



Faculty of Health, Science and Technology  
Environmental and Energy Systems

# Syllabus

## Building Services Engineering

<b>Course Code:</b>	EMGB12
<b>Course Title:</b>	Building Services Engineering <i>Installationsteknik</i>
<b>Credits:</b>	15
<b>Degree Level:</b>	Undergraduate level
<b>Progressive Specialisation:</b>	First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F)

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

### Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2020-09-01, and is valid from the Spring semester 2021 at Karlstad University.

### Prerequisites

Master of Science in Energy and Environmental Engineering:  
Registered for 90 ECTS credits in the Master programme, with 45 ECTS credits completed

Bachelor of Science in Energy and Environmental Engineering:  
Registered for 90 ECTS credits in the study programme, with 45 ECTS credits completed, or equivalent

### Learning Outcomes

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

- identify the factors that have an effect on and determine the air quality and thermal comfort of a building,
- estimate the need of ventilation, heating, and cooling with the help of energy and mass

balances,

- calculate dimensions of a system, including system components, for ventilation, heating, and cooling,
- analyse the function of a ventilation, heating, or cooling system, especially in terms of flow control and energy needs, and
- present a project in the form of a technical report.

### **Content**

The course covers the following:

- Thermal comfort and heating and cooling systems
- Air quality and ventilation systems
- Heat balance in buildings
- Components in heating, cooling, and ventilation systems
- Fluid mechanics applied to pipe branching; flow distribution, adjustment, and flow regulation
- Moist air and energy and mass transfer in heating, cooling, and ventilation systems
- Regulation functions for heating, cooling, and ventilation
- Energy analysis of heating, cooling, and ventilation systems

Students complete a project which is reported in writing.

### **Reading List**

See separate document.

### **Examination**

Assessment is based on a written exam and a written presentation of an individual project.

If students have a decision from Karlstad University entitling them to special pedagogical 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.