

Materials Science and Engineering Expert profiles

The following profiles are examples of expertise that accumulates during your studies. We hope that the example profiles give you some advice on the choices you have to make within the degree.

This document will be updated regularly as more expert profiles become available. The date of the current document is:

20.10.2021

If you have any suggestions how to develop the profiles further please let us know.

Yours,

Mikko Hokka

Professor, head of the program.



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Expert of Materials and Applied Mechanics

I am an expert of materials and applied mechanics. I understand the basics and fundamentals of mechanics, strength of materials, and machine design, but also I understand how the microstructures of materials influence on the physical properties of materials and how the material perform in industrial applications. In other words, I know how to choose materials to different machinery components, but also why these materials perform well. I have good understanding on and know-how on material models and practical tools that are use for desinging complex parts and components in the industry. In my work I can work in a team and discuss with experts in various other disciplines. I can contribute to product development (development engineer) through both materials and mechanics expertise, or I can participate research, development, and innovation projects as I can master both mechanical and materials engineering. I also often work together with our customers, providing technical support and also securing sales and new contracts. My typical tasks require expertise on specific materials, their processing methods, how to improve mechanical propertise of materials, and how to maximize the performance of materials in various applications. Because of my broad range of expertise I can typically find work in both small/medium size companies, where I am expected to do different tasks, but also large international companies where I can mostly focus on one (large) task at a time.

• My typical job descriptions include:

- Participation of R&D projects, Team Leader
- Materials selection for challenging applications
- Strength of materials and product design
- Sales and technical sales support. Product manager.
- Internationa projects and product development
- Risk evaluation and management
- Presentations, reports, surveys

• **Examples where my classmates have found jobs:** Universities, Research Centers, VTT, Metso, SSAB, Sandvik, Hilti, Wärtsilä, ABB, Outokumpu,

Bachelor Degree in Mechanical Engineering, Materials Physics, Chemistry, or similar. Strong theoretical studies in solid mechanics.

Joint Studies in Materials Engineering

- MSE.020 Master's Thesis Seminar
- LANG.SUV.001 Suomi 1
- ENS.610 Introduction to graduate studies

- Lang.Eng.007 Thesis Writing B
- MSE.400 Laboratory Exercises in Materials Science

Choose one:

- MSE.420 Corrosion and Wear of Materials (For Mechanics of Materials –major)
- MSE.410 Electron Microscopy (Advanced Engineering Materials – Major)

Advanced Engineering Materials

OR

Mechanics of Materials

- MSE.422 Non-destructive testing and failure analysis
- MSE.420 Corrosion and Wear of Materials
- **CHOOSE one area of expertise based on your own interest, and fill the module up to 30 credits**
 - Metals
 - Ceramics
 - Polymers

- RAK.RS.300 Introduction to material models
- MAT.APP.420 Differential Equations
- **CHOOSE one area of expertise based on your own interest, and fill the module up to 30 credits**
 - Computational Analysis for Composites
 - Tribology and Machine Elements
 - Mechanics of Metals

Free Choice Study Units

- MSE.472 Advanced Surface Engineering
- MSE.560 Materials for Energy Technologies
- MSE.580 Dimensioning of Machine Elements
- MSE.480 Introduction to Tribology
- KONE.6600 Machinery Monitoring and Diagnostics
- MSE.900 Special Treatise on Materials Science
- RAK.RS.360 Continuum mechanics
- MSE.120 Structure and properties of engineering materials (can be mandatory for some)
- CAD/CAM related studies

Recommended Free Choice Study Modules

- AUT-A02 Industrial Robotics
- AUT.VV.S01 Factory Automation
- TUTA.VV.A02 Industrial Management
- MTE.VV.A03 Strength Analysis of Advanced Structures
- COM.SE.A02 Information Technology
- TUTA.VV.A04 Sales in Technology Driven Industries
- TTI.VV.S123 Additive manufacturing of engineering materials



Expert on polymer technology

Bachelor Degree in Polymer Chemistry, Materials Chemistry or Materials Science

As an expert on polymer technology, I master the processing and manufacturing methods of polymeric materials (plastics and rubbers) as well as the aspects of using polymeric materials especially in industrial environments. The focus of my expertise is in the processing-structure-property relationships of polymeric materials: what are the constituents of plastics and rubbers, how processing affect their microstructure and how the microstructure affects the properties. I can measure and analyse the properties of polymeric materials and deduct from the data the performance of these materials in different applications. I can support my expertise by selecting a free choice study module focusing e.g. on polymer chemistry, mechanics of materials, industrial management or business.

I work in in teams together with process and automation engineers to optimize the processing of plastic products. My work description covers responsibilities on evaluating the performance of polymeric materials based on their processing parameters and maintaining the feasibility of the processing from technological and economical aspects. For example, I know how to optimize an injection moulding process to generate a specific microstructure and achieve the required properties for the product to ensure its functionality and performance. My expertise ensures me good starting point to work in large companies, SMEs as well as in research institutes and academia.

• Typical tasks are

- RDI projects as a research and development engineer
- Supervisory role in an R&D team as project manager or R&D manager
- Optimizing manufacturing processes
- Training, teaching
- Sales and technical support for sales
- Quality control and risk assessment
- Reports, presentations, and surveys

- **Examples of companies:** Packaking industry, Uponor, Coveris, Premix, Borealis, Nokian Tyres, Teknikum, VTT, Muovipoli

Joint Studies in Materials Engineering (MSc)

- MSE.400 Laboratory Exercises in Materials Science
- MSE.4100 Electron Microscopy
- Mathematics course(s)
- MSE.020 Master's Thesis Seminar
- ENS.610 Introduction to graduate studies
- Lang.Eng.007 Thesis Writing B
- LANG.SUV.001 Suomi 1

Advanced Studies in Advanced Engineering Materials (60 or 80 ECTS)

- MSE.422 Non-Destructive Testing and Failure Analysis
- MSE.420 Corrosion and Wear of Materials
- Choose courses related to "Expert in Polymer Materials"

Free Choice Study Units

- MSE.430 Polymeric Materials
- MSE.432 Rheology
- MSE.434 Elastomers
- MSE.436 Processing of Thermoplastics
- MSE.438 Advanced Composites
- MSE.440 Adhesion and Surface Modifications
- MSE.560 Materials for Energy Technologies
- MSE.540 Packaging Materials
- MSE.542 Converting and Packaging Processes
- MSE.510 Advanced Materials Characterization
- KEM.350 Analytical Chemistry 1

Recommended Free Choice Study Modules

- MTE.VV-03 Advanced Studies in Mechanics of Materials as Free Choice Studies
- SCE.KEM-A02 Intermediate Studies in Chemistry as Free Choice Studies
- MTE-S10
- TUTA.VV.A02 Industrial Management
- TUTA.VV.A04 Sales in Technology Driven Industries
- BBTM.TEK-S21 Advanced Studies in Medical Biomaterials and Their Applications



This expert understands materials and structures that are required to carry intensive mechanical loadings but are light with respect to their strength. This expert understands, that optimized products involve materials, which have different character in different directions, i.e., that are anisotropic. This expert understands numerically challenging and multi-disciplinary computational methods of materials analysis. This expert is capable of simulating and predicting the behavior of energy and resource-saving materials of the future.

Typical work tasks:

- Numerical simulation of material systems
- Optimization of thin-walled parts
- Materials selecting
- Modelling of reinforcements in materials

Example industries:

Companies of the composite industry, related to infrastructures, heavy-duty vehicles and tools, aircraft, ships, wood-plastic composites.

Institutions of research and development, universities. Defense forces and industries that in general work with requiring applications for materials.

Computational analysis of composites

Bachelor Degree in Science and Engineering focusing on Materials

Supporting Minor Selection at BSc level

- RAK-S35 ('Rakentamisen tietotekniikka')
- RAK-S32 ('Mechanics of materials')

Common Core Studies in Engineering Materials Science (MSc) (20-40 ECTS + thesis 30 ECTS)

- Corrosion and Wear of Materials
- Laboratory Exercises in Materials Science
- Introduction to graduate studies + (Finnish for beginners)
- Master's thesis seminar (0 OP)
- Mathematics course(s)

Mechanics of Materials (30 ECTS)

- MSE.438 Advanced composite
- MSE.530 Energy-saving lightweight material systems
- RAK.RS.300 Introduction to materials modelling
- RAK-32301 (FEM intro)
- MATH.APP.420
- MSE.440 Adhesion & surface treatments (V)

Advanced Studies (to support the profile, 0-20 ECTS)

- MSE.430 Polymeric materials
- MSE.550 Metals technology
- KEB-15207 (LCA)
- RAK.RS.320 (optimization)
- RAK.RS.360 (continuum mechanics)
- RAK.RS.120 (Introduction)
- RAK.RS.370 (Fracture, fatigue)

Recommended Minor and Free Choice Studies (20-30 ECTS)

- MTE.VV-A03 'Strength Analysis'
- MATH.APP-A03 'Mathematics'
- KONE.VV-A02 'Aeronautical engineering'
- COMP.SE-A03 'Software systems'
- KONE.VV-A04 'Data technologies'

Expert on sustainability of material technologies and solutions

Bachelor Degree in Materials Physics or Chemistry or in Mechanical Engineering, Circular Economy, Environmental Science or similar with Studies on Materials Science

Joint Studies in Materials Engineering (MSc)

- MSE.420 Corrosion and Wear of Materials
- MSE.400 Laboratory Exercises in Materials Science
- Mathematics course(s)
- MSE.020 Master's Thesis Seminar
- LANG.SUV.001 Suomi 1
- ENS.610 Intro to graduate studies
- Lang.Eng.007 Thesis Writing B

MTE-S05 Advanced Studies in Sustainable Materials (60 ECT)

- YEB.144 LCA in Energy and Environmental Engineering
- Knowledge-Based and Collaborative Decision Making for Sustainability
- MSE.550 Metals Technology
- MSE.430 Polymeric Materials

Free Choice study units

- MSE.540 Packaging Materials
- MSE.560 Materials for Energy Technologies
- MSE.460 Processing of Advanced Ceramics
- MSE.470 Coatings and Surface Treatments
- MSE.310 Materials and the Environment
- MSE.422 Non-Destructive Testing and Failure Analysis
- MSE.900 Special Treatise on Materials Science
- YEB.151 Resource Recovery
- YEB.041 Process Engineering
- TUTA.364 Turning Circular Economy Technologies into Business
- TUTA.280 Contemporary Circular Economy Challenges and Solutions

Recommended Free Choice Study Modules

- Circular Economy
- Environmental Engineering
- Energy Engineering
- Biomedical Technology
- Tissue engineering
- Medical biomaterials
- Information Technology
- Signal processing and machine learning
- Tissue engineering
- Photonics studies



I am an expert on sustainability and material science/technology. I have excellent understanding of the basics and fundamentals of the different aspects of the circular economy of materials and their environmental effects throughout their lifetime. My engineering skills allow me to evaluate and assess the performance of a specific material and assess its environmental effect in a specific application.

In my studies I have selected a personal combination of focus points within field of sustainable materials. The combination is based on my personal background and interests. These studies are very suitable also for continuing education.

As a material engineer with a multidisciplinary education with strong know-how in natural sciences, I can contribute to industrial R&D of material processing and development and to enhance the sustainability of the products developed. I am a welcomed team member in multidisciplinary product and material development teams and I have developed skills that help me to discuss with team members with different backgrounds. I also have good skills on working with people to negotiate, supervise, train and speak in public. My typical tasks require expertise in specific material properties, performance, and recycling. Because of my broad range of expertise I can find work in both small/medium size companies, but also large international companies.

My typical job descriptions include:

- Participation of R&D projects
- Sustainability manager and consulting
- Team leader responsibilities
- International projects and product development
- Training and teaching
- Risk management
- Presentations, reports, surveys

• **Examples where my classmates have found jobs:** Universities, Research Centers, VTT, Foundations such as Ellen MacArthur Foundation, Metso, Stora Enso etc.



The expert of computational selecting of materials understands load-carrying high-performance structures and products, which include materials optimized for different directional functions. This expert is the exactly correct person to work with the team and other experts specific to life cycle assessment and mechanics of materials. This expert can select analysis methods so that products can be designed to be mechanically strong yet energy-saving and lightweight. Additionally, this expert understands design processes and their linkages to requirements by authorities and manufacture.

Typical work tasks:

- Development of material systems
- Analysis of thin-walled parts
- Materials selecting
- Optimization of materials durability for a sustainable society

Example industries:

Metal- and composite industries that manufacture, for example, infrastructure products, various heavy-duty vehicles, transportation vehicles, such as cars, ships, aircraft, as well as wood-metal constructions.

Institutions of research and development, universities. Defence forces and industries that in general work with multimaterial systems.

Computational selecting of materials

Bachelor Degree in Science and Engineering focusing on Materials

Supporting Minor Selection at BSc level

- RAK-S35 ('Rakentamisen tietotekniikka')
- RAK-S32 ('Mechanics of materials')

Common Core Studies in Engineering Materials Science (MSc) (20-40 ECTS + thesis 30 ECTS)

- Corrosion and Wear
- Laboratory Exercises in Materials Science
- Introduction to graduate studies
- Master's thesis seminar
- Mathematics course(s) + (Finnish for beginners)

Sustainable Materials (30 ECTS)

- MSE.550 Metals technology
- MSE.438 Advanced composite
- MSE.530 Energy-saving light..
- KEB-15207 (LCA)
- MATH.APP.420
- MSE.440 Adhesion & surface treatments

Advanced Studies (to support the profile, 0-20 ECTS)

- RAK.RS.300 (Introduction to materials modelling)
- MSE.430 Polymeric materials
- RAK.RS.320 (optimization)
- RAK.RS.360 (continuum mechanics)
- RAK.RS.120 (Introduction)
- RAK.RS.370 (Fracture, fatigue)

Recommended Minor and Free Choice Studies (20-30 ECTS)

- MATH.APP-A03 Applied Mathematics
- KONE.VV-A04 'Robotics'
- KONE.VV-A04 'Data technologies'
- AUT.VV-S01 'Automation'
- MTE.VV-A03 'Strength Analysis'



As an expert in Materials Characterization I have excellent knowledge of the fundamental principles and theoretical background of a broad range of material characterization methods. I have the basic skills needed to operate several microscopes and other instruments including optical and scanning electron microscopes and X-Ray diffraction. I also have similar knowledge and skills for thermal analysis and non-destructive material testing methods. All this combined with my expertise in engineering materials allows me to understand well how the processing of the material affects the structure and how the structure affects the material properties and performance. Compared to a material physicist, I have much better understanding and knowhow on engineering materials used in the society at large. I understand the materials are imperfect, they have multigrain structures, alloying elements, multimaterials, composites etc. I can plan measurements and characterization methods for each material and case, and I know how to analyze the results taking into account the physical background of the measurement method and their accuracy and limitations. I always work as a part of a team where my colleagues can represent for example mechanical engineers, civil engineers, or other material experts focusing on how to use the materials in practice, but likely also I work with theoretical and experimental physicists and chemists as well as computational (materials) scientists. My role in the team is to plan and execute material characterization, and interpret the results together with the team to find better solutions for science and engineering. As my work often requires use of expensive and large infrastructure, my typical employees are universities, research centers, and large companies. Very often I also pursue a doctorate after my Master's degree to deepen my expertise in characterization of materials. My typical job descriptions include

- Materials research and characterization. Analysis of materials and products, microscopy, and analysis of the results.
- Teaching and training.
- Reporting, presentations, surveys.
- **Example companies:** Universities in Finland and abroad. VTT, large companies e.g., SSAB.

Materials Characterization Expert

B.Sc. In Material Physics, solid state physics, chemistry, etc.

Joint Studies in Materials Engineering

- MSE.020 Master's Thesis Seminar
- LANG.SUV.001 Suomi 1
- ENS.610 Introduction to graduate studies
- Lang.Eng.007 Thesis Writing B
- MSE.400 Laboratory Exercises in Materials Science
- MSE.410 Electron Microscopy

Advanced Engineering Materials 60 or 80 ECTS

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|---|----|---|
| <ul style="list-style-type: none"> • MSE.422 Non-destructive testing and failure analysis | OR | <ul style="list-style-type: none"> • MSE.420 Corrosion and Wear of Materials |
| <p>Expert in Metals</p> <ul style="list-style-type: none"> • Metals technology • Phase transformations and heat treatments • Joining methods of metals • Advanced surface engineering • Coatings and surface treatments | | <p>Expert in polymeric materials</p> <ul style="list-style-type: none"> • Polymeric Materials • Rheology • Processing of thermoplastics • Elastomers • Adhesion and surface modifications • Komposiittirakenteet |
| <p>Expert in Ceramics</p> <ul style="list-style-type: none"> • Advanced Ceramics • Processing of Advanced Ceramics • Materials for Energy technologies • Coatings and surface treatments • Advanced Surface Engineering | OR | |

Advanced Studies (to support the profile, 0-20 ECTS)

- | | |
|---|--|
| <ul style="list-style-type: none"> • Introduction to surface science • Advanced material characterization, • Electron Spectroscopy • Optical Spectroscopy | <ul style="list-style-type: none"> • Introduction to surface science • Analytical chemistry 1 and 2 • Photonics Materials |
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Recommended Free Choice Study Modules

- Physics
- Chemistry

Expert on sustainability of material technologies and solutions

Bachelor Degree in Materials Physics or Chemistry or in Mechanical Engineering, Circular Economy, Environmental Science or similar with Studies on Materials Science

Joint Studies in Materials Engineering (MSc)

- MSE.420 Corrosion and Wear of Materials
- MSE.400 Laboratory Exercises in Materials Science
- Mathematics course(s) studies
- MSE.020 Master's Thesis Seminar • Lang.Eng.007 Thesis Writing B
- LANG.SUV.001 Suomi 1
- ENS.610 Introduction to graduate

MTE-S05 Advanced Studies in Sustainable Materials (60 ECT)

- YEB.144 LCA in Energy and Environmental Engineering
- Knowledge-Based and Collaborative Decision Making for Sustainability
- MSE.550 Metals Technology
- MSE.430 Polymeric Materials

Free Choice studies

- MSE.540 Packaging Materials
- MSE.560 Materials for Energy Technologies
- MSE.460 Processing of Advanced Ceramics
- MSE.470 Coatings and Surface Treatments
- MSE.310 Materials and the Environment
- MSE.422 Non-Destructive Testing and Failure Analysis
- MSE.900 Special Treatise on Materials Science
- YEB.151 Resource Recovery
- YEB.041 Process Engineering
- TUTA.364 Turning Circular Economy Technologies into Business
- TUTA.280 Contemporary Circular Economy Challenges and Solutions

Recommended Free Choice Study Modules

- Circular Economy
- Environmental Engineering
- Energy Engineering
- Biomedical Technology
- Tissue engineering
- Medical biomaterials
- Information Technology
- Signal processing and machine learning
- Tissue engineering
- Photonics studies
- BBTK-A36 Intermediate Studies in Medical Biomaterials



I am an expert on sustainability and material science/technology. I have excellent understanding of the basics and fundamentals of the different aspects of the circular economy of materials and their environmental effects throughout their lifetime. My engineering skills allow me to evaluate and assess the performance of a specific material and assess its environmental effect in a specific application.

In my studies I have selected a personal combination of focus points within field of sustainable materials. The combination is based on my personal background and interests. These studies are very suitable also for continuing education.

As a material engineer with a multidisciplinary education with strong know-how in natural sciences, I can contribute to industrial R&D of material processing and development and to enhance the sustainability of the products developed. I am a welcomed team member in multidisciplinary product and material development teams and I have developed skills that help me to discuss with team members with different backgrounds. I also have good skills on working with people to negotiate, supervise, train and speak in public. My typical tasks require expertise in specific material properties, performance, and recycling. Because of my broad range of expertise I can find work in both small/medium size companies, but also large international companies.

My typical job descriptions include:

- Participation of R&D projects
- Sustainability manager and consulting
- Team leader responsibilities
- International projects and product development
- Training and teaching
- Risk management
- Presentations, reports, surveys

• **Examples where my classmates have found jobs:** Universities, Research Centers, VTT, Foundations such as Ellen MacArthur Foundation, Metso, Stora Enso etc.



Expert of Materials Physics and Engineering

Bachelor Degree in Science and Engineering focusing in Physics and Mathematics

REQUIRED PREREQUISITE INFORMATION

MSE. 120 Structure and properties of crystalline materials,

Joint Studies in Materials Engineering

- MSE.020 Master's Thesis Seminar
- LANG.SUV.001 Suomi 1
- ENS.610 Introduction to graduate studies

- Lang.Eng.007 Thesis Writing B
- MSE.400 Laboratory Exercises in Materials Science

Choose one:

- MSE.420 Corrosion and Wear of Materials (For Mechanics of Materials –major)
- MSE.410 Electron Microscopy (Advanced Engineering Materials – Major)

ADVANCED ENGINEERING MATERIALS, 60 ECTS or 80 ECTS

- **MSE.422 Non-destructive testing and failure analysis**

- **MSE.420 Corrosion and Wear of Materials**

Choose your expertise:

Expert in Metallic Materials and Technology

- Metals technology
- Phase transformations and heat treatments
- Joining methods of metals
- Advanced surface engineering
- Coatings and surface treatments

Expert in Ceramic Materials and Technology

- Advanced Ceramics
- Processing of Advanced Ceramics
- Materials for Energy technologies
- Coatings and surface treatments
- Advanced Surface Engineering

Expert in Polymer Materials and Technology

- Polymeric Materials
- Rheology
- Processing of thermoplastics
- Elastomers
- Adhesion and surface modifications
- Komposiittirakenteet

Advanced Electible Studies

- Photonic Materials
- Advanced Materials characterization

- Analytical Chemistry 1 and 2
- Advanced Surface Engineering
- Materials for Energy Technologies

Recommended Minor and Elective Studies

- BBTK-A32 Biomedical engineering
- BBTK-A36 Medical biomaterials
- FYS-A02 Physics
- PHO-S01 Photonics technologies

- COMP.SGN.A02 Signal processing and machine learning
- COM.SE.A02 Information Technology

I am an expert of material physics and engineering. I have excellent understanding of the basics and fundamentals of physical properties of materials, and understand well the theories and mathematics that underline well known material phenomena such as diffusion and phase transformations. My engineering skills further allow me to work with very complex alloys and materials where the ab-initio understanding of the material properties and behavior becomes too complicated. As a material engineer with strong physics and mathematics know-how, I can contribute to industrial R&D of material processing and development. I am a welcomed team member in multidisciplinary product and material development teams where physicists work together with materials and mechanical engineers trying to find scientific root causes for the most important industrial and societal problems. My typical tasks require expertise in specific materials, the fundamental physical phenomena and understanding how the changes in the material microstructure and composition and processing will change the material performance. Because of my broad range of expertise I can find work in both small/medium size companies, but also large international companies. My education, skills, and expertise are a perfect combination for PhD studies in physics, engineering, chemistry and many other areas involving materials.

• My typical job descriptions include:

- Participation of R&D projects
- Team leader responsibilities
- International projects and product development
- Training and teaching
- Risk management
- Presentations, reports, surveys

- **Examples where my classmates have found jobs:** Universities, Research Centers, VTT, Huawei, Outotec, Metso, SSAB, Valmet, Fiskars, Meyer, ColloidTEK, Corning, Schott nLIGHT, Nextrom, Iittala



Expert of Medical Biomaterials and Their Applications

As an expert in medical biomaterials, I can work in broad range of companies and in various jobs. Most of my tasks and duties, especially in early stages of my career, are related to development of the materials and their production methods for tissue compatible solutions. I am good at testing and characterization of the materials and evaluating their tissue compatibility as well. All this is carried out taking care of patient care and comfort, and under the tight boundary conditions and regulations concerning patient security and safety. Obviously, I have good understanding of these regulations and quality standards and systems, and I know how to apply them to materials development. In addition to the 'normal' materials engineering know-how, I have strong expertise in tissue engineering, and I can approach material and product development from the anatomical and physiological point of view, I understand well the fundamental reactions between materials and different tissues, the quality control and other regulations governing the biomaterial development, fundamentals of in-vitro and in-vivo experiments, and the special requirements related to the production methods in this field. My typical job descriptions include:

- Product development projects as development engineer
- Manager of the product development team
- Optimization of production processes
- Registration of medical devices
- Teaching and education
- Sales and technical support for sales
- Quality control and risk assessment
- Standards and IPR issues
- Reports, presentations, and surveys
- **Example companies where my colleagues are employed:** Universities, VTT, other research centers, Polar Electro Oy, Inion Oy, Bioretec Ltd, Thermo Fisher Scientific Oy, GE Healthcare Finland Oy, patent offices, governmental institutes (e.g. Valvira)

Bachelor Degree in Biomaterials, Biotechnology, Materials Science or other suitable field

Joint Studies in Materials Engineering

- MSE.020 Master Thesis Seminar
- MSE.400 Laboratory Exercises in Materials Science
- MSE.420 Corrosion and Wear or MSE.410 Electron Microscopy

MEDICAL BIOMATERIALS AND THEIR APPLICATIONS

- BBT.BTE.301 Biodegradable polymers
 - BBT.BTE.303 Bioceramics and their Clinical Applications
 - BBT.MJS.106 Research Project in Biomedical Sciences and Engineering
 - BBT.MJS.146 Product Development of Biomedical Devices
- Complete by choosing studies focusin on Ceramics, Polymers, Surface Engineering, or Characterization

MANDATORY STUDY MODULE IN MATERIALS SCIENCE AND ENGINEERING

- Advanced Engineering Materials
- Mechanics of Materials
- Sustainable Materials

Free Choise Study Units

- Biomedical Polymers Laboratory Course
- Nanomedicine and Advanced Drug Delivery Technologies
- Tissue Engineering Applications
- Electron microscopy
- Rheology
- Adhesion and Surface Modifications