COURSE SYLLABUS

Brottmekanik
Fracture Mechanics
7,5 ECTS credit points (7,5 högskolepoäng)

Course code: MT2522
Educational level: Advanced level
Course level: A1N
Field of education: Technology
Subject group: Mechanical Engineering

1 Course title and credit points
The course is titled Fracture Mechanics/Brottmekanik and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval
This course is established by Department of Mechanical Engineering 2013-05-29. The course syllabus was revised by School of Engineering and applies from 2013-07-01.
Replaces MT2409.

3 Objectives
The purpose of this course is for the student to acquire basic skills, to work professionally as an engineer. This means applying fracture mechanics theory and to calculate stress areas and the "energy release rate" around crack tips and crack growth due to fatigue.

4 Content
The course covers the following themes:
1 Introduction - Breakage Mechanism
   - Theory
   - Examples
2 Stress intensity factors and fracture criteria
   - Three Modus
   - stress intensity factor
   - Fracture toughness
3 Plastic zones at the crack tip
   - "The Irwin approach '
   - "The Dugdale model"
4 Energy Conditions
   - Energy balance
   - Breakage Energy
   - Energy release G
   - Stable and unstable crack growth
5 Calculation of stress intensity factors KI

5 Aims and learning outcomes
After the course the student will be able to:
• understand the mechanical behavior of materials,
• analyze and assess the strength / service life of constructions that contain material defects,
• clarify the material properties required in different situations,
• design constructions considering fracture mechanical assessments,
• Plan and prioritize non-destructive testing by means of fracture mechanics.

6 Generic skills
The following generic skills are trained in the course:
Ability to identify and formulate problems, Critical thinking, analytical thinking, Supporting communication and engineering skills.

7 Learning and teaching
The course can be studied individually or in groups. All course participants are expected to take an active role in scheduled teachings and practices. Lectures will introduce the theory and examples around problem solving in different design contexts. Independently conducted exercises and problem solving provides an opportunity for application of the theory. Article search provides an overview of relevant publications and resources, and enables critical assessment of information within the own professional field. An online course platform is used where students can gather information, submit assignments, and keep a logbook. The language of the course is English.
8 Assessment and grading

Examination of the course

<table>
<thead>
<tr>
<th>Code</th>
<th>Module</th>
<th>Credit</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1310</td>
<td>Presentation and assignments</td>
<td>4.5 ECTS</td>
<td>A-F</td>
</tr>
<tr>
<td>1320</td>
<td>Report</td>
<td>3 ECTS</td>
<td>G-U</td>
</tr>
</tbody>
</table>

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Insufficient, supplementation required, F Fail. If grade FX or UX are given, the student may after consultation with the course coordinator / examiner get an opportunity to within six weeks complement to grade E for the specific course element.

9 Course evaluation

The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feedback into the development of the course.

10 Prerequisites

Students who have completed MT1212 (Solid Mechanics & FEM depth) and MT1213 (Design Methodology) are eligible for admission to the course.

11 Field of education and subject area

The course is part of the field of education and is included in the subject area Mechanical Engineering.

12 Restrictions regarding degree

The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material

+ scientific articles.