JÖNKÖPING UNIVERSITY
School of Engineering

2017/5000-41

COURSE SYLLABUS – THIRD-CYCLE EDUCATION

Corrosion and surface protection, 7.5 higher education credits

Korrosion och ytskydd, 7.5 högskolepoäng

Education cycle:	Third-cycle education
Disciplinary domain:	Industrial Product Realisation
Subject area:	Materials and Manufacturing
Syllabus valid from:	Course syllabus reviewed by FUR, established 2017-12-04 by the dean (vd-beslut 2017/129)

Learning outcome

On completion of the course, the doctoral student must:

Knowledge and understanding
- be familiar with different corrosion types on metals and alloys in air, water solutions and at high temperatures (> 100°C)
- display comprehension of mechanisms of corrosion and degradation of metals and the influence of various environmental parameters on these processes
- demonstrate broad knowledge of industry relevant surface treatment methods for metals and alloys and corrosion protection strategies.
- demonstrate comprehension of electrochemical reactions governing corrosion of metals and alloys and make simple calculations and estimations on corrosion rates in solution.

Skills and abilities
- demonstrate skills in corrosion testing techniques
- demonstrate ability to explain why corrosion takes place using knowledge of the surrounding environment and the properties of the metallic materials.
- demonstrate ability to apply knowledge on materials and environmental conditions for problem solving and failure analyses related to corrosion

Judgement and approach
- demonstrating ability to predict corrosion behaviour of materials and corrosion protection of surface treatments
-demonstrate ability to suggest suitable corrosion prevention strategies

Content

Corrosion is a truly interdisciplinary science and the aim of the course is to discuss the underlying mechanism of the most important forms of metal corrosion. Mechanistic, as well as applied aspects will be

dealt with. The course presents existing protection strategies for prevention of corrosion in different contexts.

The course includes the following parts:

- Basics of electrochemistry and corrosion principles
- Passivity and atmospheric corrosion
- Forms of corrosion
- High temperature oxidation
- Testing and electrochemical techniques
- Main protection strategies

Type of instruction

Lectures, tutorials (and literature), and assignments. Teaching is conducted in English.

Prerequisites

Admitted to third-cycle programme or equivalent.

Examination and grades

The course will be graded Pass (G) or Fail (U).

The examination format is an oral discussion of the home assignments also based on the course content presented during the lectures.

Examination format	Extent	Scale
Oral discussion	4,5 hec	F/P
Home assignments	3 hec	F/P

Course literature

Selected chapters in "Corrosion Mechanisms in Theory and Practice", Ed. P. Marcus, CRC Press, Taylor & Francis Group, Boca Raton FL (latest edition)

Handouts such as journal articles and own literature search.