Programme syllabus

Degree Programme in Electrical Engineering
Civilingenjörsutbildning i elektroteknik
270.0 credits

Valid for students admitted to the education from autumn 06 (HT - Autumn term; VT - Spring term).

This is a translation of the Swedish, legally binding, programme syllabus.

Programme objectives

Knowledge and understanding

Skills and abilities

Ability to make judgements and adopt a standpoint

Extent and content of the programme

Eligibility and selection

Implementation of the education

Courses

The programme is course-based. Lists of courses are included in appendix 1.

Grading system

Courses in the first and the second cycle are graded on a scale from A to F. A-E are passing grades, A is the highest grade. The grades pass (P) and fail (F) are used for courses under certain circumstances.

Appendix 1 - Course list
Appendix 2 - Programme syllabus descriptions
## Appendix 1: Course list

Degree Programme in Electrical Engineering (E), Programme syllabus for studies starting in autumn 2006

### General courses

#### Year 1

**Mandatory courses (72.0 Credits)**

<table>
<thead>
<tr>
<th>Course code</th>
<th>Course name</th>
<th>Credits Edu. level</th>
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<tbody>
<tr>
<td>2A1800</td>
<td>Electrical Circuit Analysis</td>
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<td>2B1520</td>
<td>Electronics</td>
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<tr>
<td>2D1343</td>
<td>Computer Science</td>
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<tr>
<td>2U1700</td>
<td>Project Course in Electrical Engineering</td>
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<tr>
<td>5B1115</td>
<td>Mathematics I</td>
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<td>5B1116</td>
<td>Mathematics II</td>
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<td>5B1117</td>
<td>Mathematics III</td>
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<tr>
<td>5C1102</td>
<td>Mechanics, Smaller Course</td>
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**Optional courses**

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<tr>
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#### Year 2

**Mandatory courses (106.5 Credits)**

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<td>Electromagnetic Theory EB</td>
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<td>2B1100</td>
<td>Physics part 1, Thermodynamics and Wave Physics</td>
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<td>2E1313</td>
<td>Signals and Systems, part II</td>
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<td>Signals and Systems, part I</td>
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<td>5B1501</td>
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<td>Electromagnetic Field Theory</td>
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<td>Wave Propagation and Antennas</td>
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<td>Signals and Systems, part I</td>
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Year 3

Mandatory courses (39.0 Credits)

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<td>Electric Power Systems</td>
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<td>EK1190</td>
<td>Measurement Technology</td>
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<td>EL1110</td>
<td>Automatic Control, General Course</td>
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<td>IE1202</td>
<td>Analog Electronics</td>
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<tr>
<td>IF1602</td>
<td>Physics part 2, Material Physics</td>
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<tr>
<td>SF1851</td>
<td>Optimization</td>
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Biomedical Electrical Engineering (BIOE)

Year 3

Optional courses

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<td>DD2426</td>
<td>Robotics and Autonomous Systems</td>
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<tr>
<td>DD2432</td>
<td>Artificial Neural Networks and Other Learning Systems</td>
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<td>DD2433</td>
<td>Artificial Neural Networks, Advanced Course</td>
<td>6.0 hp</td>
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<tr>
<td>DD2435</td>
<td>Mathematical Modelling of Biological Systems</td>
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<td>DD2436</td>
<td>Modelling of Processes in Cell Biology</td>
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<tr>
<td>DD2450</td>
<td>Algorithmic Bioinformatics</td>
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<tr>
<td>DT2112</td>
<td>Speech Technology</td>
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<td>Second cycle</td>
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EK2260  Measurement Systems, Project Course         6.0 hp  Second cycle
EK2350  Microsystem Technology                  7.5 hp  Second cycle
EN2100  Sound Perception                        7.5 hp  Second cycle
EN2200  Pattern Recognition                     6.0 hp  Second cycle
EQ2300  Digital Signal Processing                7.5 hp  Second cycle
EQ2310  Digital Communications                   9.0 hp  Second cycle
HL1000  Quality and Regulatory Aspects on Medical Devices 3.0 hp  First cycle
HL1009  Neuroscience                             7.5 hp  First cycle
HL1010  Systems Biology                          7.5 hp  First cycle
HL2004  Engineering in Intensive Care and Anesthesia 6.0 hp  Second cycle
HL2005  Implants and Biomaterials                6.0 hp  Second cycle
IH2653  Simulation of Semiconductor Devices      7.5 hp  Second cycle
IH2655  Design and Characterisation of Nano- and Microdevices 7.5 hp  Second cycle
SH2310  Radiation Detectors and Medical Imaging Systems 7.5 hp  Second cycle

Conditionally elective courses

<table>
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<td>EQ1200</td>
<td>Signal Theory</td>
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<tr>
<td>HL1008</td>
<td>Cellular and Molecular Biology</td>
<td>15.0 hp First cycle</td>
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<td>HL2006</td>
<td>Medical Engineering, Basic Course</td>
<td>7.5 hp  Second cycle</td>
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<td>IH1611</td>
<td>Semiconductor Devices</td>
<td>7.5 hp  First cycle</td>
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Recommended courses

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<td>Medical Instrumentation and Signal Processing</td>
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<td>HL2003</td>
<td>Radiation Physics and Biology</td>
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Supplementary information

For further information please contact the student office at the School of Electrical Engineering EES.

Electronics (ELNI)

Year 3

Optional courses
<table>
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<th>Course name</th>
<th>Credits</th>
<th>Edu. level</th>
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<tbody>
<tr>
<td>EK2350</td>
<td>Microsystem Technology</td>
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<td>IH2652</td>
<td>Methods and Instruments of Analysis</td>
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<td>IH2653</td>
<td>Simulation of Semiconductor Devices</td>
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<tr>
<td>IH2654</td>
<td>Nanoelectronics</td>
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<tr>
<td>IH2655</td>
<td>Design and Characterisation of Nano- and Microdevices</td>
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<td>IH2656</td>
<td>Advanced Semiconductor Materials</td>
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<td>IH2657</td>
<td>Design of Nano Semiconductor Devices</td>
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<td>IH2661</td>
<td>Power Semiconductor Devices</td>
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<td>Second cycle</td>
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<tr>
<td>IL2200</td>
<td>ASIC-design Methodology with High-level Languages</td>
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<td>IL2201</td>
<td>Design of Digital Integrated Circuits - VLSI</td>
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<td>IL2202</td>
<td>System Modelling</td>
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<td>IL2204</td>
<td>DSP-Construction with HDL</td>
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<td>Embedded Systems</td>
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<td>IL2207</td>
<td>System-On-Chip Architectures</td>
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<td>IL2212</td>
<td>Embedded Software</td>
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<td>Second cycle</td>
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<td>IL2217</td>
<td>Digital Design with HDL</td>
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<td>IL2219</td>
<td>Radio Electronics</td>
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<td>IL2220</td>
<td>Low Power Analogue and Mixed Signal ICs</td>
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<td>IM2651</td>
<td>Physics of Electronic Materials</td>
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<td>IO2653</td>
<td>Fiber-optical Communication</td>
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<td>Second cycle</td>
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<td>IO2654</td>
<td>Optical Networking</td>
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<td>Second cycle</td>
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<td>IO2655</td>
<td>Photonics</td>
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<td>IS1202</td>
<td>Computer Systems Architecture</td>
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<td>IT2651</td>
<td>Microwave Engineering</td>
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<td>Second cycle</td>
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**Conditionally elective courses**

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<th>Credits</th>
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<tr>
<td>EQ1200</td>
<td>Signal Theory</td>
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<td>IH1611</td>
<td>Semiconductor Devices</td>
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<td>Design of Digital Integrated Circuits - LSI</td>
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<td>IL2218</td>
<td>Analog Electronics, Advanced Course</td>
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<td>IS1200</td>
<td>Computer Hardware Engineering</td>
<td>7.5 hp</td>
<td>First cycle</td>
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**Supplementary information**

For further information please contact the student office at the School of Electrical Engineering EES.
## Electrical Engineering (ELTE)

### Year 3

#### Optional courses

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<td>ED2210</td>
<td>Electromagnetic Processes in Dispersive Media</td>
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<td>EF2200</td>
<td>Plasma Physics</td>
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<td>Plasma Physics, Supplementary Course</td>
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<td>EG2030</td>
<td>Power Systems, Advanced Course</td>
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<td>Second cycle</td>
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<tr>
<td>EG2050</td>
<td>System Planning</td>
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</tr>
<tr>
<td>EH2020</td>
<td>Industrial Control and Information Systems</td>
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<td>Industrial Information Systems, Systems Engineering</td>
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<td>Applied Antenna Theory</td>
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<td>Field Theory for Guided Waves</td>
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<td>Electromagnetic Wave Propagation</td>
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<td>Analysis of Electrical Machines</td>
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<td>Power Electronics</td>
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<td>Control Theory and Practice, Advanced Course</td>
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<td>Power Semiconductor Devices</td>
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<td>Microwave Engineering</td>
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#### Conditionally elective courses

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<td>Electrotechnical Modelling</td>
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#### Supplementary information

For further information please contact the student office at the School of Electrical Engineering EES.
# Communication Systems (KSY)

## Year 3

### Optional courses

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<td>Speech Signal Processing</td>
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<td>Image Processing</td>
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<td>Internetworking</td>
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<td>Queuing Theory and Teletraffic Systems</td>
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<td>Digital Communications</td>
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<tr>
<td>EQ2120</td>
<td>Internetworking</td>
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<td>Queuing Theory and Teletraffic Systems</td>
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<td>Digital Signal Processing</td>
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<td>Advanced Digital Communications</td>
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<td>Antenna Theory</td>
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<td>Seminars in Signals, Sensors and Systems</td>
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<td>IK2500</td>
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<td>Wireless Networks</td>
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### Conditionally elective courses

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<th>Edu. level</th>
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<tr>
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### Supplementary information

For further information please contact the student office at the School of Electrical Engineering EES.

# Systems Engineering (SYS)
### Year 3

**Optional courses**

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**Conditionally elective courses**

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<td><em>Computer Hardware Engineering</em></td>
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**Supplementary information**
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Appendix 2: Specialisations

Degree Programme in Electrical Engineering (E), Programme syllabus for studies starting in autumn 2006

Biomedical Electrical Engineering (BIOE)

Medical research and processing is becoming increasingly dependent on advanced technical systems. This specialisation provides students with the extensive knowledge necessary to be able to work with the development of systems and components in medical applications. This degree will qualify students for jobs within a broad engineering field connected to medical and biological operations.

Electronics (ELNI)

This specialisation suits people interested in semi-conductors, analogue and digital systems and computer components. After graduation possible jobs include semi-conductor or analogue and digital electronic system construction or perhaps work with the optical and electronic systems connected to these.

Electrical Engineering (ELTE)

This specialisation suits students who are interested in electrical magnetism, electrical systems and similar fields. Jobs are to be found at companies who manufacture advanced electronic machines or techniques for transfer of electrical energy.

Communication Systems (KSY)

This specialisation provides extensive knowledge on the rapidly-growing area of communications, i.e. transferring information from one location to another. As a Master of Science in Communications Systems there are many job opportunities working with technical solutions for the development, construction or operation of future communication systems.

Systems Engineering (SYS)

Studies in this specialisation cover electrical engineering systems with the emphasis on the big picture rather than the component parts – not as easy as it sounds as in-depth knowledge of all the parts is essential in order to be able to reject those that do not affect the whole. There are many possible routes to go after studying this specialisation – working with industrial systems in some form or with research.