# Master of Science in Biomedical Engineering

Civilingenjörsprogram i medicinsk teknik
300 credits

6CMED

Valid from: 2026 Spring semester

**Determined by**

Board of Studies for Electrical Engineering, Physics and Mathematics

**Date determined**

2025-08-28

**Revised by**

**Revision date**

**Registration number**

LiU-2025-03949

**Offered first time**

Autumn semester 2010

**Offered for the last time**

**Replaced by**

# Entry requirements

## Degree in Swedish

Civilingenjörsexamen - Medicinsk teknik

samt

Teknologie masterexamen med huvudområde Elektroteknik, Medicinsk teknik eller Teknisk fysik

## Degree in English

Degree of Master of Science in Engineering - Biomedical Engineering

and

Degree of Master of Science (120 credits) with a major in Electrical Engineering, Biomedical Engineering or Applied Physics

# Curriculum

## Semester 1 (Autumn 2026)

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 0** | | | | | |
| TATB01 | Foundation Course in Mathematics | 6* | G1N | - | C |
| **Period 1** | | | | | |
| TATA24 | Linear Algebra | 8* | G1N | 1 | C |
| TATB01 | Foundation Course in Mathematics | 6* | G1N | 4 | C |
| TBME11 | Anatomy and Physiology | 4 | G1N | 2 | C |
| TFYY51 | Engineering Project | 6* | G1N | 3 | C |
| TATA40 | Perspectives on Mathematics | 1* | G1N | - | V |
| **Period 2** | | | | | |
| TATA24 | Linear Algebra | 8* | G1N | 4 | C |
| TATA41 | Calculus in One Variable 1 | 6 | G1F | 2 | C |
| TFYY51 | Engineering Project | 6* | G1N | 3 | C |
| TATA40 | Perspectives on Mathematics | 1* | G1N | - | V |

## Semester 2 (Spring 2027)

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TATA42 | Calculus in One Variable 2 | 6 | G1F | 1 | C |
| TDDE44 | Introduction to Computer Programming | 8* | G1N | 2 | C |
| TFYB04 | Mechanics and Fundamental Physical Concepts | 8* | G1F | 4 | C |
| TBMT32 | Perspectives on Biomedical Engineering | 2* | G1N | 3 | E |
| TFFM12 | Perspectives on Physics | 2* | G1N | - | E |
| TATA40 | Perspectives on Mathematics | 1* | G1N | - | V |
| TGTU96 | Sustainable study situation | 2* | G1N | - | V |
| **Period 2** | | | | | |
| TATA43 | Calculus in Several Variables | 8 | G1F | 2 | C |
| TDDE44 | Introduction to Computer Programming | 8* | G1N | 1 | C |
| TFYB04 | Mechanics and Fundamental Physical Concepts | 8* | G1F | 4 | C |
| TBMT32 | Perspectives on Biomedical Engineering | 2* | G1N | 3 | E |
| TFFM12 | Perspectives on Physics | 2* | G1N | - | E |
| TATA40 | Perspectives on Mathematics | 1* | G1N | - | V |
| TGTU96 | Sustainable study situation | 2* | G1N | - | V |

## Semester 3 (Autumn 2027)

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TATA44 | Vector Analysis | 4 | G1F | 1 | C |
| TFYA70 | Electromagnetism - Theory and Application | 6 | G2F | 3 | C |
| TSTE05 | Electronics and Measurement Technology | 8* | G1F | 2 | C |
| **Period 2** | | | | | |
| TBME03 | Biochemistry and Cell Biology | 6 | G2F | 2 | C |
| TBMT56 | Biomedical Engineering | 6 | G1F | 4 | C |
| TSTE05 | Electronics and Measurement Technology | 8* | G1F | 3 | C |

## Semester 4 (Spring 2028)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TFYA62 | Introduction to Biosensor Technology | 6 | G2F | 3 | C |
| TFYA63 | Materials for Biomedical Engineering | 8* | G2F | 1 | C |
| TFYB08 | Wave Physics | 6 | G2F | 4 | C |
| TSRT04 | Introduction in Matlab | 2 | G1F | 2 | C |
| **Period 2** | | | | | |
| TAMS14 | Probability, First Course | 4 | G1F | 4 | C |
| TATA57 | Transform Theory | 4 | G1F | 1 | C |
| TFYA63 | Materials for Biomedical Engineering | 8* | G2F | 3 | C |
| TPTE06 | Industrial Placement | 6 | G2F | - | E |

## Semester 5 (Autumn 2028)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TAMS24 | Statistics, First Course | 4 | G2F | 4 | C |
| TDDE71 | Programming and Data Structures | 8* | G2F | 2 | C |
| TSBB31 | Medical Images | 6 | G2F | 1 | C |
| **Period 2** | | | | | |
| TDDE71 | Programming and Data Structures | 8* | G2F | 2 | C |
| TFYA67 | Modern Physics | 6 | G2F | 1 | C |
| TSDT18 | Signals and Systems | 6 | G2F | 3 | C |

## Semester 6 (Spring 2029)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMT43 | Medical Radiation Physics | 8* | G2F | 2 | C |
| TBMT58 | Project - Biomedical Engineering | 16* | G2E | 3 | C |
| TINT01 | Introduction to Intercultural Competence | 2 | G1N | - | E |
| **Period 2** | | | | | |
| TBMT43 | Medical Radiation Physics | 8* | G2F | 2 | C |
| TBMT58 | Project - Biomedical Engineering | 16* | G2E | 3 | C |
| TSRT93 | Automatic Control | 6 | G2F | 1 | C |

## Semester 7 (Autumn 2029)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TANA21 | Scientific Computing | 6 | G1F | 3 | E |
| TAOP88 | Engineering Optimization | 6 | G2F | 1 | E |
| TATM38 | Mathematical Models in Biology | 6 | A1N | 3 | E |
| TBMI19 | Medical Information Systems | 6* | A1N | 2 | E |
| TFKE59 | Fundamentals of Chemistry | 6 | G1N | 2 | E |
| TFYA97 | Modern Optics | 6 | A1N | 4 | E |
| TINT01 | Introduction to Intercultural Competence | 2 | G1N | - | E |
| TMME67 | Musculoskeletal Biomechanics and Human Movements | 6 | A1N | 2 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 2 | E |
| TSDT14 | Signal Theory | 6 | A1N | 1 | E |
| **Period 2** | | | | | |
| TEAE01 | Industrial Economics, Basic Course | 6 | G1F | 2 | C/E |
| TEAE05 | Resource Theory | 6 | G1N | 3 | C/E |
| TKMJ24 | Environmental Engineering | 6 | G1N | 1 | C/E |
| TBMI19 | Medical Information Systems | 6* | A1N | 3 | E |
| TBMT01 | Biomedical Signal Processing | 6 | A1F | 1 | E |
| TFYA37 | Soft Condensed Matter Physics | 6 | A1N | 1 | E |
| TFYM01 | Solid State Physics I | 6 | A1F | 2 | E |
| TGTU49 | History of Technology | 6 | G1F | 1 | E |
| TMKO05 | Additive Manufacturing for Industrial Applications | 6 | G2F | 3 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 3 | E |
| TSBB21 | Computational Photography | 6 | A1F | 4 | E |
| TSRT78 | Digital Signal Processing | 6 | A1F | 2 | E |

*Specialisation: Biomedical Engineering Materials — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TFKE59 | Fundamentals of Chemistry | 6 | G1N | 2 | C |
| TAOP88 | Engineering Optimization | 6 | G2F | 1 | E |
| TATM38 | Mathematical Models in Biology | 6 | A1N | 3 | E |
| TDDC17 | Artificial Intelligence | 6 | G2F | 3 | E |
| **Period 2** | | | | | |
| TFYA37 | Soft Condensed Matter Physics | 6 | A1N | 1 | C |
| TFYM01 | Solid State Physics I | 6 | A1F | 2 | C |

*Specialisation: Biomedical Image Analysis and Visualization — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TSDT14 | Signal Theory | 6 | A1N | 1 | C |
| TANA21 | Scientific Computing | 6 | G1F | 3 | E |
| TATM38 | Mathematical Models in Biology | 6 | A1N | 3 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 2 | E |
| TSBB08 | Digital Image Processing | 6 | A1N | 4 | E |
| **Period 2** | | | | | |
| TBMT01 | Biomedical Signal Processing | 6 | A1F | 1 | C |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 3 | E |
| TSBB21 | Computational Photography | 6 | A1F | 4 | E |
| TSRT78 | Digital Signal Processing | 6 | A1F | 2 | E |

*Specialisation: eHealth — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMI19 | Medical Information Systems | 6* | A1N | 2 | C |
| TSDT14 | Signal Theory | 6 | A1N | 1 | C |
| TATM38 | Mathematical Models in Biology | 6 | A1N | 3 | E |
| TDDC17 | Artificial Intelligence | 6 | G2F | 3 | E |
| **Period 2** | | | | | |
| TBMI04 | eHealth: Aims and Applications | 6 | G2F | 2/4 | C |
| TBMI19 | Medical Information Systems | 6* | A1N | 3 | C |
| TBMT01 | Biomedical Signal Processing | 6 | A1F | 1 | C |

*Specialisation: Models in Biomedical Engineering — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMI19 | Medical Information Systems | 6* | A1N | 2 | C |
| TSDT14 | Signal Theory | 6 | A1N | 1 | C |
| TATM38 | Mathematical Models in Biology | 6 | A1N | 3 | E |
| **Period 2** | | | | | |
| TBMI19 | Medical Information Systems | 6* | A1N | 3 | C |
| TBMT01 | Biomedical Signal Processing | 6 | A1F | 1 | C |

## Semester 8 (Spring 2030)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TFYA85 | Alternative Energy Sources and their Applications | 6 | G2F | 4 | C/E |
| TGTU94 | Technology and Ethics | 6 | G1F | 1 | C/E |
| TKMJ15 | Environmental Management Strategies | 6 | G1F | 3 | C/E |
| TAMS39 | Multivariate Statistical Methods | 6 | A1N | 4 | E |
| TAOP07 | Introduction to Optimization | 6 | G1F | 2 | E |
| TATA53 | Linear Algebra, Honours Course | 6* | G2F | 3 | E |

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| TBMI26 | Neural Networks and Learning Systems | 6 | A1N | 2 | E |
| TBMT09 | Physiological Pressures and Flows | 6 | A1N | 1 | E |
| TBMT59 | Medical image formation | 6 | A1F | 3 | E |
| TDDD38 | Advanced Programming in C++ | 6* | A1N | 2 | E |
| TDDE70 | Deep Learning | 6 | A1F | 1 | E |
| TFYB11 | Materials Science | 6 | A1N | 2 | E |
| TFYM04 | Growth and Characterization of Nanomaterials | 6* | A1F | 1 | E |
| THEN18 | English | 6* | G1N | 4 | E |
| TINT02 | Intercultural Competence and Intercultural Communication, Continued Course | 6* | G2F | - | E |
| TSBB34 | Computer Vision for Video Analysis | 6 | A1N | 1 | E |
| TSBK07 | Computer Graphics | 6* | A1N | 4 | E |
| **Period 2** | | | | | |
| TEAE01 | Industrial Economics, Basic Course | 6 | G1F | 2 | C/E |
| TGTU84 | Diversity and Gender in Engineering | 6 | G1F | 4 | C/E |
| TATA53 | Linear Algebra, Honours Course | 6* | G2F | 3 | E |
| TBME08 | Biomedical Modeling and Simulation | 6 | A1N | 3 | E |
| TBMT26 | Technology in Intensive Care and Surgery | 6 | A1N | 1 | E |
| TDDD38 | Advanced Programming in C++ | 6* | A1N | 1 | E |
| TFMT19 | Chemical Sensor Systems | 6 | A1N | 4 | E |
| TFYB16 | Artificial Intelligence for Materials Science | 6 | A1X | 2 | E |
| TFYM04 | Growth and Characterization of Nanomaterials | 6* | A1F | 1 | E |
| THEN18 | English | 6* | G1N | 4 | E |
| TINT02 | Intercultural Competence and Intercultural Communication, Continued Course | 6* | G2F | - | E |
| TSBK07 | Computer Graphics | 6* | A1N | 1 | E |
| TSBK38 | Image and Audio Compression | 6 | A1N | 4 | E |

*Specialisation: Biomedical Engineering Materials — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TFYB11 | Materials Science | 6 | A1N | 2 | C |
| TFYM04 | Growth and Characterization of Nanomaterials | 6* | A1F | 1 | C |
| TBMI26 | Neural Networks and Learning Systems | 6 | A1N | 2 | E |
| TBMT09 | Physiological Pressures and Flows | 6 | A1N | 1 | E |
| TDDD38 | Advanced Programming in C++ | 6* | A1N | 2 | E |
| **Period 2** | | | | | |
| TFYM04 | Growth and Characterization of Nanomaterials | 6* | A1F | 1 | C |
| TBME08 | Biomedical Modeling and Simulation | 6 | A1N | 3 | E |
| TBMT26 | Technology in Intensive Care and Surgery | 6 | A1N | 1 | E |
| TDDD38 | Advanced Programming in C++ | 6* | A1N | 1 | E |
| TFMT19 | Chemical Sensor Systems | 6 | A1N | 4 | E |
| TFYB16 | Artificial Intelligence for Materials Science | 6 | A1X | 2 | E |

*Specialisation: Biomedical Image Analysis and Visualization — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMI26 | Neural Networks and Learning Systems | 6 | A1N | 2 | C |
| TBMT59 | Medical image formation | 6 | A1F | 3 | C |
| TSBK07 | Computer Graphics | 6* | A1N | 4 | C |
| TAMS39 | Multivariate Statistical Methods | 6 | A1N | 4 | E |
| TAOP07 | Introduction to Optimization | 6 | G1F | 2 | E |
| TBMT09 | Physiological Pressures and Flows | 6 | A1N | 1 | E |
| **Period 2** | | | | | |
| TSBK07 | Computer Graphics | 6* | A1N | 1 | C |
| TBME08 | Biomedical Modeling and Simulation | 6 | A1N | 3 | E |
| TSBB33 | 3D Computer Vision | 6 | A1N | 3 | E |
| TSBK38 | Image and Audio Compression | 6 | A1N | 4 | E |

*Specialisation: eHealth — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TDDD38 | Advanced Programming in C++ | 6* | A1N | 2 | C/E |
| TDDD97 | Web Programming | 6 | G2F | 3 | C/E |
| TBMI26 | Neural Networks and Learning Systems | 6 | A1N | 2 | E |
| TBMT09 | Physiological Pressures and Flows | 6 | A1N | 1 | E |
| TBMT59 | Medical image formation | 6 | A1F | 3 | E |
| **Period 2** | | | | | |
| TBME08 | Biomedical Modeling and Simulation | 6 | A1N | 3 | C |
| TBMI32 | eHealth: from Idea to Impact | 6 | A1N | 2/4 | C/E |
| TDDD38 | Advanced Programming in C++ | 6* | A1N | 1 | C/E |
| TBMT26 | Technology in Intensive Care and Surgery | 6 | A1N | 1 | E |

*Specialisation: Models in Biomedical Engineering — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMT09 | Physiological Pressures and Flows | 6 | A1N | 1 | C |
| TAMS39 | Multivariate Statistical Methods | 6 | A1N | 4 | E |
| TAOP07 | Introduction to Optimization | 6 | G1F | 2 | E |
| TBMI26 | Neural Networks and Learning Systems | 6 | A1N | 2 | E |
| TBMT59 | Medical image formation | 6 | A1F | 3 | E |
| **Period 2** | | | | | |
| TBME08 | Biomedical Modeling and Simulation | 6 | A1N | 3 | C |
| TBMT26 | Technology in Intensive Care and Surgery | 6 | A1N | 1 | E |

## Semester 9 (Autumn 2030)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMI19 | Medical Information Systems | 6* | A1N | 2 | E |
| TBMT39 | Project Course in Biomedical Engineering | 12* | A1F | 4 | E |
| TBMT42 | Systems Biology, Digital Twins and AI | 6 | A1N | 1 | E |

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| TBMT57 | Biomedical Optics | 6 | A1F | 1 | E |
| TDDC17 | Artificial Intelligence | 6 | G2F | 3 | E |
| TDDE15 | Advanced Machine Learning | 6 | A1F | 1 | E |
| TDDE49 | Databases and Information Security for Bioinformatics | 6 | G2F | 1 | E |
| TFFM08 | Experimental Physics | 6* | A1N | 1 | E |
| TFYA43 | Nanotechnology | 6 | G2F | 3 | E |
| TFYA47 | Surfaces and Interfaces | 6* | A1N | 2 | E |
| TFYB13 | Project Course in Applied Physics | 12* | A1F | 4 | E |
| TNM067 | Scientific Visualization | 6 | A1N | 3 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 2 | E |
| TSBB22 | Project Course in Images and Graphics | 12* | A1F | 4 | E |
| **Period 2** | | | | | |
| TEAE05 | Resource Theory | 6 | G1N | 3 | C/E |
| TBMI02 | Medical Image Analysis | 6 | A1N | 1 | E |
| TBMI19 | Medical Information Systems | 6* | A1N | 3 | E |
| TBMT39 | Project Course in Biomedical Engineering | 12* | A1F | 4 | E |
| TDDC73 | Interaction Programming | 6 | G2F | 1 | E |
| TDDD12 | Database Technology | 6 | G2F | 1 | E |
| TDDD49 | Programming in C# and .NET Framework | 4 | G2F | 3 | E |
| TDDE01 | Machine Learning | 6 | A1N | 1 | E |
| TEIO29 | Leadership and Organisation | 6 | G1F | 1 | E |
| TFFM08 | Experimental Physics | 6* | A1N | 3 | E |
| TFYA47 | Surfaces and Interfaces | 6* | A1N | 2 | E |
| TFYB13 | Project Course in Applied Physics | 12* | A1F | 4 | E |
| TMKO05 | Additive Manufacturing for Industrial Applications | 6 | G2F | 3 | E |
| TNM116 | eXtended Reality (XR) - Principles and Programming | 6 | A1N | 4 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 3 | E |
| TSBB22 | Project Course in Images and Graphics | 12* | A1F | 4 | E |
| TSKS38 | Distributed Information Processing and Machine Learning | 6 | A1N | 2 | E |

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| TSRT78 | Digital Signal Processing | 6 | A1F | 2 | E |

*Specialisation: Biomedical Engineering Materials — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TFYA47 | Surfaces and Interfaces | 6* | A1N | 2 | C |
| TBMT39 | Project Course in Biomedical Engineering | 12* | A1F | 4 | C/E |
| TFYB13 | Project Course in Applied Physics | 12* | A1F | 4 | C/E |
| TBMT57 | Biomedical Optics | 6 | A1F | 1 | E |
| TFYA43 | Nanotechnology | 6 | G2F | 3 | E |
| **Period 2** | | | | | |
| TFYA47 | Surfaces and Interfaces | 6* | A1N | 2 | C |
| TBMT39 | Project Course in Biomedical Engineering | 12* | A1F | 4 | C/E |
| TFYB13 | Project Course in Applied Physics | 12* | A1F | 4 | C/E |

*Specialisation: Biomedical Image Analysis and Visualization — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TSBB22 | Project Course in Images and Graphics | 12* | A1F | 4 | C |
| TBMI19 | Medical Information Systems | 6* | A1N | 2 | E |
| TBMT57 | Biomedical Optics | 6 | A1F | 1 | E |
| TDDC17 | Artificial Intelligence | 6 | G2F | 3 | E |
| TNM067 | Scientific Visualization | 6 | A1N | 3 | E |
| TSBB19 | Machine Learning for Computer Vision | 6 | A1N | 2 | E |
| **Period 2** | | | | | |
| TBMI02 | Medical Image Analysis | 6 | A1N | 1 | C |
| TSBB22 | Project Course in Images and Graphics | 12* | A1F | 4 | C |
| TBMI19 | Medical Information Systems | 6* | A1N | 3 | E |
| TNM116 | eXtended Reality (XR) - Principles and Programming | 6 | A1N | 4 | E |

*Specialisation: eHealth — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMI28 | eHealth Project | 12* | A1F | 4 | C |
| TBMT42 | Systems Biology, Digital Twins and AI | 6 | A1N | 1 | E |
| TBMT57 | Biomedical Optics | 6 | A1F | 1 | E |
| TDDC17 | Artificial Intelligence | 6 | G2F | 3 | E |
| TDDE15 | Advanced Machine Learning | 6 | A1F | 1 | E |
| **Period 2** | | | | | |
| TBMI28 | eHealth Project | 12* | A1F | 4 | C |
| TDDC73 | Interaction Programming | 6 | G2F | 1 | C/E |
| TBMI02 | Medical Image Analysis | 6 | A1N | 1 | E |
| TDDD12 | Database Technology | 6 | G2F | 1 | E |
| TDDD49 | Programming in C# and .NET Framework | 4 | G2F | 3 | E |
| TDDE01 | Machine Learning | 6 | A1N | 1 | E |
| TSKS38 | Distributed Information Processing and Machine Learning | 6 | A1N | 2 | E |

*Specialisation: Models in Biomedical Engineering — Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TBMT39 | Project Course in Biomedical Engineering | 12* | A1F | 4 | C |
| TBMT57 | Biomedical Optics | 6 | A1F | 1 | C |
| TDDC17 | Artificial Intelligence | 6 | G2F | 3 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 2 | E |
| **Period 2** | | | | | |
| TBMT39 | Project Course in Biomedical Engineering | 12* | A1F | 4 | C |
| TBMI02 | Medical Image Analysis | 6 | A1N | 1 | E |
| TSBB06 | Multidimensional Signal Analysis | 6* | A1N | 3 | E |

## Semester 10 (Spring 2031)

*Preliminary courses*

| Course code | Course name | Credits | Level | Timetable module | ECV |
|---|---|---|---|---|---|
| **Period 1** | | | | | |
| TQXX33 | Degree project - Master's Thesis | 30* | A2E | - | C |
| **Period 2** | | | | | |
| TQXX33 | Degree project - Master's Thesis | 30* | A2E | - | C |

ECV = Elective / Compulsory /Voluntary
*The course is divided into several semesters and/or periods

# Common rules

## Course syllabus

A syllabus must be established for each course. The syllabus specifies the aim and contents of the course, and the prior knowledge that a student must have in order to be able to benefit from the course.

## Timetabling

Program courses are timetabled after a decision has been made for this course concerning its assignment to a timetable module. Single subject courses can be timetabled at other times.

## Interruption in and deregistration from a course

The LiU decision, Guidelines concerning confirmation of participation in education, Dnr LiU-2020-02256 (https://styrdokument.liu.se/Regelsamling/VisaBeslut/764582), states that interruptions in study are to be recorded in Ladok. Thus, all students who do not participate in a course for which they have registered are therefore obliged to report the interruption so that this can be noted in Ladok. Deregistration from or interrupting a course is carried out using a Web-based form.

## Cancelled courses and changes to the course syllabus

Courses with few participants (fewer than 10) may be cancelled or organised in a manner that differs from that stated in the course syllabus. The Dean is to deliberate and decide whether a course is to be cancelled or changed from the course syllabus. For single subject courses, the cancellation must be done before students are admitted to the course (in accordance with LiUs regulation Dnr LiU-2022-01200, https://styrdokument.liu.se/Regelsamling/VisaBeslut/622645).

## Guidelines relating to examinations and examiners

For details, see Guidelines for education and examination for first-cycle and second-cycle education at Linköping University, Dnr LiU-2023-00379 (http://styrdokument.liu.se/Regelsamling/VisaBeslut/917592).

An examiner must be employed as a teacher at LiU according to the LiU Regulations for Appointments, Dnr LiU-2022-04445 (https://styrdokument.liu.se/Regelsamling/VisaBeslut/622784). For courses in second-cycle, the following teachers can be appointed as examiner: Professor (including Adjunct and Visiting Professor), Associate Professor (including Adjunct), Senior Lecturer (including Adjunct and Visiting Senior Lecturer), Research Fellow, or Postdoc. For courses in first-cycle, Assistant Lecturer (including Adjunct and Visiting Assistant Lecturer) can also be appointed as examiner in addition to those listed for second-cycle courses. In exceptional

cases, a Part-time Lecturer can also be appointed as an examiner at both first- and second cycle, see Delegation of authority for the Board of Faculty of Science and Engineering.

## Forms of examination

### Principles for examination

Written and oral examinations and digital and computer-based examinations are held at least three times a year: once immediately after the end of the course, once in August, and once (usually) in one of the re-examination periods. Examinations held at other times are to follow a decision of the faculty programme board.

Principles for examination scheduling for courses that follow the study periods:

- courses given in VT1 are examined for the first time in March, with re-examination in June and August
- courses given in VT2 are examined for the first time in May, with re-examination in August and January
- courses given in HT1 are examined for the first time in October, with re-examination in January and August
- courses given in HT2 are examined for the first time in January, with re-examination in March and in August.

The examination schedule is based on the structure of timetable modules, but there may be deviations from this, mainly in the case of courses that are studied and examined for several programmes and in lower grades (i.e. 1 and 2).

Examinations for courses that the faculty programme board has decided are to be held in alternate years are held three times during the school year in which the course is given according to the principles stated above.

Examinations for courses that are cancelled or rescheduled such that they are not given in one or several years are held three times during the year that immediately follows the course, with examination scheduling that corresponds to the scheduling that was in force before the course was cancelled or rescheduled.

When a course, or a written or oral examination (TEN, DIT, DAT, MUN), is given for the last time, the regular examination and two re-examinations will be offered. Thereafter, examinations are phased out by offering three examinations during the following academic year at the same times as the examinations in any substitute course. The exception is courses given in the period HT1, where the three examination occasions are January, March and August. If there is no substitute course, three examinations will be offered during re-examination periods during the following academic year. Other examination times are decided by the faculty programme board. In all cases above, the examination is also offered one more time during the academic year after the following, unless the faculty programme board decides otherwise. In total, 6 re-examinations are offered, of which 2 are regular re-examinations. In the examination registration system, the examinations given for the penultimate time and the last time are denoted.

If a course is given during several periods of the year (for programmes, or on different occasions for different programmes) the faculty programme board or boards determine together the scheduling and frequency of re-examination occasions.

For single subject courses, written and oral examinations can be held at other times.

### Retakes of other forms of examination

Regulations concerning retakes of other forms of examination than written examinations and digital and computer-based examinations are given in the LiU guidelines for examinations and examiners, Dnr LiU-2023-00379 (http://styrdokument.liu.se/Regelsamling/VisaBeslut/917592).

In principle, other examination forms should be handled in the same way as a written examination when they are given for the last time. However, the times for the examination may vary based on the nature of the element compared to the times for the written examinations.

### Course closure

For Decision on Routines for Administration of the Discontinuation of Educational Programs, Freestanding Courses and Courses in Programs, see Dnr LiU-2021-04782 (https://styrdokument.liu.se/Regelsamling/VisaBeslut/1156410). After a decision on closure and after the end of the discontinuation period, the students are referred to a replacement course (or similar) according to information in the course syllabus or programme syllabus. If a student has passed some part/parts of a closed program course but not all, and there is an at least partially replacing course, an assessment of crediting can be made. For questions about the crediting of course components, contact the Study councellors.

### Registration for examination

In order to take an written, digital or computer-based examination, registration in advance is mandatory, see decision in the university's rule book Dnr LiU-2020-04559 (https://styrdokument.liu.se/Regelsamling/VisaBeslut/622682). An unregistered student can thus not be offered a place. The registration is done by the student at the Student Portal or in the LiU-app during the registration period. The registration period opens 30 days before the date of the examination and closes 10 days before the date of the examination. Candidates are informed of the location of the examination by email, four days in advance.

### Code of conduct for students during examinations

Details are given in a decision in the university's rule book, Dnr LiU-2020-04559 (http://styrdokument.liu.se/Regelsamling/VisaBeslut/622682).

### Retakes for higher grade

Students at the Faculty of Science and Engineering at LiU have the right to retake written examinations and digital and computer-based examinations in an attempt

to achieve a higher grade. This is valid for all examination components with code “TEN”, “DIT” and "DAT". The same right may not be exercised for other examination components, unless otherwise specified in the course syllabus.

A retake is not possible on courses that are included in an issued degree diploma.

### Grades

The grades that are preferably to be used are Fail (U), Pass (3), Pass not without distinction (4) and Pass with distinction (5).

- Grades U, 3, 4, 5 are to be awarded for courses that have written or digital examinations.
- Grades Fail (U) and Pass (G) may be awarded for courses with a large degree of practical components such as laboratory work, project work and group work.
- Grades Fail (U) and Pass (G) are to be used for degree projects and other independent work.

### Examination components

The following examination components and associated module codes are used at the Faculty of Science and Engineering:

- Grades U, 3, 4, 5 are to be awarded for written examinations (TEN) and digital examinations (DIT).
- Examination components for which the grades Fail (U) and Pass (G) may be awarded are laboratory work (LAB), project work (PRA), preparatory written examination (KTR), digital preparatory written examination (DIK), oral examination (MUN), computer-based examination in a computer lab (DAT), digital preparatory written examination in a computer lab (DAK), home assignment (HEM), and assignment (UPG).
- Students receive grades either Fail (U) or Pass (G) for other examination components in which the examination criteria are satisfied principally through active attendance such as tutorial group (BAS) or examination item (MOM).
- Grades Fail (U) and Pass (G) are to be used for the examination components Opposition (OPPO) and Attendance at thesis presentation (AUSK) (i.e. part of the degree project).

In general, the following applies:

- Mandatory course components must be scored and given a module code.
- Examination components that are not scored, cannot be mandatory. Hence, it is voluntary to participate in these examinations, and the voluntariness must be clearly stated. Additionally, if there are any associated conditions to the examination component, these must be clearly stated as well.
- For courses with more than one examination component with grades U,3,4,5, it shall be clearly stated how the final grade is weighted.

For mandatory components, the following applies (in accordance with the LiU Guidelines for education and examination for first-cycle and second-cycle

education at Linköping University, Dnr LiU-2023-00379 http://styrdokument.liu.se/Regelsamling/VisaBeslut/917592):

- If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

For possibilities to alternative forms of examinations, the following applies (in accordance with the LiU Guidelines for education and examination for first-cycle and second-cycle education at Linköping University, Dnr LiU-2023-00379 http://styrdokument.liu.se/Regelsamling/VisaBeslut/917592):

- If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.
- If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.
- An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaing the objectives of the course.

### Reporting of examination results

The examination results for a student are reported at the relevant department.

### Plagiarism

For examinations that involve the writing of reports, in cases in which it can be assumed that the student has had access to other sources (such as during project work, writing essays, etc.), the material submitted must be prepared in accordance with principles for acceptable practice when referring to sources when the text, images, ideas, data, etc. of other people are used. This is done by using references or quotations for which the source is specified. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations, such as degree projects, project reports, etc. (this is sometimes known as “self-plagiarism”).

A failure to specify such sources may be regarded as attempted deception during examination.

### Attempts to cheat

In the event of a suspected attempt by a student to cheat during an examination, or when study performance is to be assessed as specified in Chapter 10 of the Higher Education Ordinance, the examiner is to report this to the disciplinary board of the university. Possible consequences for the student are suspension from study and a formal warning. More information is available at Cheating, deception and plagiarism.

Linköping University has also produced a guide for teachers and students' use of generative AI in education (Dnr LiU-2023-02660). As a student, you are always expected to gain knowledge of what applies to each course (including the degree project). In general, clarity to where and how generative AI has been used is important.

## Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at https://styrdokument.liu.se/Regelsamling/Innehall.

## Structure and organisation of study programmes

The contents and design of the programmes are to be continuously revised such that new knowledge is integrated into courses and specialisations. Within one programme, several study specialisations or profiles may be available. The identities of the study specialisations or profiles and the regulations governing how these may be selected are given in the syllabus and curriculum for the particular field of study and programmes.

The structure and organisation of the programmes are to follow specified criteria that are summarised in the syllabus for each programme.

- The syllabus defines the aims of the study programme.
- The curriculum, which constitutes one part of the syllabus for the field of study, gives details of the terms in which the various courses have been timetabled, and their scheduling through the academic year.
- The course syllabus specifies, among other things, the aim and contents of the course, and the prior knowledge that a student must have, in addition to the admission requirements for the programme, in order to be able to benefit from the course.

## Qualification requirements

The qualification requirements specified in the Higher Education Ordinance 2007 apply to students admitted after 1 July 2007. For students admitted earlier than 2007 and has completed components of a programme after 1 July 2007 has the right to be assessed with respect to the qualification requirements specified by the Higher Education Ordinance 2007. Regardless of the year of admission, local regulations laid down by the faculty board and university board also apply, see "Föreskrifter och allmänna råd om examensbenämningar och preciserade krav för generella examina på grundnivå och avancerad nivå", (https://styrdokument.liu.se/Regelsamling/VisaBeslut/622693).

## Qualifications within a study programme

Qualification requirements that are specific to a study programme are given in the syllabus for that programme.

## Admission requirements and matriculation and postponement of matriculation

A person who has been accepted for a study programme is to start their studies (matriculate) in the term that is specified in the decision about admission. The date and location of the matriculation procedure will be communicated to those admitted. For those admitted to term 1, the matriculation is mandatory.

Regulations concerning admission requirements, matriculation and postponement of matriculation have been laid down in the admission regulations for Linköping University (http://styrdokument.liu.se/Regelsamling/VisaBeslut/622645).

## Admission to a later part of a programme

Admission to a later part of a study programme is used here to refer to admission to term 2 or later and with the purpose of completing the programme and taking a degree. Admission to a later part of a programme may take place only if sufficient resources and space on the programme are available. Furthermore, the applicant must satisfy the entry requirements for the relevant term of the programme, as specified in Dnr LiU-2022-00174 (https://styrdokument.liu.se/Regelsamling/VisaBeslut/1179685).

## Interruption in studies

Notification of an interruption in studies is to be made by the student through a web form Forms. If such a notification is not made and if the student does not do a course registration during the first term during which the interruption is to take place, the interruption will be considered to be a withdrawal. An interruption in studies must cover a complete term, and notification of interruptions can be given for a maximum of two consecutive terms. Notification of resumption of studies is done by the student and is to take place at the course registration for the term that follows the interruption. The student then has a guaranteed place at the program, provided that the program and courses are still offered.

A student who is taking an interruption in studies may during this period retake examinations. The student is responsible that registration for courses is carried out at the correct times in preparation for the resumption of studies.

## Withdrawal from a study programme

A student who wishes to withdraw from a study programme must notify the study guidance counsellor. A student who leaves the studies without giving notification of an interruption in study and who fails to register on a course for the

immediately subsequent term is considered to have withdrawn. A student who has withdrawn may return to the study programme if a vacancy is available.

## Courses within a study programme

The curriculum for the various years of a study programme specify which courses are mandatory (m), elective (e) and voluntary (v). The course specified as voluntary (labelled with "v") in the programme syllabus are assessed solely as voluntary courses, and credits from these may not contribute to the requirements for a degree.

## Take courses from another study programme or third-cycle courses

Students taking a master's programme in engineering can apply to take courses given in Term 7 and later terms of the programme from all engineering master's programmes. Admission to courses at Term 7 or higher requires the possession of at least 150 credits within the programme to which the student has been admitted.

Admission to third-cycle courses requires studies at Master's level, i.e. year 4-5 or admitted to a Master's programme. Information can be obtained from the relevant director of advanced studies.

Admission is granted to the extent that resources allow, provided that places are available on the course. When selecting a course from another programme or third-cycle courses, the admission requirements specified in the course syllabus should be satisfied.

For credit transfer of the courses, see credit transfer below.

## Credit transfer of courses outside the programme curriculum

To include courses that are not specified in the program curriculum in a degree, the student need to apply to and be granted this from the faculty programme board. The credits must be completed at the time of application.

## Registration for programme courses

Registration for courses that are given as part of a study programme must be made during the specified period, which has been preliminarily set to 1-10 April for the autumn term, and 1-10 October for the spring term. Information about course registration is published on the Study councellors webpages or in programme rooms, sent to students by email, and disseminated at scheduled information meetings.

## Changes in the program curriculum

In case of changes in the program curriculum, study planning in consultation with the study guidance counsellor may be required in individual cases, see section Study planning.

## Study planning

Students who require support in planning their continued studies can contact the study guidance counsellor of the programme. Study planning involves the student and the study guidance counsellor together drawing up an individual plan for studies during the subsequent term. The individual plan may allow the student to deviate from the general curriculum.

Completed first-cycle courses are a precondition for successful studies at more advanced levels. For this reason, study planning is based on giving priority to courses from earlier years of study that have not been completed. If further capacity is available, other courses can be planned to achieve full-time studies, provided that suitable prerequisites are available.

Study planning takes place on a regular basis if the student:

- does not satisfy the requirements for progression to later terms. In order for a student to be able to participate in courses from later years in such cases, a decision of exemption is required.
- does not satisfy the requirements for starting a degree project.

Other situations in which study planning may be required:

- A student has fallen behind during the early part of a study programme and has failed to complete several courses.
- A student has not satisfied the entry requirements for a degree project before term 6 of an engineering degree.
- Changes in the program curriculum.
- A student has applied for admission to a later part of a programme.
- Studies have been carried out abroad.
- A study programme is to be resumed after an interruption.

In these cases the study guidance counsellor supports the student in planning the continued studies, also in situations in which the student can register for the relevant courses without the need for a special decision for the continued studies.

## Part of education abroad

Students can exchange study at LiTH for study at an institute of higher education abroad, and/or work on a degree project abroad.

In the event that study (courses) at LiTH are exchanged for study abroad, the faculty programme director is responsible for a decision about a preliminary individual study plan, which is to be drawn up in advance. After the exchange, the student apply to credit completed courses from the exchange into their degree. The guideline for credit assessment in an exchange is that the courses should be in line with the program's orientation.

Regulations for entry requirements, ranking and nomination for study abroad through LiTH's exchange agreements, see Regulation of exchange studies (https://styrdokument.liu.se/Regelsamling/VisaBeslut/622362). For the

compulsory study abroad period within Ii (Industrial Engineering and Management – International) and Yi (Applied Physics and Electrical Engineering – International), see specific regulation (https://styrdokument.liu.se/Regelsamling/VisaBeslut/755476).

## Degree project for Master's Degree in Engineering 300 credits, Master of Science (Two years), Master of Philosophy (Two years), and master's degrees without prefix

General provisions for the degree project are given here. A specific faculty programme board may have supplementary regulations that are specific for a study programme. These are specified, where relevant, in the syllabus for the field of education and/or the degree project. Information about application, reflection documents, possible examiners etc. can be found at Information.

### Aim

The aim of the degree project is described in the relevant course syllabus, https://liu.se/studieinfo/en.

### Extent

Requirements for the extent of the degree project for each type of degree are given in the syllabus of the study programme.

### Locations for a degree project

The work can be carried out in the form of:

- an internal degree project located at one of the departments at LiU
- an external degree project located at a company, government agency, or other organisation in Sweden or abroad. The examiner assesses whether the conditions exist to be able to carry out a degree project that meets the requirements stated in the respective course syllabus for degree projects.

For a degree project that is examined at another university, the Faculty program director must be contacted before commencement to assess the possibility of credit transfer.

### Selection of degree project

A degree project is to be selected in consultation with an examiner, who is also responsible that the specialisation, extent and level of the project satisfy the requirements specified in the course syllabus.

Approved main subject areas for degree projects are specified in the syllabus for the relevant programme.

The examiner for a degree project within a certain subject area are determined by the faculty programme board that is responsible for general degrees within the main subject area. An up-to-date list is given at Information on degree projects.

## Considerations regarding confidentiality, copyright and patent

In cases in which issues relating to work-related copyright or patenting may arise, provisions governing these should be established in advance. Regarding confidentiality, the student can enter into a confidentiality agreement in order to obtain access to confidential information necessary for the completion of the degree project. The supervisor and examiner, however, determine whether they are prepared to sign a confidentiality agreement. Hence, the confidential information must not normally be of such nature that it is necessary to supervise or grade the work. If large parts of the degree project are of this nature, careful consideration should be given to whether the degree project should commence or not.

The complete degree project thesis is to be published during the grading procedure, unless exceptional circumstances prevent this. If any part of the thesis should not be published, this must be approved in advance by the examiner and the relevant head of department. Note that final decisions relating to confidentiality are taken by an administrative court.

## Commencement of a degree project

Requirements that must be satisfied before a degree project can be started are given in the currently valid course syllabus, which can be obtained in the relevant programme syllabus at https://liu.se/studieinfo/en.

Notification of a degree project is to be carried out before the degree project starts, at Application. Registration of the degree project is to take place in connection to when the work commences.

Before the start of the degree project, the examiner is to ensure that the student satisfies the conditions for commencement of the degree project within the relevant main subject area. Support in this can be obtained from the Study Administration Office, who checks the general requirements for starting the degree project.

The student is also to notify the relevant department of the start of the degree project.

## Degree projects in collaboration with another student

In cases in which two students carry out a degree project together, the contribution of each student is to be specified. The extent of the work is to correspond to the extent of two individual projects. The examiner is to ensure that each student has contributed in a satisfactory manner to the work, and that each student satisfies the requirements for achieving a Pass grade for the degree project.

Degree projects carried out in collaboration between more than two students are not permitted.

## Examiners

The examiner must be employed as a teacher at LiU according to the LiU

Regulations for Appointments (https://styrdokument.liu.se/Regelsamling/VisaBeslut/622784). The following teachers can be appointed as examiner: Professor (including Adjunct and Visiting Professor), Associate Professor (including Adjunct), Senior Lecturer (including Adjunct and Visiting Senior Lecturer), Research Fellow, or Postdoc. The examiner must also have the expertise required to examine degree projects (for example through research, supervision or teaching) within the relevant main subject area, and be appointed by the faculty programme board. The faculty programme board can also appoint emerita/emeritus as examiner for a single thesis work.

The examiner is to:

- ensure before the start of the degree project that the student satisfies the conditions for commencement of the degree project within the relevant main subject area.
    - The Study Administration Office is to check whether the commencement criteria are satisfied and inform the examiner of this
    - The Examiner is to check whether special admission requirements (where relevant) are satisfied, for example that the student can demonstrate a certain degree of in-depth knowledge within the field relevant for the degree project
- determine the specialisation and principal work of the degree project, based on an assessment of whether the degree project will result in the learning outcomes of the course syllabus being satisfied
- in conjunction with the planning report, check that the student has registered for the degree project and that the student has a supervisor
- pass/fail the planning report
- pass/fail the mid-way assessment
- be responsible that the supervisor or supervisors carry out their duties
- approve the work for presentation
- before the presentation, check that the proposed opponent satisfies the conditions for commencement of the degree project and has attended three thesis presentations
- pass/fail the presentation and the opposition to it
- approve a concluding reflection document
- ensure that a degree project that has been passed satisfies the learning outcomes of the course syllabus and other requirements, and award a grade to the degree project (either G = Pass, or U = Fail).

In cases in which a degree project is carried out jointly by two students with different main subject areas, one examiner in each main subject area must be appointed, where this is necessary.

### Supervisors

A student working on a degree project is to have access to an internal supervisor at the department at which the degree project has been registered. The internal supervisor is to have a degree that corresponds at least to the level of the degree project to be supervised. The internal supervisor may, in exceptional circumstances, be the same individual as the examiner. A decision of whether to

allow this in a particular case is to be made by the relevant faculty programme board before the degree project is started. The application for exemption is made by the examiner.

The supervisor is to ensure that the student obtains help with:

- expert support in general questions related to methods, specialist knowledge of the subject, and writing the thesis
- problem formulation, and setting the limits of the work
- scheduling and planning work, and selection of appropriate methods.

If the degree project is being carried out outside of LiTH, an external supervisor from the commissioner is to be appointed.

### Planning report

During the first weeks of the degree project, the student is to draw up a planning report that contains:

- a preliminary title of the degree project
- a preliminary statement of the research question, against the background of a literature search
- a preliminary description of the approach to be taken
- planned literature foundation
- a schedule for the execution of the degree project, including suggested dates for the mid-way assessment and presentation.

Formulation of the research question is to be bounded, realistic and viewed from a perspective of societal or commercial benefit. The term “societal” is to be understood here to also include universities and university colleges.

### Mid-way assessment

Approximately half-way through the degree project, the student is to describe to the examiner at a mid-way assessment how the work is progressing relative to the planning report. The supervisor should also participate. The form of the mid-way assessment may be anything from an oral presentation to a public seminar. The conclusion of the mid-way assessment may be one of three possibilities:

1. The work has been carried out essentially as planned, and can continue as planned. The mid-way assessment has been passed.
2. The work has been carried out with certain deviations from the planning report. It is, however, believed that it will be possible to complete the work with minor adjustments to the formulation of the research question, approach and/or schedule. The mid-way assessment has been passed.
3. The work has deviated from the planning report in a significant manner, and there is a risk that a Pass grade cannot be given. The mid-way assessment has been failed. A new planning report must be drawn up and a new mid-way assessment carried out.

### Reporting

Both oral and written reports of the degree project are to be made, in Swedish or English. For the international Master's programmes, both the oral and written examination should be made in English.

The oral presentation is to take place in public, unless there are exceptional circumstances that this should not be done. The written report is to be in the form of a professionally produced degree project thesis. The presentation and thesis are to follow the instructions given below.

### Presentation

The oral presentation is to take place when the examiner considers that the work has been completed and is ready to be presented, and after the student has attended three thesis presentations. The examiner and the student must agree on the time for presentation. The presentation is to take place on site at LiU at a time when other students can attend. Normally this means that the presentation can take place between the re-examination period in August and midsummer,

The oral presentation is to describe the background to the problem that has been studied, describe the methods used, and present the results and conclusions. The presentation is to be at a level suitable for everyone present, not just for specialists. After the oral presentation, the student is to counter any criticism that the opponent may raise, and allow other participants to pose questions. The presentation and the opposition are to be approved by the examiner. When any required adjustments of the thesis have been made, the reflection document has been approved, and the student has functioned as an opponent for another degree project, the degree project is reported as a passed course and the credits can be used to satisfy the requirements for a qualification.

### Degree project thesis

The written degree project report is to be professionally written and comprehensive, and it is to demonstrate a scientific approach. The report must be prepared in accordance with principles for acceptable practice when referring to sources when the text, images, ideas, data, etc., of other people are used. This is done by using references or quotations for which the source is specified. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations, such as undergraduate work, project reports, etc. (This is sometimes known as “self-plagiarism”.) A failure to specify such sources may be regarded as attempted deception during examination.

The contents are to be easy to understand, and the way in which material is presented is important. It must describe the background to the project and the formulation of the research question. The choice of approach is to be clearly explained, and the thesis should make clear the coupling between the results and the conclusions. Commonly accepted scientific methods are to be used for processing the results. The discussion is to be comprehensive, and demonstrate that the student masters analytical thought processes. The thesis is to demonstrate good mastery of the literature in the field, and include an abstract. Theses that are principally written in Swedish should contain a summary in English. A publication-ready manuscript and a reflection document covering the work

undertaken are to be submitted to the examiner within 10 days after the oral presentation. The examiner may grant an exemption from this requirement. If final versions of the required documents are not submitted as stipulated, the examiner may determine that the presentation is to be rescheduled.

The Faculty of Science and Engineering (Institute of Technology) at Linköping University recommends that degree project theses be published.

## Opposition

An oral opposition is to be carried out in connection with the student's own presentation of his or her thesis, i.e. at the end of the own studies, and is to take place on site at LiU. The opposition is made on other degree projects at the same level and of the same extent as the own degree project. The opponent must also have attended three thesis presentations as a member of the audience. In a normal case, the number of opponents will be the same as the number of respondents. In exceptional cases, the examiner may decide that this is not to be the case. Acting as an opponent during the thesis presentation of another student is subject to points-based assessment as described in the course syllabus.

The opponent is to:

- discuss and comment on the selection of methods, results and (where relevant) data processing, conclusions, possible alternative solutions and conclusions, and the management of literature
- comment on the general arrangement of the degree project thesis and related, formal aspects of style, and comment on the oral presentation technique
- illuminate the strengths and weaknesses of the thesis.

The duration of the opposition should be approximately the same as that of the presentation, and it is to include a discussion in which the student presenting the thesis replies to and comments on the criticism raised by the opponent.

Unless otherwise agreed, at least one week before the presentation the opponent is to present in writing to the examiner the important issues that will be discussed, and the structure of the opposition that will be taken. The opponent and the examiner discuss the structure that the opponent has drawn up.

## Attendance at presentations

A student is to attend presentations of degree project theses as described in the course syllabus. Attendance at such presentations is a component of the degree work that is subject to points-based assessment. The presentations attended must be at the same level or a higher level than the degree project of the student.

It is advantageous that one of the presentations attended is a licenciate degree seminar or a doctoral disputation. The student is responsible for ensuring that a certification of attendance at the presentation is obtained and passed to the departmental administrator for registration in Ladok.

The occasions on which a student attends presentations are to be completed

before the student presents the degree project thesis. The course syllabus for the degree project describes the scheduling of the attendance at presentations.

The attendance at presentations is to take place on site at LiU. It is not possible to participate remotely.

### Reflection document

A document reflecting on the work that has been carried out is to be submitted to the examiner within 10 working days of the oral presentation. Instructions for preparing a reflection document can be reached through Reflection document.

### Grades

The degree project is graded as either Pass or Fail. In order for a student to obtain a pass grade for the degree project, all components must be completed and be awarded a pass grade.

### Right to obtain supervision

It is expected that the student complete and pass a degree project within specified time limits. After the student has registered the degree project in Ladok, the department is required to provide supervision for a maximum of:

- 18 month for degree projects of 30 credits.
- 21 month for degree projects of 45 credits.
- 24 month for degree projects of 60 credits.

The examiner may grant additional supervision after this period in special cases. If the examiner decides that supervision is to be ended, the degree project is to be awarded a Fail grade. The examiner does not have to fail the degree project if it is considered possible that the student can finish the thesis without further supervision.

If the degree project is awarded a Fail grade for the reason described above or for any other reason, the student is to be directed towards carrying out a further degree project. However, carrying out a new degree project means very limited opportunities for supervision.

### Quality assurance

The relevant faculty programme board has overall responsibility for the quality of study programmes. This responsibility covers also degree projects.

### Exemptions

If there are exceptional circumstances, an exemption can be granted from the above regulations.

Exemption to replace the oral opposition with a detailed written opposition can be granted after approval by the faculty programme board when all other elements for the degree have been fulfilled, the degree project has been submitted and there are exceptional circumstances. It is the examiner who applies to the faculty

programme board for an exemption for written opposition.

Written opposition can be carried out in any of the following ways:

- The student makes a written opposition to a work done by another student, whose examiner then examines the opposition
- The student makes a written opposition to a degree project that has already been examined by the examiner.

In the case of a written opposition, there is no need for an initial account of the structure of the opposition.

Exemption from conducting the oral opposition on site at LiU (and instead conducting it remotely) with reference to exceptional circumstances is given by the examiner. Examples of exceptional circumstances are the lack of a visa to come to Sweden.

Exemption from carrying out presentation on site at LiU (and instead conducting it remotely) can be granted by the respective faculty programme board if there are exceptional circumstances. Examples of exceptional circumstances are the lack of a visa to come to Sweden. It is the examiner who applies to the faculty programme board for an exemption from carrying out presentation on site.

## Degree projects (included in Term 6 of study programmes in engineering)

### General provisions

All study programmes in engineering (with the exception of the programme in Industrial Engineering and Management – International and the programme in Applied Physics and Electrical Engineering – International) have since 2014 included an obligatory degree project. The project undertaken may also be included as part of the Bachelor of Science (Technology). During Term 6 of each programme, one or several special courses are given that constitute degree projects. The syllabuses of these courses contain course-specific provisions, which are supplemented with the general provisions given below.

### Aim

The degree project is to contribute to general and programme-specific objectives of the study programmes in engineering being achieved. Specific learning outcomes are given in the relevant course syllabus. In addition, the degree project has also the following learning outcomes, which are common to all degree project-based courses at LiTH:

- Knowledge of the subject
  After carrying out the degree project, the student is expected to master the following:
    - integrating in a systematic manner the knowledge gained during the period of study
    - applying methodological knowledge and subject-specific knowledge

within the main subject area
    - assimilating the contents of relevant technical publications and relating the study to such contents.
- Personal and professional skills
  After carrying out the degree project, the student is expected to possess the following skills:
    - formulating research questions and limiting the same, within a specified time schedule
    - seeking and evaluating scientific literature.
- Working and communicating in a group
  After carrying out the degree project, the student is expected to possess the following skills:
    - planning, executing and presenting independent work in the form of a project carried out in a group
    - expressing oneself professionally, in writing and orally
    - critically examining and discussing independent work presented in speech and in writing.
- Engineering fundamentals
  After carrying out the degree project, the student is expected to master the following:
    - creating, analysing and/or evaluating technical solutions
    - making assessments that consider relevant scientific, societal and ethical aspects.

### Degree projects undertaken while studying abroad

During study abroad, an individual plan is to be drawn up together with the faculty programme director to determine how the requirements for a degree project in engineering can be satisfied.

### Commencing a degree project

Before a student commences a degree project, the following requirements must be satisfied:

- The student must have a minimum of 90 credits obtained from courses from Terms 1-4 of the programme (courses taken voluntarily are not counted). This requirement must be satisfied before the end of the third week of study period 2 of the autumn term before the degree project is to be carried out.
- The student must have completed the subject-specific courses listed in the course syllabus for the relevant degree project course. This requirement must be satisfied before the end of the third week of study period 2 of the autumn term before the degree project is to be carried out.

When assessing whether the requirements have been satisfied, individual decisions (such as those taken in association with admission to subsequent parts of the programme) are to be considered.

Registration for a degree project is carried out during the course registration

period 1-10 October in the autumn before the degree project is to be undertaken.

### Forms of examination

The written report of the degree project corresponds to a degree project for a bachelor's degree. This means that it is to be managed in an equivalent manner with respect to publication, unless special circumstances apply.

The report must be prepared in accordance with principles for acceptable practice when referring to sources when the text, images, ideas, data, etc., of other people are used. This is done by using references or quotations for which the source is specified. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations, such as project reports, etc. (this is sometimes known as “self-plagiarism”). A failure to specify such sources may be regarded as attempted deception during examination.

In cases in which several students carry out a degree project together, the contribution of each student is to be specified. The extent of the work for each student is to correspond to that of a degree project. The examiner is to ensure that each student has contributed in a satisfactory manner to the work, and that each student satisfies the requirements for achieving a Pass grade for the degree project.