Faculty of Technology and Science

PROGRAMME STUDY PLAN

Programme Code	TGHEL, TGHME, TGHML
Programme Approval	The Programme Study Plan was approved by the Faculty Board of Technology and Science on 30 August 2007 and is valid from the autumn semester of 2007 at Karlstad University.
Programme Title	Study Programme in Electrical Engineering, Mechatronic Engineering or Music and Sound Engineering
Credits	180 ECTS
Language of Instruction	Swedish
Degree Level	Bachelor
Degree Type	Professional degree
Prerequisites	General admission requirements plus upper secondary school level Mathematics D and Physics B.

General Information

The programme aims at preparing students for engineering work in the fields of electrical engineering, mechatronic engineering, or music and sound engineering.

Examples of future areas of work for students who choose *electrical engineering* as a major are:

- constructing, manufacturing and testing appliances in systems of telecommunications, signal processing, or automatic control engineering,
- operations monitoring, maintenance and optimization of electronic systems and components.

Examples of future areas of work for students who choose *mechatronic engineering* as a major are:

- designing measurement and control systems for the vehicle industry,
- automatizing manufacturing processes in engineering and process industries,
- marketing, purchasing and selling industrial IT systems.

Examples of future areas of work for students who choose *music and sound engineering* as a major are:

- planning and designing different types of acoustic environments,
- operation and maintenance in music and sound engineering,
- setting sound for music, stage and media productions

Aims

Upon completion of the programme students should, beyond the general requirements for a Bachelor's degree specified in the *Higher Education Ordinance*, *SFS* 2006:1053, be able to:

• demonstrate knowledge of measurement techniques, electricity, analogue and digital electronics, and signal processing,
• demonstrate skills in using modern engineering aids (e.g. the computer) to analyse and solve problems.

Upon completion of the programme, students majoring in *electrical engineering* should be able to:
• demonstrate knowledge and understanding of electrical engineering, signal processing, computer engineering and the programming skills required for projecting, designing, investigating, purchasing, and operating and maintaining electronic systems,
• demonstrate skills in using the standard equipment and instruments of an electric engineering laboratory.

Upon completion of the programme, students majoring in *mechatronic engineering* should be able to:
• demonstrate knowledge and understanding of electrical engineering, mechanical engineering, computer engineering and the programming skills required for projecting, designing, investigating, purchasing, and operating and maintaining automatic measure and control systems,
• demonstrate skills in using computer-based systems for measure and control systems.

Upon completion of the programme, students majoring in *music and sound engineering* should be able to:
• demonstrate the knowledge and understanding of sound setting, electronics, physics and mathematics required for qualified work in the field of sound engineering,
• demonstrate ability to discuss the technical as well as artistic problems of different sound environments,
• demonstrate skills in using equipment for music and sound productions,
• demonstrate knowledge and understanding of music, stage and media production.

Programme Structure
In the first year all students study an introductory course and basic courses in mathematics and electrical engineering. In addition, the students majoring in electrical engineering and mechatronics take courses in programming and mechanics, while music and sound majors take physics and sound setting. The second year centres on courses in the major.

The third-year provides opportunities to choose programme courses and electives. Majors in electrical engineering can choose courses in electronics, modulation theory, optical signal processing and automatic control. Majors in mechatronic engineering can choose programme courses in robot engineering, electronics, pneumatics and hydraulics, and automatic control. In addition, students may choose courses on offer in other fields, such as language, product development, project management, industrial economy and entrepreneurship. Majors in music and sound engineering can choose courses in the areas of PA systems, movie sound, studio engineering and signal processing.

A degree project, preferably in conjunction with community or industrial partners, concludes the study programme.

Programme Curriculum
Mandatory programme courses:

Electrical engineering 45 ECTS cr.
digital and analogue electronics, electrical and electronic power, direct and alternating currents, signal processing
Mathematics 15 ECTS cr.
variable and multivariable analysis, complex numbers, linear equation systems, ordinary differential equations, series, vector geometry.

Electrical engineering major

Mandatory courses:
Computer science 7.5 ECTS cr.
Electrical engineering 37.5 ECTS.cr
computer-aided design, micro computer engineering, automatic control, telecommunications
Degree project 22.5 ECTS cr.
Business administration 7.5 ECTS cr.
Mathematics 7.5 ECTS cr.
Fourier, Laplace and Z-transformations, probability calculus

Programme electives
Electrical engineering 22.5 ECTS cr.

General electives
Free choice of courses totalling15 ECTS cr.

Mechatronic engineering major

Mandatory courses:
Computer science 7.5 ECTS cr.
Electrical engineering 22.5 ECTS.cr
micro computer engineering, automatic control
Degree project 22.5 ECTS cr.
Business administration 7.5 ECTS cr.
Mechanical engineering 15 ECTS cr.
mechanics, solid mechanics, materials engineering
Mathematics 7.5 ECTS cr.
Fourier, Laplace and Z-transformations, probability calculus

Programme electives
Electrical and/or mechanical engineering 22.5 ECTScr.

General electives
Free choice of courses totalling15 ECTS cr.

Music and sound engineering major

Mandatory courses:
Degree project 22.5 ECTS cr.
Physics 15 ECTS cr.
acoustics, wave theory
Sound setting 45 ECTS cr.
sound design, sound equipment, light, listening, practice.

Programme electives
Musical engineering 22.5 ECTS cr.
Physics 7.5 ECTS cr.

General electives
Free choice of courses totalling 7.5 ECTS cr.

Degree Title
Bachelor of Science in Electrical Engineering/ Electrical Power Engineering/ Mechatronic Engineering/ Music and Sound Engineering

Credit Transfer
According to the *Higher Education Ordinance* (Ch 6, § 12-14), students may transfer credits from previously completed university courses subject to approval. Transfer of credits for a course module, or university studies generally, is subject to the approval by the course examiner. Transfer of credits for a full course is subject to the approval by Student Services Officials.

Additional Information

Attendance
Some programme courses may include components requiring student attendance.

Deferment and Discontinuance
Students who plan to defer or discontinue their studies are required to inform the programme administrator in writing after having consulted with the student advisor. Students who are not registered for a programme course for more than one term and fail to apply for deferment will lose their place.

Students who enrolled in the programme before 1 July 2007 will complete their studies in accordance with the requirements of the earlier curriculum. Upon completion students may request degree and course certificates to be issued under the current ordinance if they meet its requirements.

Moving Up
In order to move up to the next level automatically, students on the programme must have completed 75% of the credits in the previous year subsequent to the re-sit period at the start of the next year. Students who fail to meet this requirement should consult with the study advisor or programme director and get help to set up an individual study plan. Students are not allowed to start working on their Degree projects until they have completed 80% of the previous programme credits.

The local regulations for undergraduate studies at Karlstad University stipulate the obligations and rights of students and staff.