Faculty of Health, Science and Technology
Environmental and Energy Systems

Syllabus

Energy Systems - an Introduction

Course Code:	EMG111
Course Title:	Energy Systems - an Introduction *Introduktion till energisystem*
Credits:	7.5
Degree Level:	Undergraduate level
Progressive Specialisation:	First cycle, has only upper-secondary level entry requirements (G1N)

Major Field of Study:
MEI (Environmental and Energy Systems)

Course Approval
The syllabus was approved by the Faculty of Health, Science and Technology 2016-03-07, and is valid from the Autumn semester 2016 at Karlstad University.

Prerequisites
General admission requirements and upper secondary level Mathematics 3c, Physics 2 and Chemistry 1 (field-specific eligibility AB)

Learning Outcomes
Upon completion of the course, students should be able to:

- give an account of the Swedish energy system regarding the supply, conversion and utilization of energy,
- calculate the environmental impacts of energy conversions,
- apply mass and energy balances to energy technological systems,
- give an account of the function of incineration plants and compressor-driven refrigeration facilities,
- calculate heat transfer through plane and circular layers,
- calculate heat transfer via conduction, convection and radiation,
- calculate energy flows through heat exchangers,
- give an account of the function of different types of air handling in building ventilation,
- identify the energy flow of systems and calculate their energy consumption,
- analyse the consequences of effectivization measures in an energy system.

Content
The following components are treated:
- The Swedish energy system, energy production plants, basic circuit diagram, effect and resource flows
- Energy and effect
- Systems and system boundaries
- Incieration plants and heat value

- Cooling machines, Coefficient of Performance (COP) and heat factor
- Conduction, convextion and radiation
- Heat exchanger and logarythmic average temperature difference
- Air handling system
- Energy effectivization

Reading List
See separate document.

Examination
Assessment is based on an individual hand-in assignment and a written exam.

Grades
One of the grades Pass with Distinction (5), Pass with Some Distinction (4), Pass (3) or Fail (U) 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.