UNIVERSITY OF BORÅS

Thermal Energy Recovery
Termisk energiåtervinning

5 credits
5 högskolepoäng

Ladok Code: 42RT05
Version: 2.0
Established by: Education Committee 2014-11-21
Valid from: Spring 2015

Education Cycle: Second cycle
Main Field of Study (Progressive Specialisation): Resource Recovery (A1F)
Disciplinary Domain: Technology
Prerequisites: Meet the requirements for admission to the Masters programme in Resource Recovery.
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 course will be examined through the following examination elements:

Exam
Learning outcomes:
Credits: 2.5
Gradingscale: Seven-degree grading scale (A-F)

Projektwork
Learning outcomes:
Credits: 1.5
Gradingscale: Fail (U) or Pass (G)

Study visit
Learning outcomes:
Credits: 0.5
Gradingscale: Fail (U) or Pass (G)

Laboratory
Learning outcomes:
Credits: 0.5
Gradingscale: Fail (U) or Pass (G)

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