

# Master of Science in Applied Physics and Electrical Engineering

300 credits

Civilingenjörsprogram i teknisk fysik och  
elektroteknik

6CYYY

Valid from: 2020 Spring semester

**Determined by**

Board of Studies for Electrical  
Engineering, Physics and Mathematics

**Date determined**

2019-09-23

## Entry requirements

### Degree in Swedish

Civilingenjör 300 hp och Teknologie master 120 hp

### Degree in English

Master of Science in Engineering 300 credits and Master of Science 120 credits

# Curriculum

## Semester 1 (Autumn 2020)

| Course code     | Course name                         | Credits | Level | Timetable module | ECV |
|-----------------|-------------------------------------|---------|-------|------------------|-----|
| <b>Period 0</b> |                                     |         |       |                  |     |
| TATB01          | Foundation Course in Mathematics    | 6*      | G1X   | -                | C   |
| <b>Period 1</b> |                                     |         |       |                  |     |
| TATA24          | Linear Algebra                      | 8*      | G1X   | 1                | C   |
| TATB01          | Foundation Course in Mathematics    | 6*      | G1X   | 4                | C   |
| TFYY51          | Engineering Project                 | 6*      | G1X   | 4                | C   |
| TSEA51          | Switching Theory and Logical Design | 4       | G1X   | 2                | C   |
| TATA40          | Perspectives on Mathematics         | 1*      | G1X   | -                | V   |
| <b>Period 2</b> |                                     |         |       |                  |     |
| TATA24          | Linear Algebra                      | 8*      | G1X   | 4                | C   |
| TATA41          | Calculus in One Variable 1          | 6       | G1X   | 2                | C   |
| TFYY51          | Engineering Project                 | 6*      | G1X   | 3                | C   |
| TATA40          | Perspectives on Mathematics         | 1*      | G1X   | -                | V   |

## Semester 2 (Spring 2021)

| Course code     | Course name                            | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TATA42          | Calculus in One Variable 2             | 6       | G1X   | 1                | C   |
| TDDE44          | Introduction to Computer Programming   | 8*      | G1X   | 2                | C   |
| TFYA81          | Oscillations and Mechanical Waves      | 4       | G1X   | 4                | C   |
| TBMT32          | Perspectives on Biomedical Engineering | 2*      | G1X   | 3                | E   |
| TFFM12          | Perspectives on Physics                | 2*      | G1X   | -                | E   |
| TATA40          | Perspectives on Mathematics            | 1*      | G1X   | -                | V   |
| TGTU96          | Sustainable study situation            | 2*      | G1X   | -                | V   |
| <b>Period 2</b> |  |         |       |                  |     |
| TATA43          | Calculus in Several Variables          | 8       | G1X   | 2                | C   |
| TDDE44          | Introduction to Computer Programming   | 8*      | G1X   | 1                | C   |
| TFYA84          | Optics - Theory and Application        | 4       | G1X   | 4                | C   |
| TBMT32          | Perspectives on Biomedical Engineering | 2*      | G1X   | 3                | E   |
| TFFM12          | Perspectives on Physics                | 2*      | G1X   | -                | E   |
| TATA40          | Perspectives on Mathematics            | 1*      | G1X   | -                | V   |
| TGTU96          | Sustainable study situation            | 2*      | G1X   | -                | V   |

## Semester 3 (Autumn 2021)

| Course code     | Course name                            | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TANA21          | Scientific Computing                   | 6       | G1X   | 3                | C   |
| TATA44          | Vector Analysis                        | 4       | G1X   | 1                | C   |
| TSRT04          | Introduction in Matlab                 | 2       | G1X   | -                | C   |
| TSTE05          | Electronics and Measurement Technology | 8*      | G1X   | 2                | C   |
| <b>Period 2</b> |  |         |       |                  |     |
| TATA45          | Complex Analysis                       | 6       | G2X   | 1                | C   |
| TMME12          | Engineering Mechanics Y                | 4       | G1X   | 2                | C   |
| TSTE05          | Electronics and Measurement Technology | 8*      | G1X   | 3                | C   |

## Semester 4 (Spring 2022)

| Course code     | Course name                          | Credits | Level | Timetable module | ECV |
|-----------------|--------------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                      |         |       |                  |     |
| TAOP07          | Introduction to Optimization         | 6       | G1X   | 3                | C   |
| TMME04          | Engineering Mechanics II             | 6       | G2X   | 4                | C   |
| TSEA28          | Computer Hardware and Architecture Y | 6*      | G1X   | 1                | C   |
| <b>Period 2</b> |                                      |         |       |                  |     |
| TAMS14          | Probability, first course            | 4       | G1X   | 4                | C   |
| TFYA13          | Electromagnetic Field Theory         | 8       | G2X   | 2                | C   |
| TSEA28          | Computer Hardware and Architecture Y | 6*      | G1X   | 3                | C   |
| TPTE06          | Industrial Placement                 | 6       | G1X   | -                | E   |

## Semester 5 (Autumn 2022)

| Course code     | Course name                              | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TAMS24          | Statistics, First Course                 | 4       | G2X   | 4                | C   |
| TATA77          | Fourier Analysis                         | 6       | G2X   | 1                | C   |
| TDDC76          | Programming and Data Structures          | 8*      | G2X   | 2                | C   |
| TFYA43          | Nanotechnology                           | 6       | G2X   | 3                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TDDC76          | Programming and Data Structures          | 8*      | G2X   | 2                | C   |
| TFYA12          | Thermodynamics and Statistical Mechanics | 6       | G2F   | 4                | C   |
| TSDT18          | Signals and Systems                      | 6       | G2X   | 3                | C   |

## Semester 6 (Spring 2023)

| Course code     | Course name                                | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TFYA73          | Modern Physics I                           | 4       | G2X   | 3                | C   |
| TSRT12          | Automatic Control                          | 6       | G2X   | 1                | C   |
| TFYA75          | Applied Physics - Bachelor Project         | 16*     | G2E   | 2                | C/E |
| TSEA56          | Electronics Engineering - Bachelor Project | 16*     | G2X   | 2                | C/E |
| THEN18          | English                                    | 6*      | G1X   | 4                | E   |
| TINT01          | Introduction to Intercultural Competence   | 2       | G1N   | -                | V   |
| <b>Period 2</b> |  |         |       |                  |     |
| TEAE01          | Industrial Economics, Basic Course         | 6       | G1X   | 2                | C/E |
| TFYA74          | Modern Physics II                          | 4       | G2X   | 1                | C/E |
| TFYA75          | Applied Physics - Bachelor Project         | 16*     | G2E   | -                | C/E |
| TSEA56          | Electronics Engineering - Bachelor Project | 16*     | G2X   | -                | C/E |
| TSKS10          | Signals, Information and Communication     | 4       | G2X   | 3                | C/E |
| THEN18          | English                                    | 6*      | G1X   | 4                | E   |

## Semester 7 (Autumn 2023)

| Course code     | Course name                              | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TAMS32          | Stochastic Processes                     | 6       | A1X   | 1                | E   |
| TAMS43          | Probability Theory and Bayesian Networks | 6*      | A1X   | 4                | E   |
| TAMS46          | Probability Theory, Second Course        | 6       | A1X   | 3                | E   |
| TAOP34          | Large Scale Optimization                 | 6       | A1X   | 3                | E   |
| TATA34          | Real Analysis, Honours Course            | 6*      | G2X   | 4                | E   |
| TATA55          | Abstract Algebra                         | 6*      | G2X   | 3                | E   |
| TATM85          | Functional Analysis                      | 6*      | A1X   | 2                | E   |
| TBME04          | Anatomy and Physiology                   | 6       | G2X   | 3                | E   |
| TBMI19          | Medical Information Systems              | 6*      | A1X   | 2                | E   |
| TDDC17          | Artificial Intelligence                  | 6       | G2X   | 3                | E   |
| TDDD08          | Logic Programming                        | 6       | A1X   | 4                | E   |
| TDDD38          | Advanced Programming in C++              | 6*      | A1X   | 2                | E   |

| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| TDTS06          | Computer Networks                                    | 6       | G2X   | 1                | E   |
| TDTS08          | Advanced Computer Architecture                       | 6       | A1X   | 2                | E   |
| TFFM08          | Experimental Physics                                 | 6*      | A1X   | 1                | E   |
| TFY54           | Quantum Mechanics                                    | 6       | A1X   | 2                | E   |
| TFKE59          | Fundamentals of Chemistry                            | 6       | G1X   | 2                | E   |
| TFYA18          | Mathematical Methods of Physics                      | 6       | A1X   | 3                | E   |
| TFYA43          | Nanotechnology                                       | 6       | G2X   | 3                | E   |
| TFYA88          | Additive Manufacturing: Tools, Materials and Methods | 6       | A1X   | 3                | E   |
| TFYA97          | Modern Optics  | 6       | A1X   | 4                | E   |
| THFR27          | French with a technical focus                        | 6*      | G1N   | 4                | E   |
| THSP27          | Spanish with a technical focus                       | 6*      | G1N   | 4                | E   |
| THTY27          | German with a technical focus                        | 6*      | G1N   | 4                | E   |
| TMHL03          | Mechanics of Light Structures                        | 6       | A1X   | 4                | E   |
| TMMV18          | Fluid Mechanics                                      | 6       | A1X   | 1                | E   |
| TPPE17          | Corporate Finance                                    | 6       | G2X   | 4                | E   |
| TSBB06          | Multidimensional Signal Analysis                     | 6*      | A1X   | 2                | E   |
| TSBB08          | Digital Image Processing                             | 6       | A1X   | 4                | E   |
| TSDT14          | Signal Theory  | 6       | A1X   | 1                | E   |
| TSFS09          | Modelling and Control of Engines and Drivelines      | 6*      | A1N   | 4                | E   |
| TSKS01          | Digital Communication                                | 6*      | A1X   | 4                | E   |
| TSKS15          | Detection and Estimation of Signals                  | 6       | A1X   | 2                | E   |
| TSRT92          | Modelling and Learning for Dynamical Systems         | 6       | A1X   | 3                | E   |
| TSTE12          | Design of Digital Systems                            | 6       | A1X   | 3                | E   |
| TSTE86          | Digital Integrated Circuits                          | 6       | A1X   | 2                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TGTU49          | History of Technology                                | 6       | G1X   | 1                | C/E |
| TKMJ24          | Environmental Engineering                            | 6       | G1N   | 1                | C/E |
| TAMS17          | Statistical Theory, advanced course                  | 6       | A1X   | 1                | E   |
| TAMS41          | Statistical Modelling with Regression Methods        | 6       | A1X   | 3                | E   |
| TAMS43          | Probability Theory and Bayesian Networks             | 6*      | A1X   | 4                | E   |

| Course code | Course name   | Credits | Level | Timetable module | ECV |
|-------------|---|---------|-------|------------------|-----|
| TAOP04      | Mathematical Optimization                             | 6       | A1X   | 4                | E   |
| TATA34      | Real Analysis, Honours Course                         | 6*      | G2X   | 4                | E   |
| TATA55      | Abstract Algebra                                      | 6*      | G2X   | 3                | E   |
| TATA71      | Ordinary Differential Equations and Dynamical Systems | 6       | G2X   | 2                | E   |
| TATM85      | Functional Analysis                                   | 6*      | A1X   | 2                | E   |
| TBME03      | Biochemistry and Cell Biology                         | 6       | G2X   | 2                | E   |
| TBMI19      | Medical Information Systems                           | 6*      | A1X   | 3                | E   |
| TBMT01      | Biomedical Signal Processing                          | 6       | A1F   | 1                | E   |
| TDDD38      | Advanced Programming in C++                           | 6*      | A1X   | 1                | E   |
| TEAE05      | Resource Theory                                       | 6       | G1X   | 3                | E   |
| TFFM08      | Experimental Physics                                  | 6*      | A1X   | 1                | E   |
| TFYA39      | Semiconductor Technology                              | 6       | A1X   | 3                | E   |
| TFYA60      | Astronomy and Geophysics                              | 6       | G1X   | 3                | E   |
| TFYA90      | Computational Physics                                 | 6       | A1X   | 4                | E   |
| TFYB01      | Advanced Electromagnetics                             | 6       | A1N   | 2                | E   |
| TFYM01      | Solid State Physics I                                 | 6       | A1X   | 2                | E   |
| TGTU04      | Leadership  | 6       | G2X   | 2                | E   |
| THFR27      | French with a technical focus                         | 6*      | G1N   | 4                | E   |
| THSP27      | Spanish with a technical focus                        | 6*      | G1N   | 4                | E   |
| THTY27      | German with a technical focus                         | 6*      | G1N   | 4                | E   |
| TMKM90      | Engineering Materials - Deformation and Fracture      | 6       | A1X   | 2                | E   |
| TMMS31      | Biomechanical Modelling of Tissues and Systems        | 6       | A1N   | 4                | E   |
| TPPE29      | Financial Markets and Instruments                     | 6       | A1X   | 2                | E   |
| TSBB06      | Multidimensional Signal Analysis                      | 6*      | A1X   | 3                | E   |
| TSBB21      | Computational Photography                             | 6       | A1X   | 4                | E   |
| TSEA81      | Computer Engineering and Real-time Systems            | 6       | A1X   | 4                | E   |
| TSEK02      | Radio Electronics                                     | 6       | A1X   | 3                | E   |
| TSEK37      | Analog CMOS Integrated Circuits                       | 6       | A1X   | 1                | E   |
| TSFS02      | Vehicle Dynamics and Control                          | 6       | A1X   | 1                | E   |



| Course code | Course name                                     | Credits | Level | Timetable module | ECV |
|-------------|---|---------|-------|------------------|-----|
| TSFS09      | Modelling and Control of Engines and Drivelines | 6*      | A1N   | 3                | E   |
| TSIN02      | Internetworking                                 | 6       | A1X   | 1                | E   |
| TSIT02      | Computer Security                               | 6       | G2X   | 2                | E   |
| TSKS01      | Digital Communication                           | 6*      | A1X   | 4                | E   |
| TSKS33      | Complex networks and big data                   | 6       | A1X   | 3                | E   |
| TSRT78      | Digital Signal Processing                       | 6       | A1X   | 2                | E   |

*Specialisation: Applied Physics - Materials and Nano Physics*

| Course code     | Course name              | Credits | Level | Timetable module | ECV |
|-----------------|--------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                          |         |       |                  |     |
| TFFM08          | Experimental Physics     | 6*      | A1X   | 1                | C   |
| TFFY54          | Quantum Mechanics        | 6       | A1X   | 2                | E   |
| TFYA43          | Nanotechnology           | 6       | G2X   | 3                | E   |
| TFYA97          | Modern Optics            | 6       | A1X   | 4                | E   |
| <b>Period 2</b> |                          |         |       |                  |     |
| TFFM08          | Experimental Physics     | 6*      | A1X   | 1                | C   |
| TFYM01          | Solid State Physics I    | 6       | A1X   | 2                | C   |
| TFYA39          | Semiconductor Technology | 6       | A1X   | 3                | E   |

*Specialisation: Applied Physics - Theory, Modelling and Computation*

| Course code     | Course name                     | Credits | Level | Timetable module | ECV |
|-----------------|---------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                 |         |       |                  |     |
| TFFY54          | Quantum Mechanics               | 6       | A1X   | 2                | C   |
| TFYA18          | Mathematical Methods of Physics | 6       | A1X   | 3                | C   |
| TFYA40          | Analytical Mechanics            | 6*      | A1X   | 1                | C   |
| TATA75          | Theory of Relativity            | 6*      | A1X   | -                | E   |
| <b>Period 2</b> |                                 |         |       |                  |     |
| TFYA40          | Analytical Mechanics            | 6*      | A1X   | 3                | C   |
| TFYA90          | Computational Physics           | 6       | A1X   | 4                | C   |
| TATA75          | Theory of Relativity            | 6*      | A1X   | 3                | E   |
| TDDE01          | Machine Learning                | 6       | A1X   | 1                | E   |
| TFYM01          | Solid State Physics I           | 6       | A1X   | 2                | E   |

*Specialisation: Biomedical Engineering*

| Course code     | Course name                   | Credits | Level | Timetable module | ECV |
|-----------------|-------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                               |         |       |                  |     |
| TBME04          | Anatomy and Physiology        | 6       | G2X   | 3                | C   |
| TBMI19          | Medical Information Systems   | 6*      | A1X   | 2                | E   |
| TSDT14          | Signal Theory                 | 6       | A1X   | 1                | E   |
| <b>Period 2</b> |                               |         |       |                  |     |
| TBMT01          | Biomedical Signal Processing  | 6       | A1F   | 1                | C   |
| TBME03          | Biochemistry and Cell Biology | 6       | G2X   | 2                | E   |
| TBMI19          | Medical Information Systems   | 6*      | A1X   | 3                | E   |

*Specialisation: Communication*

| Course code     | Course name                         | Credits | Level | Timetable module | ECV |
|-----------------|-------------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                     |         |       |                  |     |
| TSDT14          | Signal Theory                       | 6       | A1X   | 1                | C   |
| TSKS01          | Digital Communication               | 6*      | A1X   | 4                | C   |
| TSKS15          | Detection and Estimation of Signals | 6       | A1X   | 2                | C   |
| <b>Period 2</b> |                                     |         |       |                  |     |
| TSKS01          | Digital Communication               | 6*      | A1X   | 4                | C   |
| TDDE01          | Machine Learning                    | 6       | A1X   | 1                | E   |
| TSEK02          | Radio Electronics                   | 6       | A1X   | 3                | E   |
| TSIN02          | Internetworking                     | 6       | A1X   | 1                | E   |
| TSKS33          | Complex networks and big data       | 6       | A1X   | 3                | E   |
| TSRT78          | Digital Signal Processing           | 6       | A1X   | 2                | E   |

*Specialisation: Control and Information Systems*

| Course code     | Course name                                     | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TSRT92          | Modelling and Learning for Dynamical Systems    | 6       | A1X   | 3                | C   |
| TSDT14          | Signal Theory                                   | 6       | A1X   | 1                | E   |
| TSFS09          | Modelling and Control of Engines and Drivelines | 6*      | A1N   | 4                | E   |
| TSKS15          | Detection and Estimation of Signals             | 6       | A1X   | 2                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TSRT78          | Digital Signal Processing                       | 6       | A1X   | 2                | C   |
| TSEA81          | Computer Engineering and Real-time Systems      | 6       | A1X   | 4                | C/E |
| TSFS02          | Vehicle Dynamics and Control                    | 6       | A1X   | 1                | E   |
| TSFS09          | Modelling and Control of Engines and Drivelines | 6*      | A1N   | 3                | E   |
| TSKS33          | Complex networks and big data                   | 6       | A1X   | 3                | E   |

*Specialisation: Data Science and Machine Intelligence*

| Course code     | Course name                                  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TAMS43          | Probability Theory and Bayesian Networks     | 6*      | A1X   | 4                | C   |
| TSKS15          | Detection and Estimation of Signals          | 6       | A1X   | 2                | C   |
| TSRT92          | Modelling and Learning for Dynamical Systems | 6       | A1X   | 3                | C   |
| <b>Period 2</b> |  |         |       |                  |     |
| TAMS43          | Probability Theory and Bayesian Networks     | 6*      | A1X   | 4                | C   |
| TDDE01          | Machine Learning                             | 6       | A1X   | 1                | C   |
| TSKS33          | Complex networks and big data                | 6       | A1X   | 3                | C   |

*Specialisation: Electronics*

| Course code     | Course name                      | Credits | Level | Timetable module | ECV |
|-----------------|----------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                  |         |       |                  |     |
| TSKS01          | Digital Communication            | 6*      | A1X   | 4                | C   |
| TSTE86          | Digital Integrated Circuits      | 6       | A1X   | 2                | C   |
| TSTE12          | Design of Digital Systems        | 6       | A1X   | 3                | E   |
| <b>Period 2</b> |                                  |         |       |                  |     |
| TSEK37          | Analog CMOS Integrated Circuits  | 6       | A1X   | 1                | C   |
| TSKS01          | Digital Communication            | 6*      | A1X   | 4                | C   |
| TSEA26          | Design of Embedded DSP Processor | 6       | A1X   | 2                | E   |
| TSEK02          | Radio Electronics                | 6       | A1X   | 3                | E   |

*Specialisation: Engineering Mathematics*

| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TAMS32          | Stochastic Processes                                  | 6       | A1X   | 1                | C   |
| TATM85          | Functional Analysis                                   | 6*      | A1X   | 2                | C   |
| TAMS46          | Probability Theory, Second Course                     | 6       | A1X   | 3                | E   |
| TAOP34          | Large Scale Optimization                              | 6       | A1X   | 3                | E   |
| TATA32          | Discrete Mathematics                                  | 8*      | G1X   | 2                | E   |
| TATA55          | Abstract Algebra                                      | 6*      | G2X   | 3                | E   |
| TDDD08          | Logic Programming                                     | 6       | A1X   | 4                | E   |
| TFYA18          | Mathematical Methods of Physics                       | 6       | A1X   | 3                | E   |
| TSKS15          | Detection and Estimation of Signals                   | 6       | A1X   | 2                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TATM85          | Functional Analysis                                   | 6*      | A1X   | 2                | C   |
| TAOP04          | Mathematical Optimization                             | 6       | A1X   | 4                | E   |
| TATA32          | Discrete Mathematics                                  | 8*      | G1X   | 3                | E   |
| TATA55          | Abstract Algebra                                      | 6*      | G2X   | 3                | E   |
| TATA71          | Ordinary Differential Equations and Dynamical Systems | 6       | G2X   | 2                | E   |

*Specialisation: Financial Mathematics*

| Course code     | Course name                       | Credits | Level | Timetable module | ECV |
|-----------------|-----------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                   |         |       |                  |     |
| TAMS32          | Stochastic Processes              | 6       | A1X   | 1                | C   |
| TPPE17          | Corporate Finance                 | 6       | G2X   | 4                | C   |
| TAMS46          | Probability Theory, Second Course | 6       | A1X   | 3                | E   |
| TATM85          | Functional Analysis               | 6*      | A1X   | 2                | E   |
| <b>Period 2</b> |                                   |         |       |                  |     |
| TAOP04          | Mathematical Optimization         | 6       | A1X   | 4                | E   |
| TATM85          | Functional Analysis               | 6*      | A1X   | 2                | E   |
| TPPE29          | Financial Markets and Instruments | 6       | A1X   | 2                | E   |

*Specialisation: Mechanics and Control*

| Course code     | Course name                                     | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TMMV11          | Fluid Mechanics and Heat Transfer               | 6       | G2X   | 2                | E   |
| TSFS09          | Modelling and Control of Engines and Drivelines | 6*      | A1N   | 4                | E   |
| TSRT92          | Modelling and Learning for Dynamical Systems    | 6       | A1X   | 3                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TSEA81          | Computer Engineering and Real-time Systems      | 6       | A1X   | 4                | C   |
| TSFS02          | Vehicle Dynamics and Control                    | 6       | A1X   | 1                | E   |
| TSFS09          | Modelling and Control of Engines and Drivelines | 6*      | A1N   | 3                | E   |
| TSRT78          | Digital Signal Processing                       | 6       | A1X   | 2                | E   |

*Specialisation: Photonics and Quantum Technology*

| Course code     | Course name               | Credits | Level | Timetable module | ECV |
|-----------------|---------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                           |         |       |                  |     |
| TFFY54          | Quantum Mechanics         | 6       | A1X   | 2                | C   |
| TFYA97          | Modern Optics             | 6       | A1X   | 4                | C   |
| TFFM08          | Experimental Physics      | 6*      | A1X   | 1                | E   |
| <b>Period 2</b> |                           |         |       |                  |     |
| TFFM08          | Experimental Physics      | 6*      | A1X   | 1                | E   |
| TFYB01          | Advanced Electromagnetics | 6       | A1N   | 2                | E   |
| TSIN02          | Internetworking           | 6       | A1X   | 1                | E   |

*Specialisation: Signal and Image Processing*

| Course code     | Course name                      | Credits | Level | Timetable module | ECV |
|-----------------|----------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                  |         |       |                  |     |
| TSBB06          | Multidimensional Signal Analysis | 6*      | A1X   | 2                | C   |
| TSBB08          | Digital Image Processing         | 6       | A1X   | 4                | C   |
| TSDT14          | Signal Theory                    | 6       | A1X   | 1                | C   |
| <b>Period 2</b> |                                  |         |       |                  |     |
| TSBB06          | Multidimensional Signal Analysis | 6*      | A1X   | 3                | C   |
| TSBB21          | Computational Photography        | 6       | A1X   | 4                | C   |
| TSRT78          | Digital Signal Processing        | 6       | A1X   | 2                | C   |

*Specialisation: System-on-Chip*

| Course code     | Course name                                | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TSTE12          | Design of Digital Systems                  | 6       | A1X   | 3                | C   |
| TSTE86          | Digital Integrated Circuits                | 6       | A1X   | 2                | C   |
| TDTS06          | Computer Networks                          | 6       | G2X   | 1                | E   |
| TSKS01          | Digital Communication                      | 6*      | A1X   | 4                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSEA26          | Design of Embedded DSP Processor           | 6       | A1X   | 2                | C   |
| TSEA81          | Computer Engineering and Real-time Systems | 6       | A1X   | 4                | E   |
| TSEK37          | Analog CMOS Integrated Circuits            | 6       | A1X   | 1                | E   |
| TSKS01          | Digital Communication                      | 6*      | A1X   | 4                | E   |

**Semester 8 (Spring 2024)**

| Course code     | Course name                                       | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TEIO94          | Entrepreneurship and Idea Development             | 6*      | G2F   | 4                | C/E |
| 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 |

| Course code | Course name  | Credits | Level | Timetable module | ECV |
|-------------|--|---------|-------|------------------|-----|
| TAMS29      | Stochastic Processes Applied to Financial Models                           | 6       | A1F   | 3                | E   |
| TANA15      | Numerical Linear Algebra   | 6       | A1N   | 1                | E   |
| TATA27      | Partial Differential Equations   | 6*      | A1N   | 2                | E   |
| TATA53      | Linear Algebra, Honours Course   | 6*      | G2F   | 2                | E   |
| TATA54      | Number Theory  | 6*      | G2F   | 3                | E   |
| TATA66      | Fourier and Wavelet Analysis   | 6*      | A1N   | 4                | E   |
| TATA78      | Complex Analysis, second course  | 6*      | A1N   | 2                | E   |
| TBMI26      | Neural Networks and Learning Systems                                       | 6       | A1N   | 2                | E   |
| TBMI31      | Medical Information and Knowledge  | 6       | A1F   | 4                | E   |
| TBMT02      | Medical Imaging  | 6       | A1F   | 3                | E   |
| TBMT09      | Physiological Pressures and Flows  | 6       | A1N   | 1                | E   |
| TDDD41      | Data Mining - Clustering and Association Analysis                          | 6       | A1N   | 3                | E   |
| TDDD95      | Algorithmic Problem Solving  | 6*      | A1F   | 1                | E   |
| TDDE09      | Natural Language Processing  | 6       | A1F   | 2                | E   |
| TDS07       | System Design and Methodology  | 6       | A1N   | 1                | E   |
| TFYA17      | Advanced Project Work in Applied Physics                                   | 6*      | A1F   | -                | E   |
| TFYA38      | Optoelectronics  | 6       | A1X   | 3                | E   |
| TFYB03      | Advanced Quantum Mechanics   | 6       | A1F   | 4                | E   |
| TFYM02      | Solid State Physics II   | 6       | A1F   | 2                | E   |
| TFYM04      | Growth and characterization of nanomaterials                               | 6*      | A1F   | 1                | E   |
| TGTU91      | Oral and Written Communication   | 6       | G1F   | 2                | E   |
| THFR27      | French with a technical focus  | 6*      | G1N   | 4                | E   |
| THSP27      | Spanish with a technical focus   | 6*      | G1N   | 4                | E   |
| THTY27      | German with a technical focus  | 6*      | G1N   | 4                | E   |
| TINT02      | Intercultural Competence and Intercultural Communication, continued course | 6*      | G2F   | -                | E   |
| TMES21      | Industrial Energy Systems  | 6       | A1F   | 3                | E   |
| TMMS30      | Multi Body Dynamics and Robotics   | 6       | A1N   | 1                | E   |
| TNM111      | Information Visualization  | 6       | A1N   | 3                | E   |
| TPPE32      | Financial Risk Management  | 6       | A1F   | 2                | E   |
| TSBB34      | Computer Vision for Video Analysis   | 6       | A1N   | 1                | E   |



| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| TSBK07          | Computer Graphics   | 6*      | A1N   | 4                | E   |
| TSBK08          | Data Compression  | 6       | A1X   | 2                | E   |
| TSEK06          | VLSI Design   | 12*     | A1F   | 4                | E   |
| TSEK38          | Radio Frequency Transceiver Design                                    | 6       | A1F   | 2                | E   |
| TSFS04          | Electrical Drives   | 6       | G2F   | 4                | E   |
| TSIT12          | Quantum Electronics and Quantum Optics                                | 6*      | A1N   | 1                | E   |
| TSKS13          | Wireless Communications   | 6       | A1F   | 4                | E   |
| TSRT07          | Industrial Control Systems  | 6       | A1N   | 2                | E   |
| TSRT09          | Control Theory  | 6       | A1N   | 3                | E   |
| TSTE14          | Analog Filters  | 6       | A1N   | 2                | E   |
| TSTE27          | Analog and Discrete-Time Integrated Circuits                          | 6       | A1F   | 3                | E   |
| TSTE93          | Analog Circuits   | 6*      | G2F   | 1                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TEAE01          | Industrial Economics, Basic Course                                    | 6       | G1F   | 2                | C/E |
| TEIO94          | Entrepreneurship and Idea Development                                 | 6*      | G2F   | 4                | C/E |
| TANA31          | Computational Methods for Ordinary and Partial Differential Equations | 6       | A1N   | 2                | E   |
| TAOP24          | Optimization, Advanced Course   | 6       | G2F   | 1                | E   |
| TAOP87          | Applied Optimization Project Course                                   | 6       | A1N   | 3                | E   |
| TATA27          | Partial Differential Equations  | 6*      | A1N   | 4                | E   |
| TATA53          | Linear Algebra, Honours Course  | 6*      | G2F   | 3                | E   |
| TATA54          | Number Theory   | 6*      | G2F   | 1                | E   |
| TATA66          | Fourier and Wavelet Analysis  | 6*      | A1N   | 2                | E   |
| TATA78          | Complex Analysis, second course                                       | 6*      | A1N   | 3                | E   |
| TBME08          | Biomedical Modeling and Simulation                                    | 6       | A1N   | 3                | E   |
| TBMT26          | Technology in Intensive Care and Surgery                              | 6       | A1N   | 1                | E   |
| TDDD12          | Database Technology   | 6       | G2F   | 4                | E   |
| TDDD95          | Algorithmic Problem Solving   | 6*      | A1F   | 4                | E   |
| TDDE07          | Bayesian Learning   | 6       | A1F   | 2                | E   |
| TDDE31          | Big Data Analytics  | 6       | A1X   | 3                | E   |
| TDDE65          | Programming of Parallel Computers - Methods and Tools                 | 6       | A1N   | 2                | E   |
| TDDE70          | Deep Learning   | 6       | A1F   | 1                | E   |

| Course code | Course name  | Credits | Level | Timetable module | ECV |
|-------------|--|---------|-------|------------------|-----|
| TEAE13      | Civil and Commercial Law   | 6       | G1F   | 2                | E   |
| TEAE20      | Intellectual Property Rights   | 6       | G1X   | 1                | E   |
| TFMT19      | Chemical Sensor Systems  | 6       | A1N   | 4                | E   |
| TFYA17      | Advanced Project Work in Applied Physics                                   | 6*      | A1F   | -                | E   |
| TFYA21      | Physical Metallurgy  | 6       | A1F   | 3                | E   |
| TFYM04      | Growth and characterization of nanomaterials                               | 6*      | A1F   | 1                | E   |
| TGTU84      | Diversity and Gender in Engineering  | 6       | G1F   | 4                | E   |
| TGTU95      | Philosophy of Science and Technology                                       | 6       | G1F   | 4                | E   |
| THFR27      | French with a technical focus  | 6*      | G1N   | 4                | E   |
| THSP27      | Spanish with a technical focus   | 6*      | G1N   | 4                | E   |
| THTY27      | German with a technical focus  | 6*      | G1N   | 4                | E   |
| TINT02      | Intercultural Competence and Intercultural Communication, continued course | 6*      | G2F   | -                | E   |
| TKMJ29      | Resource Efficient Products  | 6       | A1N   | 1                | E   |
| TNM079      | Modelling and Animation  | 6       | A1N   | 2                | E   |
| TPPE33      | Portfolio Management   | 6       | A1N   | 2                | E   |
| TSBB33      | 3D Computer Vision   | 6       | A1N   | 3                | E   |
| TSBK07      | Computer Graphics  | 6*      | A1N   | 1                | E   |
| TSBK38      | Image and Audio Compression  | 6       | A1N   | 4                | E   |
| TSEK06      | VLSI Design  | 12*     | A1F   | 4                | E   |
| TSFS03      | Vehicle Propulsion Systems   | 6       | A1N   | 4                | E   |
| TSFS06      | Diagnosis and Supervision  | 6       | A1N   | 1                | E   |
| TSFS11      | Electrical and Energy Technology   | 6       | G2F   | 4                | E   |
| TSIT11      | Quantum Algorithms and Quantum Information                                 | 6       | A1N   | 3                | E   |
| TSIT12      | Quantum Electronics and Quantum Optics                                     | 6*      | A1N   | 1                | E   |
| TSKS14      | Multiple Antenna Communications  | 6       | A1F   | 3                | E   |
| TSKS16      | Signal Processing for Communications                                       | 6       | A1N   | 1                | E   |
| TSRT14      | Sensor Fusion  | 6       | A1N   | 3                | E   |
| TSTE06      | Digital Filters  | 6       | A1N   | 3                | E   |
| TSTE87      | Application-Specific Integrated Circuits                                   | 6       | A1N   | 2                | E   |
| TSTE93      | Analog Circuits  | 6*      | G2F   | 1                | E   |

*Specialisation: Applied Physics - Materials and Nano Physics*

| Course code     | Course name                                  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TFYM04          | Growth and characterization of nanomaterials | 6*      | A1F   | 1                | C   |
| TFYA17          | Advanced Project Work in Applied Physics     | 6*      | A1F   | -                | E   |
| TFYA38          | Optoelectronics                              | 6       | A1X   | 3                | E   |
| TFYM02          | Solid State Physics II                       | 6       | A1F   | 2                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TFYA21          | Physical Metallurgy                          | 6       | A1F   | 3                | C   |
| TFYM04          | Growth and characterization of nanomaterials | 6*      | A1F   | 1                | C   |
| TFMT19          | Chemical Sensor Systems                      | 6       | A1N   | 4                | E   |
| TFYA17          | Advanced Project Work in Applied Physics     | 6*      | A1F   | -                | E   |

*Specialisation: Applied Physics - Theory, Modelling and Computation*

| Course code     | Course name                                | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TATA27          | Partial Differential Equations             | 6*      | A1N   | 2                | E   |
| TBMI26          | Neural Networks and Learning Systems       | 6       | A1N   | 2                | E   |
| TFYA17          | Advanced Project Work in Applied Physics   | 6*      | A1F   | -                | E   |
| TFYB03          | Advanced Quantum Mechanics                 | 6       | A1F   | 4                | E   |
| TFYM02          | Solid State Physics II                     | 6       | A1F   | 2                | E   |
| TSBK07          | Computer Graphics                          | 6*      | A1N   | 4                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TATA27          | Partial Differential Equations             | 6*      | A1N   | 4                | E   |
| TFYA17          | Advanced Project Work in Applied Physics   | 6*      | A1F   | -                | E   |
| TFYA21          | Physical Metallurgy                        | 6       | A1F   | 3                | E   |
| TSBK07          | Computer Graphics                          | 6*      | A1N   | 1                | E   |
| TSIT11          | Quantum Algorithms and Quantum Information | 6       | A1N   | 3                | E   |

*Specialisation: Biomedical Engineering*

| Course code     | Course name                              | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TBMT02          | Medical Imaging                          | 6       | A1F   | 3                | C   |
| TBMT09          | Physiological Pressures and Flows        | 6       | A1N   | 1                | C   |
| TBMI26          | Neural Networks and Learning Systems     | 6       | A1N   | 2                | E   |
| TBMI31          | Medical Information and Knowledge        | 6       | A1F   | 4                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TBME08          | Biomedical Modeling and Simulation       | 6       | A1N   | 3                | E   |
| TBMT26          | Technology in Intensive Care and Surgery | 6       | A1N   | 1                | E   |

*Specialisation: Communication*

| Course code     | Course name                          | Credits | Level | Timetable module | ECV |
|-----------------|--------------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                      |         |       |                  |     |
| TBMI26          | Neural Networks and Learning Systems | 6       | A1N   | 2                | E   |
| TSBK08          | Data Compression                     | 6       | A1X   | 2                | E   |
| TSEK38          | Radio Frequency Transceiver Design   | 6       | A1F   | 2                | E   |
| TSKS13          | Wireless Communications              | 6       | A1F   | 4                | E   |
| <b>Period 2</b> |                                      |         |       |                  |     |
| TSBK38          | Image and Audio Compression          | 6       | A1N   | 4                | E   |
| TSKS14          | Multiple Antenna Communications      | 6       | A1F   | 3                | E   |
| TSKS16          | Signal Processing for Communications | 6       | A1N   | 1                | E   |

*Specialisation: Control and Information Systems*

| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TSRT07          | Industrial Control Systems                            | 6       | A1N   | 2                | C   |
| TSRT09          | Control Theory  | 6       | A1N   | 3                | C   |
| <b>Period 2</b> |   |         |       |                  |     |
| TDDD12          | Database Technology                                   | 6       | G2F   | 4                | C/E |
| TDDE65          | Programming of Parallel Computers - Methods and Tools | 6       | A1N   | 2                | E   |
| TSFS06          | Diagnosis and Supervision                             | 6       | A1N   | 1                | E   |
| TSRT14          | Sensor Fusion   | 6       | A1N   | 3                | E   |

*Specialisation: Data Science and Machine Intelligence*

| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TDDD95          | Algorithmic Problem Solving                           | 6*      | A1F   | 1                | C   |
| TANA15          | Numerical Linear Algebra                              | 6       | A1N   | 1                | E   |
| TBMI26          | Neural Networks and Learning Systems                  | 6       | A1N   | 2                | E   |
| TDDD38          | Advanced Programming in C++                           | 6*      | A1N   | 2                | E   |
| TDDD41          | Data Mining - Clustering and Association Analysis     | 6       | A1N   | 3                | E   |
| TDDE09          | Natural Language Processing                           | 6       | A1F   | 2                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TDDD95          | Algorithmic Problem Solving                           | 6*      | A1F   | 4                | C   |
| TAOP24          | Optimization, Advanced Course                         | 6       | G2F   | 1                | E   |
| TDDD38          | Advanced Programming in C++                           | 6*      | A1N   | 1                | E   |
| TDDE07          | Bayesian Learning                                     | 6       | A1F   | 2                | E   |
| TDDE31          | Big Data Analytics                                    | 6       | A1X   | 3                | E   |
| TDDE65          | Programming of Parallel Computers - Methods and Tools | 6       | A1N   | 2                | E   |
| TSRT14          | Sensor Fusion   | 6       | A1N   | 3                | E   |

*Specialisation: Electronics*

| Course code     | Course name                                  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TSEK06          | VLSI Design                                  | 12*     | A1F   | 4                | C/E |
| TSEK38          | Radio Frequency Transceiver Design           | 6       | A1F   | 2                | E   |
| TSTE14          | Analog Filters                               | 6       | A1N   | 2                | E   |
| TSTE27          | Analog and Discrete-Time Integrated Circuits | 6       | A1F   | 3                | E   |
| TSTE93          | Analog Circuits                              | 6*      | G2F   | 1                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSTE87          | Application-Specific Integrated Circuits     | 6       | A1N   | 2                | C   |
| TSEK06          | VLSI Design                                  | 12*     | A1F   | 4                | C/E |
| TSKS16          | Signal Processing for Communications         | 6       | A1N   | 1                | E   |
| TSTE06          | Digital Filters                              | 6       | A1N   | 3                | E   |
| TSTE93          | Analog Circuits                              | 6*      | G2F   | 1                | E   |

*Specialisation: Engineering Mathematics*

| Course code     | Course name                     | Credits | Level | Timetable module | ECV |
|-----------------|---------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                 |         |       |                  |     |
| TANA15          | Numerical Linear Algebra        | 6       | A1N   | 1                | C   |
| TATA27          | Partial Differential Equations  | 6*      | A1N   | 2                | E   |
| TATA66          | Fourier and Wavelet Analysis    | 6*      | A1N   | 4                | E   |
| TATA78          | Complex Analysis, second course | 6*      | A1N   | 2                | E   |
| TSRT09          | Control Theory                  | 6       | A1N   | 3                | E   |
| <b>Period 2</b> |                                 |         |       |                  |     |
| TAOP24          | Optimization, Advanced Course   | 6       | G2F   | 1                | C   |
| TATA27          | Partial Differential Equations  | 6*      | A1N   | 4                | E   |
| TATA66          | Fourier and Wavelet Analysis    | 6*      | A1N   | 2                | E   |
| TATA78          | Complex Analysis, second course | 6*      | A1N   | 3                | E   |

*Specialisation: Financial Mathematics*

| Course code     | Course name                                      | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TAMS29          | Stochastic Processes Applied to Financial Models | 6       | A1F   | 3                | C   |
| TANA15          | Numerical Linear Algebra                         | 6       | A1N   | 1                | C   |
| TPPE32          | Financial Risk Management                        | 6       | A1F   | 2                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TAOP24          | Optimization, Advanced Course                    | 6       | G2F   | 1                | E   |
| TDDD12          | Database Technology                              | 6       | G2F   | 4                | E   |
| TPPE33          | Portfolio Management                             | 6       | A1N   | 2                | E   |

*Specialisation: Mechanics and Control*

| Course code     | Course name                      | Credits | Level | Timetable module | ECV |
|-----------------|----------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                  |         |       |                  |     |
| TMMS30          | Multi Body Dynamics and Robotics | 6       | A1N   | 1                | E   |
| TSFS04          | Electrical Drives                | 6       | G2F   | 4                | E   |
| TSRT07          | Industrial Control Systems       | 6       | A1N   | 2                | E   |
| TSRT09          | Control Theory                   | 6       | A1N   | 3                | E   |
| <b>Period 2</b> |                                  |         |       |                  |     |
| TSFS03          | Vehicle Propulsion Systems       | 6       | A1N   | 4                | E   |
| TSFS06          | Diagnosis and Supervision        | 6       | A1N   | 1                | E   |
| TSRT14          | Sensor Fusion                    | 6       | A1N   | 3                | E   |

*Specialisation: Photonics and Quantum Technology*

| Course code     | Course name                                | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TFYA38          | Optoelectronics                            | 6       | A1X   | 3                | C   |
| TSIT12          | Quantum Electronics and Quantum Optics     | 6*      | A1N   | 1                | C   |
| TFYB03          | Advanced Quantum Mechanics                 | 6       | A1F   | 4                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSIT12          | Quantum Electronics and Quantum Optics     | 6*      | A1N   | 1                | C   |
| TSIT11          | Quantum Algorithms and Quantum Information | 6       | A1N   | 3                | E   |

*Specialisation: Signal and Image Processing*

| Course code     | Course name                          | Credits | Level | Timetable module | ECV |
|-----------------|--------------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                      |         |       |                  |     |
| TBMI26          | Neural Networks and Learning Systems | 6       | A1N   | 2                | E   |
| TBMT02          | Medical Imaging                      | 6       | A1F   | 3                | E   |
| TDDE09          | Natural Language Processing          | 6       | A1F   | 2                | E   |
| TNM111          | Information Visualization            | 6       | A1N   | 3                | E   |
| TSBB34          | Computer Vision for Video Analysis   | 6       | A1N   | 1                | E   |
| TSBK07          | Computer Graphics                    | 6*      | A1N   | 4                | E   |
| TSBK08          | Data Compression                     | 6       | A1X   | 2                | E   |
| <b>Period 2</b> |                                      |         |       |                  |     |
| TSBB33          | 3D Computer Vision                   | 6       | A1N   | 3                | E   |
| TSBK07          | Computer Graphics                    | 6*      | A1N   | 1                | E   |
| TSBK38          | Image and Audio Compression          | 6       | A1N   | 4                | E   |
| TSRT14          | Sensor Fusion                        | 6       | A1N   | 3                | E   |

*Specialisation: System-on-Chip*

| Course code     | Course name                                  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TDTS07          | System Design and Methodology                | 6       | A1N   | 1                | C   |
| TSEK06          | VLSI Design                                  | 12*     | A1F   | 4                | C/E |
| TSBK07          | Computer Graphics                            | 6*      | A1N   | 4                | E   |
| TSTE27          | Analog and Discrete-Time Integrated Circuits | 6       | A1F   | 3                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSEK06          | VLSI Design                                  | 12*     | A1F   | 4                | C/E |
| TEAE20          | Intellectual Property Rights                 | 6       | G1X   | 1                | E   |
| TSBK07          | Computer Graphics                            | 6*      | A1N   | 1                | E   |
| TSKS16          | Signal Processing for Communications         | 6       | A1N   | 1                | E   |
| TSTE06          | Digital Filters                              | 6       | A1N   | 3                | E   |
| TSTE87          | Application-Specific Integrated Circuits     | 6       | A1N   | 2                | E   |

**Semester 9 (Autumn 2024)**



| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TAMS39          | Multivariate Statistical Methods   | 6       | A1N   | 4                | E   |
| TAMS43          | Probability Theory and Bayesian Networks                                   | 6*      | A1N   | 4                | E   |
| TAMS46          | Probability Theory, Second Course  | 6       | A1N   | 3                | E   |
| TATA32          | Discrete Mathematics   | 8*      | G1N   | 2                | E   |
| TATA62          | Project - Applied Mathematics  | 12*     | A1F   | 4                | E   |
| TATA75          | Theory of Relativity   | 6*      | A1F   | -                | E   |
| TBMT14          | Biomedical Engineering - Project Course                                    | 12*     | A1F   | 4                | E   |
| TBMT57          | Biomedical Optics  | 6       | A1F   | 1                | E   |
| TDDC88          | Software Engineering   | 12*     | A1N   | 1                | E   |
| TDDE15          | Advanced Machine Learning  | 6       | A1F   | 1                | E   |
| TFKE59          | Fundamentals of Chemistry  | 6       | G1X   | 2                | E   |
| TFYA36          | Chaos and Non-Linear Phenomena   | 6       | A1N   | 2                | E   |
| TFYA40          | Analytical Mechanics   | 6*      | A1N   | 1                | E   |
| TFYA99          | Project Course in Applied Physics, CDIO                                    | 12*     | A1F   | 4                | E   |
| TFYM03          | Nanophysics  | 6       | A1X   | 3                | E   |
| TMMV01          | Aerodynamics   | 6       | A1N   | 3                | E   |
| TNE071          | Microwave Engineering  | 6       | A1N   | 1                | E   |
| TNE089          | Electromagnetic Compatibility (EMC) and Printed Circuit Board (PCB) Design | 6*      | A1N   | 2                | E   |
| TNM067          | Scientific Visualization   | 6       | A1N   | 3                | E   |
| TPPE53          | Financial Valuation Methodology  | 6       | A1F   | 2                | E   |
| TSBB11          | Images and Graphics, Project Course CDIO                                   | 12*     | A1F   | 4                | E   |
| TSBB19          | Machine Learning for Computer Vision                                       | 6       | A1N   | 2                | E   |
| TSBK03          | Advanced Game Programming  | 6*      | A1N   | 1                | E   |
| TSEA84          | Digital Design Project   | 6*      | A1F   | 1                | E   |
| TSEK03          | Radio Frequency Integrated Circuits  | 6       | A1F   | 2                | E   |
| TSFS12          | Autonomous Vehicles - Planning, Control, and Learning Systems              | 6       | A1X   | 1                | E   |
| TSIN01          | Information Networks   | 6       | A1N   | 3                | E   |
| TSIT03          | Cryptology   | 6       | A1N   | 2                | E   |
| TSIT13          | Quantum Communication  | 6       | A1N   | 1                | E   |

| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| TSKS12          | Modern Channel Coding, Inference and Learning                              | 6       | A1N   | 1                | E   |
| TSKS23          | Project Course in Signal Processing, Communications and Networking, CDIO   | 12*     | A1F   | 4                | E   |
| TSRT10          | Automatic Control - Project Course   | 12*     | A1F   | 4                | E   |
| TSTE17          | System Design  | 12*     | A1F   | 4                | E   |
| TSTE28          | Power Electronics  | 6       | A1N   | 3                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TGTU49          | History of Technology  | 6       | G1F   | 1                |     |
| TKMJ24          | Environmental Engineering  | 6       | G1N   | 1                |     |
| TAMS43          | Probability Theory and Bayesian Networks                                   | 6*      | A1N   | 4                | E   |
| TATA32          | Discrete Mathematics   | 8*      | G1N   | 3                | E   |
| TATA62          | Project - Applied Mathematics  | 12*     | A1F   | 4                | E   |
| TATA71          | Ordinary Differential Equations and Dynamical Systems                      | 6       | G2F   | 2                | E   |
| TATA75          | Theory of Relativity   | 6*      | A1F   | 3                | E   |
| TBMI02          | Medical Image Analysis   | 6       | A1N   | 1                | E   |
| TBMT14          | Biomedical Engineering - Project Course                                    | 12*     | A1F   | 4                | E   |
| TDDC88          | Software Engineering   | 12*     | A1N   | 1                | E   |
| TDDD37          | Database Technology  | 6       | G2F   | 1                | E   |
| TDDD49          | Programming in C# and .NET Framework                                       | 4       | G2F   | 3                | E   |
| TDDD56          | Multicore and GPU Programming  | 6       | A1N   | 2                | E   |
| TDDD89          | Scientific Method  | 6       | A1F   | 3                | E   |
| TDDE01          | Machine Learning   | 6       | A1N   | 1                | E   |
| TDDE16          | Text Mining  | 6       | A1F   | 2                | E   |
| TFYA40          | Analytical Mechanics   | 6*      | A1N   | 3                | E   |
| TFYA90          | Computational Physics  | 6       | A1F   | 4                | E   |
| TFYA99          | Project Course in Applied Physics, CDIO                                    | 12*     | A1F   | 4                | E   |
| TFYB02          | Elementary Particles and Quantum Fields                                    | 6       | A1F   | 1                | E   |
| TMME50          | Flight Mechanics   | 6       | A1N   | 2                | E   |
| TNE083          | Antenna Theory   | 6       | A1F   | 2                | E   |
| TNE089          | Electromagnetic Compatibility (EMC) and Printed Circuit Board (PCB) Design | 6*      | A1N   | 1                | E   |

| Course code | Course name  | Credits | Level | Timetable module | ECV |
|-------------|--|---------|-------|------------------|-----|
| TNM116      | eXtended Reality (XR) - Principles and Programming                       | 6       | A1N   | 2                | E   |
| TPPE61      | Financial Optimization   | 6       | A1F   | 2                | E   |
| TSBB11      | Images and Graphics, Project Course CDIO                                 | 12*     | A1F   | 4                | E   |
| TSBK03      | Advanced Game Programming  | 6*      | A1N   | -                | E   |
| TSEA26      | Design of Embedded DSP Processor   | 6       | A1N   | 2                | E   |
| TSEA44      | Computer Hardware - a System on Chip                                     | 6       | A1F   | 1                | E   |
| TSEA84      | Digital Design Project   | 6*      | A1F   | 3                | E   |
| TSEK07      | Test and measurement of integrated circuits                              | 6       | A1F   | 1                | E   |
| TSKS23      | Project Course in Signal Processing, Communications and Networking, CDIO | 12*     | A1F   | 4                | E   |
| TSRT08      | Optimal Control  | 6       | A1N   | 3                | E   |
| TSRT10      | Automatic Control - Project Course                                       | 12*     | A1F   | 4                | E   |
| TSTE17      | System Design  | 12*     | A1F   | 4                | E   |
| TSTE26      | Powergrid and Technology for Renewable Production                        | 6       | A1N   | 3                | E   |
| TSTE85      | Low Power Electronics  | 6       | A1N   | 2                | E   |

*Specialisation: Applied Physics - Materials and Nano Physics*

| Course code     | Course name                             | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TFYA99          | Project Course in Applied Physics, CDIO | 12*     | A1F   | 4                | C   |
| TFYM03          | Nanophysics                             | 6       | A1X   | 3                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TFYA99          | Project Course in Applied Physics, CDIO | 12*     | A1F   | 4                | C   |
| TFYA90          | Computational Physics                   | 6       | A1F   | 4                | E   |

*Specialisation: Applied Physics - Theory, Modelling and Computation*

| Course code     | Course name                             | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TFYA40          | Analytical Mechanics                    | 6*      | A1N   | 1                | C   |
| TFYA99          | Project Course in Applied Physics, CDIO | 12*     | A1F   | 4                | C   |
| TFYA36          | Chaos and Non-Linear Phenomena          | 6       | A1N   | 2                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TFYA40          | Analytical Mechanics                    | 6*      | A1N   | 3                | C   |
| TFYA99          | Project Course in Applied Physics, CDIO | 12*     | A1F   | 4                | C   |
| TFYB01          | Advanced Electromagnetics               | 6       | A1N   | 2                | E   |
| TFYB02          | Elementary Particles and Quantum Fields | 6       | A1F   | 1                | E   |

*Specialisation: Biomedical Engineering*

| Course code     | Course name                             | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TBMT14          | Biomedical Engineering - Project Course | 12*     | A1F   | 4                | C   |
| TAMS39          | Multivariate Statistical Methods        | 6       | A1N   | 4                | E   |
| TATM38          | Mathematical Models in Biology          | 6       | A1N   | 3                | E   |
| TBMT57          | Biomedical Optics                       | 6       | A1F   | 1                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TBMT14          | Biomedical Engineering - Project Course | 12*     | A1F   | 4                | C   |
| TBMI02          | Medical Image Analysis                  | 6       | A1N   | 1                | E   |

*Specialisation: Communication*

| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TSIN01          | Information Networks   | 6       | A1N   | 3                | C   |
| TSKS23          | Project Course in Signal Processing, Communications and Networking, CDIO | 12*     | A1F   | 4                | C   |
| TSEK03          | Radio Frequency Integrated Circuits                                      | 6       | A1F   | 2                | E   |
| TSIT03          | Cryptology   | 6       | A1N   | 2                | E   |
| TSKS12          | Modern Channel Coding, Inference and Learning                            | 6       | A1N   | 1                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSKS23          | Project Course in Signal Processing, Communications and Networking, CDIO | 12*     | A1F   | 4                | C   |

*Specialisation: Control and Information Systems*

| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TATA62          | Project - Applied Mathematics                                 | 12*     | A1F   | 4                | C/E |
| TSRT10          | Automatic Control - Project Course                            | 12*     | A1F   | 4                | C/E |
| TDTS06          | Computer Networks   | 6       | G2F   | 1                | E   |
| TSFS12          | Autonomous Vehicles - Planning, Control, and Learning Systems | 6       | A1X   | 1                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TATA62          | Project - Applied Mathematics                                 | 12*     | A1F   | 4                | C/E |
| TSRT10          | Automatic Control - Project Course                            | 12*     | A1F   | 4                | C/E |
| TSRT08          | Optimal Control   | 6       | A1N   | 3                | E   |

*Specialisation: Data Science and Machine Intelligence*

| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TSBB11          | Images and Graphics, Project Course CDIO                                 | 12*     | A1F   | 4                | C/E |
| TSKS23          | Project Course in Signal Processing, Communications and Networking, CDIO | 12*     | A1F   | 4                | C/E |
| TAMS39          | Multivariate Statistical Methods   | 6       | A1N   | 4                | E   |
| TAOP34          | Large Scale Optimization   | 6       | A1N   | 3                | E   |
| TDDC17          | Artificial Intelligence  | 6       | G2F   | 3                | E   |
| TDDE15          | Advanced Machine Learning  | 6       | A1F   | 1                | E   |
| TSBB06          | Multidimensional Signal Analysis   | 6*      | A1N   | 2                | E   |
| TSBB08          | Digital Image Processing   | 6       | A1N   | 4                | E   |
| TSDT14          | Signal Theory  | 6       | A1N   | 1                | E   |
| TSKS12          | Modern Channel Coding, Inference and Learning                            | 6       | A1N   | 1                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TDDD89          | Scientific Method  | 6       | A1F   | 3                | C   |
| TSBB11          | Images and Graphics, Project Course CDIO                                 | 12*     | A1F   | 4                | C/E |
| TSKS23          | Project Course in Signal Processing, Communications and Networking, CDIO | 12*     | A1F   | 4                | C/E |
| TBMI02          | Medical Image Analysis   | 6       | A1N   | 1                | E   |
| TDDD37          | Database Technology  | 6       | G2F   | 1                | E   |
| TDDE16          | Text Mining  | 6       | A1F   | 2                | E   |
| TSBB06          | Multidimensional Signal Analysis   | 6*      | A1N   | 3                | E   |
| TSRT78          | Digital Signal Processing  | 6       | A1F   | 2                | E   |

*Specialisation: Electronics*

| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TSTE17          | System Design  | 12*     | A1F   | 4                | C/E |
| TNE071          | Microwave Engineering  | 6       | A1N   | 1                | E   |
| TNE089          | Electromagnetic Compatibility (EMC) and Printed Circuit Board (PCB) Design | 6*      | A1N   | 2                | E   |
| TSEA84          | Digital Design Project   | 6*      | A1F   | 1                | E   |
| TSEK03          | Radio Frequency Integrated Circuits  | 6       | A1F   | 2                | E   |
| TSTE28          | Power Electronics  | 6       | A1N   | 3                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSTE17          | System Design  | 12*     | A1F   | 4                | C/E |
| TNE083          | Antenna Theory   | 6       | A1F   | 2                | E   |
| TNE089          | Electromagnetic Compatibility (EMC) and Printed Circuit Board (PCB) Design | 6*      | A1N   | 1                | E   |
| TSEA26          | Design of Embedded DSP Processor   | 6       | A1N   | 2                | E   |
| TSEA44          | Computer Hardware - a System on Chip                                       | 6       | A1F   | 1                | E   |
| TSEA84          | Digital Design Project   | 6*      | A1F   | 3                | E   |
| TSEK07          | Test and measurement of integrated circuits                                | 6       | A1F   | 1                | E   |
| TSTE26          | Powergrid and Technology for Renewable Production                          | 6       | A1N   | 3                | E   |
| TSTE85          | Low Power Electronics  | 6       | A1N   | 2                | E   |

*Specialisation: Engineering Mathematics*

| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TATA62          | Project - Applied Mathematics                         | 12*     | A1F   | 4                | C/E |
| TSRT10          | Automatic Control - Project Course                    | 12*     | A1F   | 4                | C/E |
| TATA75          | Theory of Relativity                                  | 6*      | A1F   | -                | E   |
| TATM38          | Mathematical Models in Biology                        | 6       | A1N   | 3                | E   |
| TDDD38          | Advanced Programming in C++                           | 6*      | A1N   | 2                | E   |
| TFYA40          | Analytical Mechanics                                  | 6*      | A1N   | 1                | E   |
| TPPE53          | Financial Valuation Methodology                       | 6       | A1F   | 2                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TATA62          | Project - Applied Mathematics                         | 12*     | A1F   | 4                | C/E |
| TSRT10          | Automatic Control - Project Course                    | 12*     | A1F   | 4                | C/E |
| TATA71          | Ordinary Differential Equations and Dynamical Systems | 6       | G2F   | 2                | E   |
| TATA75          | Theory of Relativity                                  | 6*      | A1F   | 3                | E   |
| TDDD38          | Advanced Programming in C++                           | 6*      | A1N   | 1                | E   |
| TFYA40          | Analytical Mechanics                                  | 6*      | A1N   | 3                | E   |
| TPPE61          | Financial Optimization                                | 6       | A1F   | 2                | E   |

*Specialisation: Financial Mathematics*

| Course code     | Course name                     | Credits | Level | Timetable module | ECV |
|-----------------|---------------------------------|---------|-------|------------------|-----|
| <b>Period 1</b> |                                 |         |       |                  |     |
| TATA62          | Project - Applied Mathematics   | 12*     | A1F   | 4                | C   |
| TPPE53          | Financial Valuation Methodology | 6       | A1F   | 2                | C   |
| <b>Period 2</b> |                                 |         |       |                  |     |
| TATA62          | Project - Applied Mathematics   | 12*     | A1F   | 4                | C   |
| TPPE61          | Financial Optimization          | 6       | A1F   | 2                | C   |



*Specialisation: Mechanics and Control*

| Course code     | Course name   | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TSRT10          | Automatic Control - Project Course                            | 12*     | A1F   | 4                | C   |
| TFYA40          | Analytical Mechanics  | 6*      | A1N   | 1                | E   |
| TSFS12          | Autonomous Vehicles - Planning, Control, and Learning Systems | 6       | A1X   | 1                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TSRT10          | Automatic Control - Project Course                            | 12*     | A1F   | 4                | C   |
| TFYA40          | Analytical Mechanics  | 6*      | A1N   | 3                | E   |
| TMME50          | Flight Mechanics  | 6       | A1N   | 2                | E   |
| TSRT08          | Optimal Control   | 6       | A1N   | 3                | E   |

*Specialisation: Photonics and Quantum Technology*

| Course code     | Course name                             | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TFYA99          | Project Course in Applied Physics, CDIO | 12*     | A1F   | 4                | C   |
| TBMT57          | Biomedical Optics                       | 6       | A1F   | 1                | E   |
| TFYM03          | Nanophysics                             | 6       | A1X   | 3                | E   |
| TSIT03          | Cryptology                              | 6       | A1N   | 2                | E   |
| TSIT13          | Quantum Communication                   | 6       | A1N   | 1                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TFYA99          | Project Course in Applied Physics, CDIO | 12*     | A1F   | 4                | C   |
| TSIT02          | Computer Security                       | 6       | G2F   | 2                | E   |

*Specialisation: Signal and Image Processing*

| Course code     | Course name  | Credits | Level | Timetable module | ECV |
|-----------------|--|---------|-------|------------------|-----|
| <b>Period 1</b> |  |         |       |                  |     |
| TSBB11          | Images and Graphics, Project Course CDIO           | 12*     | A1F   | 4                | C   |
| TNM067          | Scientific Visualization                           | 6       | A1N   | 3                | E   |
| TSBB19          | Machine Learning for Computer Vision               | 6       | A1N   | 2                | E   |
| TSBK03          | Advanced Game Programming                          | 6*      | A1N   | 1                | E   |
| TSKS15          | Detection and Estimation of Signals                | 6       | A1N   | 4                | E   |
| <b>Period 2</b> |  |         |       |                  |     |
| TSBB11          | Images and Graphics, Project Course CDIO           | 12*     | A1F   | 4                | C   |
| TBMI02          | Medical Image Analysis                             | 6       | A1N   | 1                | E   |
| TDDD56          | Multicore and GPU Programming                      | 6       | A1N   | 2                | E   |
| TDDE01          | Machine Learning                                   | 6       | A1N   | 1                | E   |
| TNM116          | eXtended Reality (XR) - Principles and Programming | 6       | A1N   | 2                | E   |
| TSBK03          | Advanced Game Programming                          | 6*      | A1N   | -                | E   |

*Specialisation: System-on-Chip*

| Course code     | Course name                                 | Credits | Level | Timetable module | ECV |
|-----------------|---|---------|-------|------------------|-----|
| <b>Period 1</b> |   |         |       |                  |     |
| TSTE17          | System Design                               | 12*     | A1F   | 4                | C/E |
| TDS08           | Advanced Computer Architecture              | 6       | A1N   | 2                | E   |
| TSEA84          | Digital Design Project                      | 6*      | A1F   | 1                | E   |
| <b>Period 2</b> |   |         |       |                  |     |
| TSEA26          | Design of Embedded DSP Processor            | 6       | A1N   | 2                | C   |
| TSTE17          | System Design                               | 12*     | A1F   | 4                | C/E |
| TDDD56          | Multicore and GPU Programming               | 6       | A1N   | 2                | E   |
| TSEA44          | Computer Hardware - a System on Chip        | 6       | A1F   | 1                | E   |
| TSEA84          | Digital Design Project                      | 6*      | A1F   | 3                | E   |
| TSEK07          | Test and measurement of integrated circuits | 6       | A1F   | 1                | E   |
| TSIT02          | Computer Security                           | 6       | G2F   | 2                | E   |
| TSTE85          | Low Power Electronics                       | 6       | A1N   | 2                | E   |

## Semester 10 (Spring 2025)

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

### 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. A student who 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. In addition, local regulations laid down by the faculty boards and university board apply, see

[http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva/Examina](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva/Examina).

Higher Education Act Chapter 1, Section 8:

First-cycle courses and study programmes are to develop:

- the ability to make independent and critical assessments
- the ability to identify, formulate and solve problems autonomously, and
- the preparedness to deal with changes in working life.

In addition to knowledge and skills in their field of study, students shall develop the ability to:

- gather and interpret information at a scholarly level
- stay abreast of the development of knowledge, and
- communicate their knowledge to others, including those who lack specialist knowledge in the field.

## 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 compulsory matriculation procedure will be communicated to those admitted to the first term of the programme.

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 part of a study programme is used here to refer to admission 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 [http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva/Tekniska\\_fakulteten](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva/Tekniska_fakulteten).

## Interruption in studies

Notification of an interruption in studies is to be made through a web form, <https://www.lith.liu.se/for-studenter/anmalan-studieuppehall?l=en>. 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 to take place at the course registration for the term that follows the interruption.

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 that is not required for students returning after an interruption in study, and not required for students who are changing their location of study and/or study programme.

## **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). If a student wishes to study a different combination than the one specified in the curriculum, an application must be made to the board of studies.

### **Voluntary courses**

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.

## **Courses from another study programme or third-cycle courses**

To include courses in a degree from another study programme or third-cycle courses, the student need to apply to and be granted this from the board of studies. If such a decision is not taken, such courses are regarded as voluntary courses.

When selecting a course from another programme, the admission requirements specified in the course syllabus must be satisfied.

Admission is granted to the extent that resources allow, provided that places are available on the course.

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.

### **Students taking a master’s programme in engineering**

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.

### **Students taking a Bachelor of Science (Engineering)**

Students taking Bachelor of Science (Engineering) degrees may apply to take courses specified in the programme syllabuses of all Bachelor of Science (Engineering) programmes.

### **Students taking a Bachelor of Science**

Students taking Bachelor of Science degrees may apply to take courses specified in the programme syllabuses of all Bachelor of Science programmes.

## Single-subject courses, courses from other faculties, or other Higher Education Institutions

To include single-subject courses, courses from another faculty, or courses from other Higher Education Institutions in a degree, the student need to apply to and be granted this from the board of studies.

### 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.

### Registration for programme courses as single-subject courses

Admission to a programme course as a single-subject subject course may take place only if sufficient resources and space on the course are available. Furthermore, the applicant must satisfy the entry requirements for the relevant course.

In the event of a scarcity of resources, the board of LiTH can decide to limit the possibilities of taking courses that are part of a programme as freestanding courses.

### 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, new courses may be taken.

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.
- 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 and for the compulsory study abroad period within Ii (Industrial Engineering and Management – International) and Yi (Applied Physics and Electrical Engineering – International) can be found at: [http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva/Tekniska\\_fakulteten](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva/Tekniska_fakulteten).

## 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

Courses are timetabled after a decision has been made for this course concerning its assignment to a timetable module.

## Interrupting a course

The vice-chancellor's decision concerning regulations for registration, deregistration and reporting results (Dnr LiU-2015-01241) 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 must record the interruption, such that the registration on the course can be removed.



Deregistration from a course is carried out using a web-based form:  
<https://www.lith.liu.se/for-studenter/kurskomplettering?l=en>.

## Cancelled courses

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.

## Guidelines relating to examinations and examiners

For details, see Guidelines for education and examination for first-cycle and second-cycle education at Linköping University,  
<http://styrdokument.liu.se/Regelsamling/VisaBeslut/917592>.

An examiner must be employed as a teacher at LiU according to the LiU Regulations for Appointments (<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

### Examination

Written and oral 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 board of studies.

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 October
- 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 board of studies 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 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. 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 board of studies. In all cases above, the examination is also offered one more time during the academic year after the following, unless the board of studies decides otherwise.

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

### **Registration for examination**

In order to take an examination, a student must register in advance at the Student Portal during the registration period, which opens 30 days before the date of the examination and closes 10 days before it. Candidates are informed of the location of the examination by email, four days in advance. Students who have not registered for an examination run the risk of being refused admittance to the examination, if space is not available.

Symbols used in the examination registration system:

\*\* denotes that the examination is being given for the penultimate time.

\* denotes that the examination is being given for the last time.

### **Code of conduct for students during examinations**

Details are given in a decision in the university's rule book:  
<http://styrdokument.liu.se/Regelsamling/VisaBeslut/622682>.

### **Retakes for higher grade**

Students at the Institute of Technology at LiU have the right to retake written examinations and computer-based examinations in an attempt to achieve a higher grade. This is valid for all examination components with code "TEN" 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.

### **Retakes of other forms of examination**

Regulations concerning retakes of other forms of examination than written examinations and computer-based examinations are given in the LiU guidelines for examinations and examiners,  
<http://stydokument.liu.se/Regelsamling/VisaBeslut/917592>.

### **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 (references or quotations for which the source is specified) when the text, images, ideas, data, etc. of other people are used. 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  
<https://www.student.liu.se/studenttjanster/lagar-regler-rattigheter?l=en>.

### **Grades**

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

1. Grades U, 3, 4, 5 are to be awarded for courses that have written examinations.
2. 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.
3. Grades Fail (U) and Pass (G) are to be used for degree projects and other independent work.

### **Examination components**

1. Grades U, 3, 4, 5 are to be awarded for written examinations (TEN).
2. 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), oral examination (MUN), computer-based examination (DAT), home assignment (HEM), and assignment (UPG).

3. 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 other examination (ANN), tutorial group (BAS) or examination item (MOM).
4. 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).

For mandatory components, the following applies: 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. (In accordance with the LiU Guidelines for education and examination for first-cycle and second-cycle education at Linköping University, <http://sturdokument.liu.se/Regelsamling/VisaBeslut/917592>).

For written examinations, the following applies: 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 instead 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. (In accordance with the LiU Guidelines for education and examination for first-cycle and second-cycle education at Linköping University, <http://sturdokument.liu.se/Regelsamling/VisaBeslut/917592>).

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

### **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 [http://sturdokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://sturdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).

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

General provisions for the degree project are given here. A specific board of studies 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 and links to course syllabuses, registration, reflection documents, etc. can be found at <https://www.lith.liu.se/examensarbete/examensarbete?l=en>.

### **General provisions**

To be awarded a Master's Degree in Engineering 300 credits, Master of Science (Two years), Master of Philosophy (Two years), Master of Science (One year), or master's degree without prefix a student must carry out an approved degree project. The components of the degree project are described in the relevant course syllabus.

### **Aim**

The aim of the degree project is described in the relevant course syllabus, <https://www.lith.liu.se/examensarbete/examensarbete?l=en>. Links to respective course syllabus can be found under the respective headings Master's programme, Civilingenjörsutbildning (only in Swedish), Högskoleingenjörsutbildning (only in Swedish), Kandidatutbildning (only in Swedish).

### **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 is carried out in the form of:

- an internal degree project located at one of the participating departments at LiU
- an external degree project located at a company, government agency, or other organisation in Sweden or abroad, that an examiner has assessed is able to manage a degree project that satisfies the requirements, or
- a degree project within an exchange agreement in association with study abroad, whereby all study results are to be credited to the student by the relevant board of studies.

The main subject areas that are permitted within each study programme are described in the programme syllabus. Any individual subjects that may be relevant to the main subject area are to be determined by the relevant board of studies.

The examiner for a degree project within a certain subject area are determined by the board of studies that is responsible for general degrees within the main subject area. An up-to-date list is given at <https://www.lith.liu.se/examensarbete/examensarbete?l=en>.

### **Degree projects within agreements relating to study abroad**

During study abroad that takes place within the framework of an agreement, the provisions of the host institute relating to degree projects are applied. The student is to consult the board of studies and together ensure that the proposed degree project is carried out in a main subject area that is permitted within the study

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

A certificate confirming that the degree project has been approved and a copy of the degree project thesis (in PDF format) are to be submitted to the relevant board of studies.

### **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.

In cases in which issues relating to work-related copyright, patenting or remuneration may arise, provisions governing these should be established in advance. A student working on a degree project may sign a confidentiality agreement in order to obtain access to confidential information necessary for the degree project. The supervisor and examiner, however, determine whether they are prepared to sign a confidentiality agreement, and thus the confidential information must not normally be of such nature that it is necessary to supervise or grade the work. The complete degree project thesis is to be published during the grading procedure, unless special 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 when the degree project starts, at <https://www.lith.liu.se/for-student/for-student/anmalan-till-exjobb?l=en>. Registration of the degree project is to take place before 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 guidance counsellor, 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 within the relevant main subject area, and be appointed by the board of studies. The board of studies 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 guidance counsellor is to check whether the commencement criteria are satisfied and inform the examiner of this
- 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
- pass/fail the planning report
- pass/fail the mid-way assessment
- be responsible that the supervisor or supervisors carry out their duties
- in conjunction with the planning report, check that the student has registered for the degree project
- 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 board of studies before the degree project is started.

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 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 board of studies can allow the reporting to be carried out in another language than Swedish or English.

The oral presentation is to take place in public, unless there are special grounds 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. The presentation is to take place at LiTH at a time when other students can attend. This means that the presentation can take place on a date that the student has agreed with the examiner, normally between the re-examination period in August and midsummer, and after the student has attended three thesis presentations.

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 (references or quotations for which the source is specified) when the text, images, ideas, data, etc., of other people are used. 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 either before or after the student presents his or her thesis. The opponent must satisfy the same requirements for the number and level of credits gained as those of the student's degree project. The opponent must also have attended three thesis presentations as a member of the audience. 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.

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.

### **Attendance at presentations**

A student is to attend presentations of degree project theses as described in the course syllabus. 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. Attendance at such

presentations is a component of the degree work that is subject to points-based assessment.

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.

### **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 <https://www.lith.liu.se/examensarbete/reflektionsdokument?l=en>.

### **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. The department is required to provide supervision for a maximum of 18 months after the student has registered the degree project in Ladok. The examiner may grant additional supervision after this period in special cases. If the examiner determines 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.

### **Quality assurance**

The relevant board of studies has overall responsibility for the quality of study programmes. This responsibility covers also degree projects. Quality assurance is to be carried out as determined by the faculty board.

### **Exemptions**

If special circumstances apply, a board of studies may grant exemptions from the regulations specified above. The oral opposition, for example, may be replaced by an extensive written opposition, if the board of studies approves this

- for international students for whom special circumstances apply
- for other students for whom all other components of the qualification have been satisfied, the degree project thesis has been submitted, and special circumstances apply.

Written opposition may be carried out in one of the following ways:

- The student presents a written opposition to a degree project thesis that has been written by another student, whose examiner subsequently examines the opposition.
- The student's examiner requests that the student prepare a written opposition to a degree project thesis that has previously been examined by an examiner.

If written opposition is used, it is not necessary that the student prepare an introductory statement describing the structure.

The examiner applies to the board of studies for exemption regarding written opposition. The board of studies must approve that opposition may take place in written form, before it is carried out.

## **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 examiner for the degree project is responsible for ensuring that examination takes place as specified by the course syllabus, and, where appropriate, carries out the duties of an examiner for degree projects.

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 (references or quotations for which the source is specified) when the text, images, ideas, data, etc., of other people are used. 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.

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.