Reg No: ELGA01/20252

Faculty of Health, Science and Technology
Electrical Engineering

Syllabus

Circuit Analysis

Course Code:	ELGA01
Course Title:	Circuit Analysis *Kretsteknik*
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

Major Field of Study:
ETA (Electrical Engineering)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2025-02-06, and is valid from the Autumn semester 2025 at Karlstad University.

Prerequisites
Registered for Mathematics for Engineers I, 7.5 ECTS credits, or equivalent

Learning Outcomes
Upon completion of the course, students should be able to:
- demonstrate knowledge of basic concepts and components within electric circuit theory,
- demonstrate basic knowledge of measurement methods for electric circuits and the use of measuring instruments,
- perform calculations on basic electric circuits using Ohm's law, Kirchoff's laws, node and loop analysis, the superposition theorem, Norton's theorem and Thevenin's theorem,
- perform calculations on basic alternating current circuits using phasors and the jw-method,
- perform simple connections with passive components,
- perform measurements on electric circuits, and
- present the results of laboratory experiments in a written report.

Content
Instruction is in the form of lectures, exercises, and laboratory sessions.

Basic concepts: Charge, current, potential, voltage, conductors, resistance, power and energy, capacitance, inductance, and electric and magnetic fields.

Knowledge of components: Passive components (resistors, capacitors, and inductors) and ideal transformers.

Circuit theory: Calculations using Ohm's law, Kirchoff's laws, the superposition theorem, Norton's theorem and Thevenin's theorem, and node and loop analysis. Power and power matching, equivalent circuits. Sinusoidal current and voltage, calculations using phasors and the jw-method, resonance circuits. Charging and discharging of a capacitor.

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 U (Fail), 3 (Pass), 4 (Some Distinction), or 5 (Distinction) 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.