UNIVERSITY OF BORÅS

Thermal Energy Recovery
Termisk energiåtervinning
5 credits

Ladok Code: 42RT05
Version: 5.0
Established by: Committee for Education in Technology 2019-03-08
Valid from: Spring 2019

Education Cycle: Second cycle
Main Field of Study (Progressive Specialisation): Resource Recovery (A1F)
Disciplinary Domain: Technology
Prerequisites: Degree of Bachelor of Science or Bachelor of Science in Engineering with major in Mechanical Engineering, Industrial Business Economics, Energy Technology, Chemical Engineering, Biotechnology, Civil Engineering, Textile Engineering or Structural Engineering
or
Bachelor's degree in physics or chemistry.
Knowledge of thermodynamics
Proficiency in English equivalent to :
IELTS (academic training), 6.5 (with no part of the test below 5.5)
or
TOEFL (Internet based): 90 (with a minimum of 20 on the written part)
or
TOEFL (paper based): 575 (with a minimum of 4.5 on the written part)
For further information about English language proficiency requirements, please view: www.hb.se/Englishlanguageproficiency
Subject Area: Energy Technology
Grading Scale: Seven-degree grading scale (A-F)

Content

Combustion
• Fluidised bed
• Grate boilers
• Gasification
• Energy recovery technologies
• Effects of inorganic material in the fuel
• Fuel and ash handling
• Corrosion
• Agglomeration
• Laboratory experiments on a full scale combustion plant
• Study visits to a combustion plant
Materials science
• Basics of metallic materials
• The phenomenon of oxidation
• High-temperature corrosion
• Erosion corrosion

Learning Outcomes

After completing the course, students must be able to:
1. Knowledge and understanding
1.1 Describe the most common technologies for the combustion of solid, liquid and gaseous fuels,
1.2 Describe how gasification works and what the most common technologies are,
1.3 Describe the most common gasification reactions and their temperature and pressure dependencies,

1.4 Explain why phenomena such as corrosion and agglomeration occur,
1.5 Describe the basics of oxide formation on metal components in combustion plants,
1.6 Explain different types of high-temperature corrosion – why they occur and how they can be inhibited,
2. Skills and abilities
2.1 Apply theories to determine reaction kinetics during pyrolysis based on experimental data,
2.2 Identify the important parts of different energy-technology processes and explain how they work,
2.3 Compile and summarise information about energy-technology processes,
2.4 Apply basic heat and mass balances along with process data in order to calculate the flows in a combustion plant,
3. Judgement and approach
3.1 Assess and evaluate the function of an energy-technology process and determine when the process has its greatest potential in relation to today's actual or presumed area of application.

Forms of Teaching

Lectures, laboratory experiments, study visits and project work requiring oral and written accounts.

The language of instruction is English.

Forms of Examination

The grade on the written examination determines the final course grade.

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

Literature and Other Teaching Materials

Self-produced materials, digital resources and lab guides.

Student Influence and Evaluation

The Head of Academy and course coordinator are responsible for ensuring that students are invited systematically and regularly to put forward their views on the course. The results of the evaluations will be reported back to the students and will form the basis for the future structure of the course.

Miscellaneous