



## HÖGSKOLAN I GÄVLE

### Energy Utilization in Buildings 9 cr

*Energianvändning i byggnader 9 hp*

Set by Faculty of Engineering and Sustainable Development

**Version**

**Set at**

**Valid from**

2/26/18

**HT2018**

<b>Level</b>	A1F
<b>Education level</b>	Second cycle
<b>Course identifier</b>	ETA311
<b>Credits</b>	9 cr
<b>Main field of study</b>	Energy Systems
<b>Subject group</b>	Energy Technology
<b>Disciplinary domain</b>	Technology 100.0 %

**Learning outcomes**

After completion of the course the student shall be able to

1. present different principles for the transport of heat, moisture, and air through the building envelope
2. analyse different energy carriers and measures to decrease the energy demand either at the production stage or at utilization
3. discuss fundamentals in heating, cooling, ventilation and indoor climate in buildings
4. analyse heat transfer with applications to energy losses from a building envelope and moisture transmission in buildings
5. plan and, using appropriate methods, undertake a project within predetermined time frames
6. in writing report their project work and discuss their conclusions and the knowledge and arguments on which they are based.

**Course content**

Energy utilization  
The building as an energy system  
Building physics – heat, air, mass, and moisture transport  
The building and its HVAC system  
The Energy Balance in residential buildings  
The Energy Balance in non-residential buildings  
Cooling

	Air distribution system/Ventilation Energy efficient buildings
<b>Teaching</b>	Lectures and project work
<b>Prerequisites</b>	English language proficiency equivalent to (the Swedish upper secondary school) English course 6/B. Bachelor of Science or Bachelor of Engineering degree in relevant discipline and a minimum of Thermodynamics and Fluid Dynamics 15 credits or equivalent.
<b>Examination</b>	Written examinations and project.  0010 Written examination 7,5 credits examines Learning outcomes 1, 2, 3, 4, grades A-F. 0020 Project Work 1,5 credits examines Learning outcomes 5, 6, grades Pass or Fail.
<b>Grade</b>	A, B, C, D, E, Fx, F
<b>Other regulations</b>	Degree Criteria for final grade will be given by course responsible or examiner latest at the beginning of the course.
<b>Sustainable environment</b>	A minor part of the course content deals with sustainable development.
<b>Module</b>	
	0010 Written examination 7.5 cr Grade: AF
	0020 Project Building Energy Systems 1.5 cr Grade: UG