



HÖGSKOLAN I GÄVLE

Thermal Comfort and Indoor Climate 7.5 cr

Termisk komfort och inomhusmiljö 7,5 hp

Set by Faculty of Engineering and Sustainable Development

Version

Set at

Valid from

12/12/12

VT2013

Level	A1F
Education level	Second cycle
Course identifier	ME545D
Credits	7.5 cr
Main field of study	Energy Technology
Subject group	Energy Technology
Disciplinary domain	Technology 100.0 %

Learning outcomes

1. state the effects of heating and ventilation on indoor air quality and thermal comfort
2. state the effects of heating and ventilation on working expenses and indoor environment
3. construct HVAC-systems (Heating, Ventilation and Air Conditioning)
4. describe the use of energy in a building
5. describe the environmental building assessment and various assessment schemes and tools commercially available

Course content

The objective of this course is to provide a thorough understanding of how ventilation and heating/cooling affect thermal comfort, and air quality indoors, and how this, in turn reflects on energy management in the built environment. Thermal comfort and space-conditioning are analysed against the background of human physiological requirements. Different methods for evaluating thermal comfort and indoor climate are presented as applicable in different indoor environments (industries, offices, dwellings, etc.). Factors affecting air quality are analysed. Gaseous and particulate indoor air pollutants are discussed with regard to acceptable concentrations, health effects, existing regulations/standards and control measures. Ventilation demand and ventilation effectiveness are discussed as determined by requirements

of pollutant and heat removal in different indoor environments. Methods for estimating/calculating the energy flows required for achieving specific levels of thermal comfort and air quality are analysed as relevant to energy management in the built environment. The influence of architectural aspects is presented and analysed. The concept of environmental building assessment is presented together with assessment schemes and tools commercially available. Occupant behaviour is discussed as relevant to the possibilities of enhancing energy efficiency. A study visit to a relevant site/facility is arranged.

Teaching	All course activities consist of internet-based lectures and tutorials.		
Prerequisites	Basic thermodynamics 7.5 credits Basic Heat Transfer 7.5 credits Basic Fluid Mechanics 6.0 credits Energy Utilization 9.0 credits or equivalent courses		
Examination	All Exams are web-based. There are three basic exams: Midterm exam 1 (20%), Midterm exam 2 (20%) and Final exam (60%). Final exam includes all chapters of course literatures.		
Grade	A, B, C, D, E, Fx, F		
Sustainable environment	The majority of the course content deals with sustainable development..		
Module	0010 Written examination	7.5 cr	Grade: AF