

**SYLLABUS**

# **Electricity Consumption 7.5 credits W0030T**

**Elförbrukning**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

DECISION DATE  
**2023-02-15**

# Electricity Consumption 7.5 credits W0030T

## Elförbrukning

### First cycle, W0030T

| Education level | Grade scale | Subject       | Subject group (SCB) |
|-----------------|-------------|---------------|---------------------|
| First cycle     | G U 3 4 5   | Elkraftteknik | Energy Technology   |

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and the course electrical circuit theory or equivalent knowledge

## Selection

The selection is based on 1-165 credits.

## Course Aim

After the completion of this course, the student should be able to:

### Knowledge and understanding

- describe and explain the general structure and functionality of the system for the transmission and distribution of electrical energy (also known as the electricity network or electric power system)
- describe and explain basic concepts regarding electricity consumption for different types of electricity customers and industrial processes
- describe in a general way the electricity consumption volume and variation over time for different types of electricity customers and industrial processes
- describe and explain basic principles for the electricity market from the consumption viewpoint

### Skills and abilities

- be able to calculate and make estimates of the volume and variation of electricity consumption over time for an aggregation of different customers and processes

### Valuation and approach

- reflect on how the electrical and the non-electrical forms of energy consumption relate to and complement each other

## Contents

Meeting electricity demand reliably is the primary mission of the electric power system. This course pursues to provide the societal, economical, and technical context for the provision of the electrical service, as well as the characterization of the electricity customers and their consumption behavior. The course will cover the following topics:

General and introductory description of the structure and the functionality of the electric power system  
General and introductory description of the electricity market – Market formation, functioning, and emission-based markets  
Consumption patterns. Residential, commercial, and industrial electricity consumption  
Non-electrical energy consumption  
Industrial processes based on electricity  
Correlation between loads  
Time series analysis  
Load forecasting models  
Weather dependency of the load: humidity, temperature, etc.  
Load modeling for steady state and dynamic performance studies  
Electricity price and consumption: their relation and their forecast  
Demand side management

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course will be given as a combination of pre-recorded lectures, live lectures in a lecture room and question hours via Zoom and/or in a lecture room. The course also contains a project work with small groups.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

Quiz (1 hp); Report from project work (1,5 hp); Written examination (5 hp)

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Course offered by

Department of Engineering Sciences and Mathematics

## Modules

| Code | Description  | Grade scale | Cr  | Status    | From period | Title |
|------|--------------|-------------|-----|-----------|-------------|-------|
| 0001 | Quiz         | U G#        | 1   | Mandatory | A23         |       |
| 0002 | Project      | U G#        | 1.5 | Mandatory | A23         |       |
| 0003 | Written exam | G U 3 4 5   | 5   | Mandatory | A23         |       |

## Syllabus established

by Mats Näsström, Head of Undergraduate Education 2023-02-15