Reg No: ELAD17/20222

Faculty of Health, Science and Technology
Electrical Engineering

Syllabus

Electrical power systems technology

Course Code:	ELAD17
Course Title:	Electrical power systems technology *Teknik för elkraftsystem*
Credits:	7.5
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:
ETA (Electrical Engineering)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2022-01-26, and is valid from the Autumn semester 2022 at Karlstad University.

Prerequisites
Registered for 30 ECTS credits of programme courses in Mathematics at the Master level (Engineering), with 15 ECTS credits completed, and 7.5 ECTS credits in Engineering Physics, Industrial Engineering and Management, or Energy and Environmental Engineering, plus upper secondary level Swedish 3 or Swedish as a second language 3 and English 6, or equivalent

Learning Outcomes
The aim of the course is for students to acquire knowledge about electrical power systems technology.

Upon completion of the course, students should be able to perform calculations on:
- single-phase and three-phase systems
- transformers

- parameters and models for electrical power transmission systems
- power flows in electrical power systems
- electrical power distribution and smart micro grids

Content
- One-phase and three-phase systems: j-omega method, complex effects, Y- and D-connected three-phase systems, analysis of balanced and unbalanced three-phase systems
- Tranformers: Ideal, one-phase, and three-phase transformers, autotransformers, and per-unit system
- Parameters and models of electric power grids: resistance, conductance, inductance, capacitance; short, medium, and long power lines
- Power flows in electrical power systems: problems related to power flow and techniques for solving them, including software solutions
- Electrical power distribution and smart micro grids: primary and secondary distribution, transformers and capacitors in distribution grids, smart electricity grids

Reading List
See separate document.

Examination
Assessment is based on a written exam, mandatory laboratory sessions, and lab reports.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades
One of the grades Distinction (VG), Pass (G), or Fail (U) is awarded in the examination of the course. For programme students in Engineering, one of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), or U (Fail) is awarded in the examination of the course.

Quality Assurance
Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate
A course certificate will be provided upon request.

Additional information
The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.