate manufacturing processes within textile products at basic level. * select a suitable material for a specific process * analyze product in respect to production methods	Students should acquire basic competences in: * Within commonly used production process for textile and plastics * Characteristic textile processes (spinning, weaving, knitting, sewing, tufting, coloring and finishing, etc.) * Characteristic plastic processes (molding, calendaring, extrusion, injection molding etc.) * Within commonly used properties in relation to processing * Characteristic textile properties in relation to processes – like dtex, filament length, filament thick-ness. * Characteristic plastic properties in relation to processes – MFI, viscosity, molecular weight distribution, Molecular weight and branching	<u>Requirements for attending examination</u> None <u>Type of examination:</u> Individual mini project in both the textile and plastics area. Evaluation by teacher in Wiseflow (masked) Examination counts for 100% of the final grade. Internal censor To pass the course, students must do two mini projects, with the purpose of researching the production processes of materials and/or products based on: 1. Textile fabrics 2. Plastics product For both analysis, the student must describe the product analysis in a written report that will be marked. The overall mark for the course will be the average of the marks of the two reports. Each report must receive the mark of 2 or above. Re-examination:

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			viscosity, molecular weight distribution, Molecular weight and branching * Characteristic plastic processes (molding, calendaring, extrusion, injection molding etc.) * Thermoset materials * Identification of materials * Industry 4.0 in relation to plastics.			Same as the ordinary examination on two new project case(s). Allowed tools: Re-examination Same as the ordinary examination on two new project case(s).
PHY2	Electronics and Thermodynamics module 2	5	The student will acquire knowledge at an introductory level in the following subjects: * Basic kinematics and kinetics (dynamics) * Basic thermodynamics, in particular temperature and mechanisms of heat transfer * Simple direct-current electric circuits	After completion of the course, the student will be able to: * Apply the kinematic definitions and relations valid for constant acceleration * Apply Newtons laws to solve simple problems in particle dynamics * Apply energy methods to solve simple problems in particle dynamics * Explain aspects of the overall behavior of complex systems in terms of conservation of energy * Apply the formula for heat conduction to simple problems * Apply Ohms law and Kirchhoff's rules to simple direct-current circuits	The student will gain the competence to: * read and understand texts using language and concepts from basic dynamics (including energy methods), the theory of heat transfer, or the theory of simple electric DC circuits * reason about physical situations involving energy, heat transfer or electrical circuits * expand independently his/her knowledge and skills in the topics of the course.	Requirements for attending examination Minimum 4 mandatory assignments handed in before deadline and accepted. Type of examination: Individual oral examination based upon a subject found by draw. No preparation time Examination counts for 100% of the final grade. Internal censor Additional comments: At least one week before the exam the exam papers are handed out. At the exam only the course textbook (provided by the teacher) and a calculator are allowed. Allowed tools: Course literature according to the course description Calculator

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						Re-examination
CHE2	Applied Chemistry, Dying, Printing Chromotology module 2	5	The student will acquire knowledge of chemical processes and its application * Dying of fibers, synthetics and natural fibers * Synthetics dyes and natural dyes, dyestuff principle * How to account for the correlation between fabric structure and chemical and physical properties of fabric as well as for the application of fabric in an everyday and technological context Students should have knowledge of commonly used color theory and their industrial application. * The color theories of Goethe and Itten * The color systems applied by the industry (NCS, Pantone and RAL) * Colorimetric exercises * Dyeing exercises * Reactive, etc. * Industry dyeing methods	After completion of the course, the student will be able to: * Handling chemicals and lab equipment using a secure and reflective approach * Registering and treating data and observations * Analyzing, assessing and communicating research results orally and in writing * Make calculations on chemical reactions * Independently select relevant dyes for natural and synthetics fibers * Select and use an appropriate color system	Students should acquire competences in: * Obtaining and using chemical information from different sources * Communicating knowledge of chemistry orally and in writing using terminology appropriate in a professional as well as an everyday context * Demonstrating knowledge of course identity and course methods * Identify and account for simple chemical problems occurring * Independently select relevant dyes for natural and synthetics fibers * Select and use an appropriate color system	Requirements for attending examination Minimum 4 mandatory assignments handed in before deadline and accepted. Type of examination: Individual oral examination based upon a subject found by draw. Preparation time: 40 minutes Examination counts for 100% of the final grade. Internal censor Allowed tools: Course literature according to the course description Re-examination Re exam will be held in the same way as the ordinary exam.
ECO1	Economy	5	The student will acquire knowledge at an introductory level in the following subjects: * Is able to understand the financial statement for a	It is expected that the student has established a fundamental understanding of economy. That the student can relate theory to practical conditions and that the student	The student will gain the competence to: * read and understand texts using language and concepts from basic dynamics (including energy methods),	Requirements for attending examination Minimum 4 mandatory assignments handed in before deadline and accepted. Type of examination:

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			small company and make an interpretation what the figures shows * Is able to make cost price calculation as well as an investment calculations and budgets	understands the basic concepts of financial management, and can make simple price quotes, investment analysis and budgets. Students should acquire basic competences in: * The balance sheet and income statement * The total accounting year report * Cash flow reporting and measurement * Interpreting the financial statement * Cost Learning * Cost price calculation * Budgeting * Investment and Financing	the theory of heat transfer, or the theory of simple electric DC circuits * reason about physical situations involving energy, heat transfer or electrical circuits * expand independently his/her knowledge and skills in the topics of the course.	Written: 4 hours. Examination counts for 100% of the final grade. Internal censor Allowed tools: Course literature according to the course description Re-examination Re-examination will be held in the same way as the ordinary exam or as an oral exam, 20 min preparation and 20 min examination.
SEP3	Future Materials Project	10	Through the project, students will acquire knowledge of research, innovation, idea development methods as well as concepts and tools for the scouting and exploitation of new materials and technologies required for a specific assignment By analyzing and describing the functionalities, the selection of technologies and new application areas for a specific future material, students will acquire insights and understanding of innovations across the technical	Students who complete the project acquire skills in: * Demonstrating broad knowledge in future materials and their application possibilities * Demonstrating enhance skills in the evaluation of advanced material properties within textile or plastics. * Identify and account the correlations between material properties, manufacturing and processing options in relation to the use of the products * Demonstrating enhance	After the project, the students should be able to demonstrate achieved competence in the following area: * Interdisciplinary work in a project that will contain elements of all the 3rd semester's subject areas. * Making a structure project report based on scientific methodology methods using the guidelines in the Engineering Project Web. * Make product requirements and specifications * Perform Technologies screening	Requirements for attending examination Course assignment handed in before deadline Type of examination: Oral examination At the exam, students must deliver an oral group presentation of their project work followed by and individual assessment and join assessment part. Students are given only one overall mark for the Project report, the Process report and their oral presentation. The reports carries a weight

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			textile and plastics industry. Students will achieve knowledge on the correlation between functional performance, material properties and production processes as well as knowledge on the use of the products in everyday life and in technological contexts. Students will achieve knowledge on the correlation between performance, comfort, design and material properties as well as knowledge on the use of the products in everyday life. Students will be trained to perform in-depth research and testing of materials, and it is expected that they will provide innovative solutions to the specific problem. Students should be able to communicate and document the results of the development project orally as well as in writing.	performance of test and documentation of the tests * Record and process data and observations * Basic knowledge in gathering and using material information from different sources * Analysing, assessing and disseminating orally and in writing research results * Communicating test results orally and in writing using appropriate terminology * Presenting product development and innovation, e.g. including drawings, pictures, and samples * Demonstrating knowledge and application of innovation and development methods used within the area of future materials * Create a technical based report using scientific methodology methods	* Application areas description (needs, targets, value creation, competitive advantage, etc.) * Analyse future material including: o Technical description of the functional properties o Definition of the product specifications o Analysis and selection of the Bio-based polymers o Analysis and selection of the suitable technology o Analysis of the process sustainability o Analysis of application area * Describe the project process in a process report * Formulate the reports in a concise, accurate and clear language * Present orally and state the reasons for selected solutions and methods used clear * Gain an understanding of the group work form and solving a specific task in collaborate with a group of fellow students	of 60% and the presentation carries a weight of 40%. The assessment of both the written reports as well as the oral presentation is based on the 7-point grading scale. The duration of the oral group presentation is approximately 10 pr. Student, followed by 20 minutes individual assessment pr student and in the end a join assessment of 10 min pr. student. After the assessment grade assessment is followed and individual feedback is given to each student 15 min pr. student all together. Examination counts for 100% of the final grade. <u>Report format</u> The project report should provide a written presentation of Future material project. * Students must hand the project Report and Process Report in WISE flow as stated in the guideline on the Project Web * Student must hand in the Group Formation and Group contract and Project Description at the dead-line

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						given by Wiseflow during the project period. * Report structure and method: (should follow the Guideline on the Engineering Project Web) * Report length etc. - (should follow the Guideline on the Engineering Project Web) * In addition, students could include prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. The Project and the Process report plus optional prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. must be handed in on time. External censor <u>Allowed tools:</u> Personal notes Laptop <u>Re-examination</u> Re-examination: Any re-exam will take place in the same way as the ordinary exam. If the student receive a grade below 2 then the teacher wil evaluate if the student can improve on the project one time or if the

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						student must make a new report. The re-exam and handing in of improved or new project will follow the general timeframe for reexamination of SEP projects in Engineering. If the student receives a grade below 2 on an improved project or if the student delivers in the project after the improvement period have exceeded then the student must have a new assignment. If the student choice not to deliver in the project or participate in the ordinary exam then the student must have a new assignment for the project. <u>Engineering timeframe:</u> Students who failed a semester project in January or June must attend an information meeting on the last Friday in June. At this meeting, the students will get information on specific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students at the individual semesters. Based on the feedback, the students have received after the ordinary exam, they

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
PRO1	Project Management	5	Upon completion of the course, the students should be able to: * Have knowledge of the basic paradigms, perspectives, theories, models and concepts of the subject area * Be able to describe, classify and structure theories, models and methods * Have knowledge of the assumptions upon which the subject area as well as the theories, models, methods and techniques relating to this area are based * Have knowledge of how to combine theories, models,	After completion of the course, the student should be able to: - Use and combine theories, models, methods and techniques - Identify and analyze practice-based project work - Present and assess alternative project design options - Assessing the control and management challenges related	After completion of the course, the students should be able to: * Analyze, plan, adapt and manage projects * Understand and use project as a dynamic and integrated part of the company strategy and organization. * Able to analyze, structure, plan, manage and document projects and should be able to put different types of projects into perspective.	<u>Requirements for attending examination</u> None <u>Type of examination:</u> Individual oral exam based on a synopsis. Examination counts for 100% of the final grade. Internal censor <u>Allowed tools:</u> Course literature according to the course description Personal notes Laptop <u>Re-examination</u> Any re-exam will take place in the same way as the ordinary exam on new synopsis.
LOG1	Logistics, Purchasing and Out/Insourcing	5	Students should gain a broad knowledge of: * Logistics in relation to Supply chain management	Upon completing the course the student is expected to acquire broad skills to:	It is expected that the student has established a fundamental understanding of logistics, purchasing and In/Outsourcing.	<u>Requirements for attending examination</u> None <u>Type of examination:</u>

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			* Purchasing and inventory management * In/outsourcing and Make / Buy analysis¨	* Logistics goals and logistics strategy * Logistics customer focus * Purchase Management * Transport and 3.party logistics * Warehouse management * Inventory management * Operations and material management * Logistics information technology incl. ERP * Human resources and organizing for logistics * Logistics financial performance * Purchasing * Make / buy analysis	That the student can relate theory to practical conditions and that the student understands the basic concepts of logistics, inventory management, purchasing . Students should acquire basic competences in: * The relationship between supply chain management and logistics * The logistics influence on enterprise competitiveness and economic influence * Know the logistics customer service elements * Could explain the purchasing process * Understand the basic ideas of JIT and Lean	Individual oral examination based upon a miniproject Examination counts for 100% of the final grade. Internal censor <u>Allowed tools:</u> Course literature according to the course description <u>Re-examination</u> Re exam will be held in the same way as the ordinary exam (new mini project).
MET4	Material Science Module 4	5	The students is expected to reach a stage where he/she can relate and reflect over the material range within the field of textile and plastics. Students should gain knowledge of: * Polymer potential and application possibilities with the textile and plastics area * Understand the chemistry of polymers on a high level and how it influence the polymer properties within the textile and polymer area	Upon completing the course the student is expected to acquire the skills to: * Identify and describe polymer materials for specific advanced applications of textiles and plastics * Relate properties of high-performance textile and plastics materials with the chemical com-position and properties on advance level * predict and determine material performance	Upon completing the course the student is expected to have gain competences in: * Being familiar with the textile and plastics materials used for different performance applications. * Assessing and considering materials properties and applications in relation to chemical structure and properties. * Researching and analyzing materials characteristics with special emphasis on	<u>Requirements for attending examination</u> None <u>Type of examination:</u> Individual project approx. 10-20 pages. Individual presentation followed by an individual examination. Duration presentation 15-20 minutes Examination counts for 75% of the final grade. Course assignment accounts for 25% of final grade. Internal censor

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			* Standard and testing methods * Interesting and innovative materials * Applications and uses	* identify and measure relevant material parameters for a specific purpose applying standard or customized test methods * Account for economical and environmental aspects related to the materials	chemical composition. * Being familiar with standard test methods for assessing the properties of textile and plastics materials	Allowed tools: All Re-examination Any re-exam will take place in the same way as the ordinary exam. New assignments.
STR1	Business Development and Strategic Management	5	Upon completion of the course, the students should be able to: * Understand organizational behaviour and structures * Understand the concept of management and leadership including the different schools of management and leadership * Understand the basis issues of business strategy and business development * Understand the elements of the strategic planning process and a range of strategic tools.	After completion of the course, the student should be able to: * Design, evaluate and chose appropriate organizational structures * Evaluate and choose relevant management and leadership strategies * Formulate mission, vision and values * Manage organizational change processes * Manage organizational business development and blue ocean strategies * Analyze the external macro and micro environment in the context of business strategy making * Analyze the internal environment in the context of business strategy making * Identify strategic options * Design, evaluate and chose appropriate business strategies.	After completion of the course, the students should be able to: * Understand the basic issues of management and leadership * Apply the appropriate kind of management/leadership in a given situational context * Understand the basis issues of business strategy * Apply different strategic tools * Understand change management * Plan and implement a strategic planning process in an organizational context	Requirements for attending examination None Type of examination: Individual oral exam based on a synopsis. Examination counts for 100% of the final grade. External censor Allowed tools: Course literature according to the course description Personal notes Laptop Re-examination Any re-exam will take place in the same way as the ordinary exam.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
DM-INO1	Engineering Innovation Weeks (Materials Science Engineering)	5	After having successfully completed the course, the students will have gained: An understanding of innovation and its uses within the field of engineering-Knowledge about Design Thinking (double diamond) processKnowledge about how to create a systematic and measurable progress in innovation tasks	After having successfully completed the course, the students will be able to:Engage in innovative processes in a cross-/inter-/multidisciplinary settingConceive, plan, and execute innovative ideasWork methodically with innovationCollect and apply relevant information about technologies, markets and end users	After having successfully completed the course, the students will have gained competences in:Introducing innovative ideas into project workContributing own professional skills in teams with the objective of solving problems by using innovative processes and modelsClarifying multidisciplinary group competencies	Group presentation of project in both shared-weeks as well as mono-weeks.
SEP4	Innovation and Business Development	5	Through the project, students will acquire knowledge of research, innovation, idea development methods as well as concepts and tools for the creation of the business model based on a specific assignment. Upon completion of the project, students should be able to: * To analyze a product, the related issues and the potential market applications, students will develop a business model on the basis of a reference to the Osterwalders canvas model. * To perform a thorough research on the materials composition, properties and functional integration, it is	Students who complete the project acquire broad skills within the following area depending on the subject given by the company: * Analyze and account for the correlations between material properties in relation to the use of the products * Record and process data and observations * Research, validate and use material information from different sources * Analyze, assess and disseminate orally and in writing research results * Present prototype development, e.g. including drawings, pictures, mock-up and samples * Demonstrate structured	After the project, the students should be able to demonstrate broad knowledge of materials and their application possibilities: * Work interdisciplinary in a project that will contain elements of all the 4th semester's subject areas. * Make a structure project report based on scientific methodology methods. * Conduct a product development process through the analyzing phase and description of a product, including design of the project and the selection of material. * Perform market product description (needs, targets, value creation, competitive	<u>Requirements for attending examination</u> Course assignment handed in before deadline <u>Type of examination:</u> Oral examination At the exam, students must deliver an effective and professional presentation of their project work involving different tools as PowerPoints, sketches, pictures, prototypes, etc. Students are given only one overall mark for the Project report, the Process report and their oral presentation. The reports carries a weight of 60% and the presentation carries a weight of 40%. The assessment of both the written reports as well as the oral presentation is

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			expected that students generate and propose concrete solutions – documented, tested and validated – suitable for solving the specific problem. * Present prototype development orally and in writing using terminology appropriate in a professional as well as an everyday context * Demonstrate initial knowledge of innovation and development methods Students will achieve knowledge on the correlation between performance, comfort, design and material properties as well as knowledge on the use of the products in everyday life. Students will be trained to perform in-depth research and testing of materials, and it is expected that they will provide innovative solutions to the specific problem. Students should be able to communicate and document the results of the development project orally as well as in writing.	knowledge of innovation and development methods * Demonstrate and present basic skill in making product marked product descriptions * Obtain basic skills in marked analysis * Obtain basic knowledge in resource analysis * Obtain basic knowledge in making economical and financial calculation on the given project and make a Conclusion and recommendations - the idea is economically attractive to pursue? * Identify and account for the different issues related to a development project * Prepare a business model including a thorough description of the added value - seen through the customer's eyes – of the product you want to market * Understand and make Product requirements specification * Create a technical based report using scientific methodology methods * Communication orally as well as in writing and documentation of the project process	advantage, etc.) * Make market analysis including: o Estimates of market size and growth potential o Analysis of market segments and target groups o Analysis of competitors and competition o Estimates of market share, volume and price strategy * Document the result in a project report and accompanying attachments (Appendix) * Make basic resource analysis (industrial, financial and human) * Calculate economic and financial assessment of the main consequences over a 3-year horizon * Describe the project process in a process report * Formulate the reports in a concise, accurate and clear language * Present orally and state the reasons for selected solutions and methods used * Gain an understanding of the group work form and solving a specific task in collaborate with a group of fellow students	based on the 7-point grading scale. The duration of the oral presentation is approximately 20 minutes followed by a Q & A and assessment session of 15 minutes. Examination counts for 100% of the final grade. <u>Report format</u> • The project report should provide a written presentation of the innovation process, the develop-ment process and the product solution developed • Students must hand the project Report and Process Report in WISE flow • In addition, students could include prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. • Report structure and method: (should follow the Guideline for preparing project report, MI 2017, VIA and Scientific Methodology) The Project and the Process report plus optional prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. must be handed in on time.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						External censor <u>Allowed tools:</u> Personal notes Laptop <u>Re-examination</u> Re-examination: Any re-exam will take place in the same way as the ordinary exam. If the student receive a grade below 2 then the student can improve on the project one time and delivery in the approved project for a new exam before or in in the beginning of the next semester. If the student receives a grade below 2 on an improved project or if the student delivers in the project after the improvement period have exceeded then the student must have a new assignment. If the student choice not to deliver in the project or participate in the ordinary exam then the student must have a new assignment for the project. <u>Engineering timeframe:</u> Students who failed a semester project in January or June must attend an information meeting on the last Friday in June.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						At this meeting, the students will get information on specific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students at the individual semesters. Based on the feedback, the students have received after the ordinary exam, they must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
INP 1	Internship (DM)	30	The student must: • gain knowledge of theory, methodology and practice within a profession or one or more fields of study • be able to understand and reflect on theories, methodology and practice • be aware of non-technical – societal, health and safety, environmental, economic and industrial – implications of engineering practice	The student must: • be able to apply the methodologies and tools of one or more fields of study and to apply skills related to work within the field/fields of study or profession • be able to assess theoretical and practical problems and to substantiate and select relevant solutions • be able to communicate professional issues	The student must: • be able to handle complex and development oriented situations in study or work contexts • be able to independently participate in professional and interdisciplinary collaboration with a professional approach • be able to identify own learning needs and to organise own learning in different learning environments	

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
					• promote an engineering-oriented approach during the remaining semesters on the Bachelor programme • develop personal skills required for the professional career as engineer • form the basis for developing personal/professional network	
MET5	Technology - Module 5	5	The students is expected to reach a stage where he/she can relate and reflect over new materials and new technology in the field of preference. Students should gain knowledge of: - Technology for high-performance materials and their properties - Processing and finishing of high-performance textiles - Technology for change in surface properties of high-performance materials - Standard and testing methods for properties of high-performance textiles - New methods for processing	Upon completing the course the student is expected to acquire the skills to: - Identify and describe technological and technical processes for specific advanced applications of textiles - Relate technology and technical processes to properties of high-performance textile materials with their uses - Predict technics in processes for high-performance and new application of materials - Identify the technic and analytical measurements relevant material parameters for a specific purpose applying standard or customized test methods - Account for economic and environmental aspects - Recognize the importance	Upon completing the course the student is expected to have gain competences in: - Being familiar with technics and processes of the textile materials used for different high- performance applications. - Assessing and considering the different processes for obtaining materials properties and ap-plications - Researching and analyzing technics and processes for obtaining materials characteristics - Being familiar with standard test methods for assessing the properties of advanced textile materials for describing the technics to obtain that - Selecting and substantiating the choice of specific technical and processing solu-tions/materials for the	Requirements for attending examination Course assignment handed in before deadline Type of examination: Written: 4 hours Course assignment accounts for 25% of final grade Examination accounts for 75% of final grade Internal censor Allowed tools: All Re-examination If the student receives a grade below 2 then the student must go to a reexam. The reexam can be oral instead of written depending on the number of students participating in the reexam.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
				using the processes of advanced textile materials in different fields -	development of a high-performance textile materials - Taking part in corporation with relevant suppliers and customers for the purpose of selecting the most suitable materials and/ or developing new materials for advanced applications by the use of different technical processes. Furthermore the students should be capable of seeking, validating and implementing additional knowledge within the subject on their own hand within the following areas. - Non-woven technics - Fiber manufacturing processes for man-made fibers - Technics and treatment of natural fibers to making them for high-performance materials - Technics for biomaterials and - Chemicals used in the textile processes - Processes for obtaining the relevant properties of high-performance materials - Technics for making microfibers - The chemical and technics in making functional finishing of materials - LCA of high-performance materials and processes for	

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
					them - The possibility of recycling high-performance materials	
MET6	Future Materials - Module 6	5	The students is expected to reach a stage where he/she can relate and reflect over new materials in the field of preference. Students should gain knowledge of:- - High-performance fibers and their properties - Processing and finishing of high-performance textiles - Standard and testing methods - Interesting and innovative materials - Applications and uses	Upon completing the course the student is expected to acquire the skills to: - Identify and describe materials and technological processes for specific advanced applications of textiles - Relate properties of high-performance textile materials with their uses - Predict and determine material performance - Identify and measure relevant material parameters for a specific purpose applying standard or customized test methods - Account for economical and environmental aspects - Recognize the importance of advanced textile materials in different fields	- Assessing and considering materials properties and applications - Researching and analyzing materials characteristics - Being familiar with standard test methods for assessing the properties of advanced textile materials - Selecting and substantiating the choice of specific solutions/materials for the development of a high performance textile materials - Taking part in corporation with relevant suppliers and customers for the purpose of selecting the most suitable materials and/ or developing mew materials for advanced applications.. Furthermore the students should be capable of seeking, validating and implementing additional knowledge within the subject on their own hand within the following areas. - Elastomeric fibers - Fibers with Chemical, Heat or Fire Resistance - Other Special-Use Fibers - High performance textiles for protective clothing	<u>Requirements for attending examination</u> Course assignment handed in before deadline <u>Type of examination:</u> Individual presentation of abstract followed by an individual examination.Duration examination: 5 min presentation follow by 10-15 min examination. Grading on 7 scale. External censor <u>Allowed tools:</u> All <u>Re-examination</u> Same as original examination on new assignment

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
					- High performance textiles for heat and fire protection - Functional Finishes for Protection	
OPN1 (DM17)	Open Material Technology Subject (Class DM17)	5	The student is expected to reach a stage where he/she can acquire deep knowledge and analyze different material aspects on a new material area on relevant issues within the industry.	The student is expected to apply the following relevant tools, scientific descriptions and methods to analyze the chosen material into depth: - Material and chemistry structure - Material constraints - Environmental consideration - TBL perspectives - Legislation issues - Material substitution tools - Processing issues - Business perspective	The students are expected to have gained enough knowledge on their own to be able to look into a new material area and to come with relevant recommendations on the given subject at a qualified level in relation to - Material usage and relevant scarce resources - Material substitution - TBL perspectives - Environmental consideration - Relevant legislation issues - Relevant processing issues - Business perspectives	<u>Requirements for attending examination</u> None <u>Type of examination:</u> To pass the course, students must hand in a mini project of 15-20 pages excluding appendix (following the normal guidelines for projects) The report will be given a mark directly without oral presentation. In order to pass the course the report must be assessed at least with the mark of 2. Examination accounts for 100% of final grade Internal censor <u>Allowed tools:</u> Course literature according to the course description Personal notes Laptop Calculator <u>Re-examination</u> Same as the ordinary examination on a new project subject.

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
VER3	Knitting, Sewing and Print laboratory work	0	Upon completion of the workshop, students should be able to: • Perform simple manufacturing process in knitting and sewing machines • Perform simple manufacturing process with printing on different process • Demonstrate initial knowledge about safe work standard within the different textile machine and lab areas	Students who complete the workshop have acquire skills in: • Knitting work • Sewing work • Printing work • Safety work within textile machines and lab areas	After the workshop, students should be able to: • Work in the knitting and sewing area on simple item • Work in the printing lab on the different type of machines on simple item • Understand safety procedure within the relevant areas	Requirements for attending examination Course assignment handed in be-fore deadline and mandatory participation Type of examination: Mandatory participation in the full workshop and approval of finished products within the three areas The assessment of the mandatory participation and approval of finished products on a pass / non pass basis. Allowed tools: Personal notes, laptop, Re-examination Re-examination: Any re-exam will take place in the same way as the ordinary exam. New work-shop next year.
VER1	Metal and Wood laboratory work	0	Upon completion of the workshop, students should be able to: • Perform simple manufacturing process on metal and wood • Demonstrate initial knowledge about safe work standard for metal and wood work.	Students who complete the workshop have acquire skills in: • Metal work • Wood work • Safety work	After the workshop, students should be able to: • After the workshop, students should be able to: • Work in the metal and wood workshop on simple item • Understand safety procedure within metal and wood workshop	Requirements for attending examination Course assignment handed in be-fore deadline and mandatory participation Type of examination: Mandatory participation in the full workshop and approval of finished products within the three areas

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						The assessment of the mandatory participation and approval of finished products on a pass / non pass basis. <u>Allowed tools:</u> Personal notes, laptop, <u>Re-examination</u> Re-examination: Any re-exam will take place in the same way as the ordinary exam. New work-shop next year.
VER2	Material laboratory and Chemistry	0	Upon completion of the workshop, students should be able to: • Perform simple material testing on fiber, yarn and textile • Perform simple chemical testing • Demonstrate initial knowledge about safe work standard for lab work. • Understand Safety and health datasheet and requirement therefor. •	Students who complete the workshop have acquire skills in: • Material testing • Chemistry testing • Technical report testing • Health and Safety Datasheet • Safety work	After the workshop, students should be able to: • Work in the Material lab on their different project • Set up test requirement and test plans for fiber, yarn and textile • Set up simple chemical testing • Make safety and health work	<u>Requirements for attending examination</u> Course assignment handed in be-fore deadline and mandatory participation <u>Type of examination:</u> Mandatory participation in the full workshop and approval of finished products within the three areas The assessment of the mandatory participation and approval of finished products on a pass / non pass basis. <u>Allowed tools:</u> Personal notes, laptop, <u>Re-examination</u>

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						Re-examination: Any re-exam will take place in the same way as the ordinary exam. New work-shop next year.
PHY1	Statics and Mechanics of Materials Module 1	5	The student will acquire knowledge at an introduction level in the following subjects: * Units, Physical Quantities and Vectors * Basic kinematics, motion along a straight line * Newton's laws of motion * Work and Kinetic Energy * Potential Energy and energy conservation * Static equilibrium and Elasticity * Stresses and strains in materials	After completion of the course, the student will be able to, * Apply the kinematic definitions and relations valid for constant acceleration * Apply Newtons laws to solve simple problems in particle dynamics * Apply energy methods to solve simple problems in particle dynamics * Explain aspects of the overall behavior of complex systems in terms of conservation of energy * Calculate tensile and compressive stress and strains in materials * Explain aspects of reflection and refraction and dispersion of light	The student will gain competence to: * Reason about physical situations involving kinematics, dynamics, energy, stresses/strains and light * In addition, the student will have the competence to expand independently his/her knowledge and skills in the topics of the course.	<u>Requirements for attending examination</u> Minimum 6 mandatory assignments handed in before deadline and accepted. <u>Type of examination:</u> Individual oral examination based upon a subject found by draw. No preparation Examination counts for 100% of the final grade. Internal censor. At least one week before the exam the exam papers are handed out. At the exam, only the textbooks delivered by the teacher are allowed. <u>Allowed tools</u>

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						Course literature according to the course description <u>Re-examination</u> As ordinary
QM1	Quality management and statistics (Class DM17)	5	The students is expected to reach a stage where he/she can analyze different quality management set up and apply the different quality tools on relevant issues within the industry. The students is expected to give/teach others on obtained knowledge on quality management and control from company visit(s) to other student in relation to the industry where the company is placed. (Textile or Furniture and product type with the given specialty). Especially emphasis must be given to the product characteristics and supply chain set up in the specialty area.	The student is expected to apply the following tools and methods and to criticize other companies on the following tools and methods: - ISO 9001 - Use SPC, Capability CpK and other different statistic tools for continuous surveillance - Understand and calculate COPQ as a mean to control cost of quality. - Use P-FMEA to prevent Quality issues in the production set up - Use House of Quality as a tool in the design phase to translate customer requirement to product characteristics. - Product characteristics, products standards and testing of these - Use CAPA tools for Corrective and Preventive actions. - Design Supplier evaluation	The student is expected to have gained enough knowledge to be able to work with in a quality department in relation to Quality Management or quality control after specific training within the field of preference. - Make ISO instruction - Participate in internal audit - Set up Quality control systems - Set up supplier evaluation and assessment procedures - Participate in FMEA and tools like QFD - Make and calculate COPQ - Knowledge about specific product and supplier standard. - Use CAPA tools - Calculate process Capability etc.	<u>Requirements for attending examination</u> Course assignment handed in before deadline <u>Type of examination:</u> Group presentation followed by an individual examination. Duration presentation: 15-20 minutes The students must hand-in a group poster presentations and present the posters to the other groups in the course. The presentation is followed by an individual examination on the assignment demonstrating the knowledge, skills and competences developed throughout the course and in the research phase. Course assignment accounts for 25% of the final grade Examination accounts for

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				and supplier assessment - Knowledge about supplier standards like PPAP - Random check		75% of final grade Internal censor <u>Allowed tools:</u> Course literature according to the course description Personal notes Laptop <u>Re-examination</u>
SEP6	Open Project	10	Through the project, students will acquire specific knowledge within the area of interest in the field of Material Science and Product Design By analyzing and describing the functionalities, the selection of technologies and new application areas for a specific future material, students will acquire insights and understanding of innovations across the technical textile and furniture industry. Students will achieve knowledge on the correlation between performance, production, design and material properties as well as knowledge on the use of the products in everyday life in relation to the given project. Students will be trained to perform in-depth research and testing of materials, and	Students who complete the project acquire skills in: - Demonstrating broad knowledge in material science and their application possibilities - Demonstrating enhance skills in the evaluation of material properties - Identify and account the correlations between material properties, manufacturing and processing options in relation to open project - Demonstrating enhance performance of test and documentation of the tests if relevant in the open project - Record and process data and observations if relevant in the open project. - Basic knowledge in gathering and using material information from different sources - Analysing, assessing and	After the project, the students should be able to demonstrate achieved competence in the following area: - Interdisciplinary work in a project that will contain elements of different subject in the study program so fare. - Making a structure project report based on scientific methodology methods using the Project guidance in the Engineering Project Web. - Application areas description (needs, targets, value creation, competitive advantage, etc.) - Analyse material like: o Technical description of the functional properties o Definition of the product specifications o Analysis and selection of the suitable technology o Analysis of the process sustainability	<u>Requirements for attending examination</u> Course assignment handed in before deadline <u>Type of examination:</u> Oral examination External censor At the exam, students must deliver an effective and professional presentation of their project work involving different tools as PowerPoints, sketches, pictures, prototypes, etc. Students are given only one overall mark for the Project report, the Process report and their oral presentation. The reports carries a weight of 60% and the presentation carries a weight of 40%. The assessment of both the written reports as well as the oral presentation is based on the 7-point grading scale.

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			it is expected that they will provide innovative solutions to the specific problem in relation to the given project. Students should be able to communicate and document the results of the development project orally as well as in writing.	disseminating orally and in writing research results - Communicating test results orally and in writing using appropriate terminology - Presenting product project e.g. including drawings, pictures, and samples - Create a technical based report using scientific methodology methods	o Analysis of application area - Describe the project process in a process report - Formulate the reports in a concise, accurate and clear language - Present orally and state the reasons for selected solutions and methods used clear - Gain an understanding of solving a specific task in collaborate with a group of fellow students, company or other stakeholders	The duration of the oral presentation is approximately 20 minutes followed by a Q & A of 15 min and assessment session of 15 minutes. <u>Report format</u> The project report should provide a written presentation of the Open project. - Students must hand the project Report and Separate Process Report in Wiseflow as stated in the Project guidance on the Engineering Project Web. - Student must hand in a Project Description at the deadline given by Wiseflow during the pro-ject period. - Report structure and method: (must follow the Project Guidance on the Engineering Project Web) - Report length etc.: (must follow the Project Guidance on the Engineering Project Web) - Process Report: (must follow the Project Guidance on the Engineering Project Web) - In addition, students could include prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						etc. The Project and the Process report plus optional prototypes, mock-ups, models, products, drawings, and Films/pictures on DVD etc. must be handed in on time. <u>Allowed tools:</u> Personal notes Laptop <u>Re-examination</u> Re-examination: Any re-exam will take place in the same way as the ordinary exam. If the student receive a grade below 2 then the student can improve on the project one time and delivery in the approved project for a new exam before or in in the beginning of the next semester. If the student receives a grade below 2 on an improved project or if the student delivers in the project after the improvement period have exceeded then the student must have a new assignment. If the student choice not to deliver in the project or participate in the ordinary exam then the student must have a new assignment for the

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
						project. Engineering timeframe: Students who failed a semester project in January or June must attend an information meeting on the last Friday in June. At this meeting, the students will get information on specific deadlines as well as the process of re-exam. They will form new groups, if possible in relation to the number of failed students at the individual semesters. Based on the feedback, the students have received after the ordinary exam, they must prepare a new project, or the failed project must be improved. Deadline for hand in of the project is mid-August (exact date will be informed at the meeting). There will be no guidance in the period up to hand in. Oral assessment of the project takes place in September.
OPN1	Open Material Technology Subject	5	The student is expected to reach a stage where he/she can acquire deep knowledge and analyze different material aspects on a	The student is expected to apply the following relevant tools, scientific descriptions and methods to analyze the chosen material into depth:	The students are expected to have gained enough knowledge on their own to be able to look into a new material area and to come	Requirements for attending examination None

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			new material area on relevant issues within the industry.	- Material and chemistry structure - Material constraints - Environmental consideration - TBL perspectives - Legislation issues - Material substitution tools - Processing issues - Business perspective	with relevant recommendations on the given subject at a qualified level in relation to - Material usage and relevant scarce resources - Material substitution - TBL perspectives - Environmental consideration - Relevant legislation issues - Relevant processing issues - Business perspectives	Type of examination: To pass the course, students must hand in a mini project of 15-20 pages excluding appendix (following the normal guidelines for projects) The report will be given a mark directly without oral presentation. In order to pass the course the report must be assessed at least with the mark of 2. Examination accounts for 100% of final grade Internal censor Allowed tools: Course literature according to the course description Personal notes Laptop Calculator Re-examination Same as the ordinary examination on a new project subject.
OSS1	Open Sustainability subject	5	The students are expected to reach a stage where he/she can acquire and show deep knowledge on material substitution with respect to sustainability issues related to relevant UN world Goals for sustainable development. The analysis must take both material aspects	The student is expected to apply the following relevant tools, scientific descriptions and methods to analyze the impact of material substitution in deep: - Material selection framework	The student is expected to have gained enough knowledge on their own to be able to look in material sub-stitution on a high level and give a clear recommendation to the case company in relation to the broader TBL perspective.	Requirements for attending examination Project handed in before deadline Type of examination:To pass the course, students must make a mini project

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
			and process aspects into considerations.	- Process selection framework o Use process mapping for illustrating the different processes. - LCA considerations o Functional basis for making an LCA comparison o Use of data from CES Edupack or HIGGS database - TBL perspectives - Relate to relevant UN world Goals for sustainable development.		15-20 pages excluding appendix (following the normal guidelines for projects) and a self-explanatory poster presentation. The report will be given a mark directly without oral presentation. The report must receive the mark of 2 or above. 7-point scale Internal censor Allowed tools: Course litterature according to the course description Personal notes Laptop Re-examination Same as the ordinary examination in a new project case
FMT1 (DM17)	Fluid Mechnics and heat transfer (Class DM17)	5	Students who pass this module should have knowledge about: • Basic fluid mechanics and heat transfer • Heat transfer expressed by thermal networks • Common pipe system components such as pumps, heat exchangers and valves	The student should develop competences within: • Use of the field of study in combination with other subjects learned on their education • Communication of the topics and the methods to persons without any prior knowledge of the field • Interpretation of the calculated results and presentation of the main conclusions	- Assessing and considering materials properties and applications - Researching and analyzing materials characteristics - Being familiar with standard test methods for assessing the properties of advanced textile materials - Selecting and substantiating the choice of specific solutions/materials for the development of a high performance textile materials - Taking part in corporation with relevant suppliers and	Requirements for attending examination None Type of examination: Individual oral examination based upon a subject found by draw.No preparation Internal censor Allowed tools: Personal notes Re-examination

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
					customers for the purpose of selecting the most suitable materials and/ or developing mew materials for advanced applications.. Furthermore the students should be capable of seeking, validating and implementing additional knowledge within the subject on their own hand within the following areas. - Elastomeric fibers - Fibers with Chemical, Heat or Fire Resistance - Other Special-Use Fibers - High performance textiles for protective clothing - High performance textiles for heat and fire protection - Functional Finishes for Protection	Same as original examination on new assignment
AU	AU Course - Global Management	5				
OMQ1	Operation Mangement and Quality	5	The students are expected to reach a stage where he/she can acquire and show deep knowledge when faced with challenges' in relation to improving the operation and quality processes. The student will acquire knowledge in applying suitable analytical methods/tools to achieve the necessary knowledge and thereby make deliberate decisions.	Upon completing the course, the student is expected to acquire broad skills to: • Manufacturing philosophies and operational strategies • How to describe and apply value stream mapping to analyze business performance • How to establish and use Key Performance Indicators	The student is expected to have gain competence within the field of improving operations management and the related quality systems so that he/she have the basic tools for addressing these issues in the future situations.	<u>Requirements for attending examination</u> Project handed in before deadline <u>Type of examination:</u>To pass the course, students must make a mini project 10-12 pages excluding appendix (following the normal guidelines for projects) The report will be given a mark directly without oral

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
				• Sales and Operations Planning, (S&OP) and the Master Production Schedule • Material Requirement Planning • Process designs and lay-out types • Work (time and methods) studies • Forecasting methods • Planning and control activi-ties including capacity man-agement • Inventory management • Lean values, principles, methods and tools • Quality philosophies and Quality assurance tools • ISO 9000, ISO 14001 and CE directives		presentation. The report must receive the mark of 2 or above. 7-point scale Internal censor <u>Allowed tools:</u> Course litterature according to the course description Personal notes Laptop <u>Re-examination</u> Same as the ordinary exam-ination in a new project case
FMT1	Fluid Mechnics and heat transfer	5	Students who pass this module should have knowledge about: • Basic fluid mechanics and heat transfer • Heat transfer expressed by thermal networks • Common pipe system components such as pumps, heat exchangers and valves	The student should develop competences within: • Use of the field of study in combination with other sub-jects learned on their educa-tion • Communication of the top-ics and the methods to per-sons without any prior knowledge of the field • Interpretation of the calcu-lated results and presenta-tion of the main conclusions	- Assessing and considering materials properties and ap-plications - Researching and analyz-ing materials characteristics - Being familiar with stand-ard test methods for as-sessing the properties of ad-vanced textile materials - Selecting and substantiat-ing the choice of specific so-lutions/materials for the de-velopment of a high perfor-mance textile materials - Taking part in corporation with relevant suppliers and customers for the purpose	<u>Requirements for attending examination</u> None <u>Type of examination:</u> Individual oral examination based upon a subject found by draw.No preparation Internal censor <u>Allowed tools:</u> Personal notes <u>Re-examination</u> Same as original examina-tion on new assignment

Code	Title	ECTS-point	Knowledge	Skills	Competences	Examination
					of selecting the most suitable materials and/ or developing mew materials for advanced applications.. Furthermore the students should be capable of seeking, validating and implementing additional knowledge within the subject on their own hand within the following areas. - Elastomeric fibers - Fibers with Chemical, Heat or Fire Resistance - Other Special-Use Fibers - High performance textiles for protective clothing - High performance textiles for heat and fire protection - Functional Finishes for Protection	