



JÖNKÖPING UNIVERSITY  
*School of Engineering*

# Course-PM

Corrosion and surface protection – 2024

Credits: 7,5 hec

Course duration : **week 17 – week 23**

## Introduction

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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

Course coordinator and examiner:

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## Course literature:

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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.

## Schedule and lectures plan:

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week	date	topic	time
	23 april	basic electrochemistry and corrosion principles 1	9.00-12
	24 april	basic electrochemistry and corrosion principles 2	9.00-12
	29 april	atmospheric corrosion - forms of corrosion - high temperature oxidation	9.00-12
online	7 may	testing and electrochemical techniques	13.30 - 16.30
online	13 may	main protection strategies	13.30 - 16.30
	31 may at 13	Practical session in the lab	13.30 - 16.30
	3 June at 13,30	Practical session in the lab	13.30 - 16.30
tentative	x june	Examination Students seminar and discussion	

## Intended Learning Outcomes (ILO)

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On completion of the course, the doctoral student must:

### *Knowledge and understanding*

1. be familiar with different corrosion types on metals and alloys in air, water solutions and at high temperatures
2. display comprehension of mechanisms of corrosion and degradation of metals and the influence of various environmental parameters on these processes
3. demonstrate broad knowledge of industry relevant surface treatment methods for metals and alloys and corrosion protection strategies.
4. 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*

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

### *Judgement and approach*

8. demonstrating ability to predict corrosion behaviour of materials and corrosion protection of surface treatments
9. demonstrate ability to suggest suitable corrosion prevention strategies

## Examination

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The examination will be made of 2 parts:

- A report of the lab practical testing session, with data analysis and discussion
- A presentation and final discussion of a corrosion problem. Each student will be assigned a problem, closed to their field of research to deepen and study based on available literature

## Grading

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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
Lab report	3 hec	F/P

## Forms of Feedback

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### Continuous feedback

Course participants are expected to be active during the lectures, participate to the lab sessions. All the activities will be an opportunity to receive feedback and consist of a formative assessment.

### Course Evaluation

As the last activity of the course, a course evaluation will take place, which will give as well feedback to the teachers as well as making the participants reflect on the course evaluation process itself. The course evaluation is an important tool to keep develop and improve the course quality, all student are warmly invited to fill the survey distributed

### Last Year's Course Evaluation

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Feedback from 2018 and 2020 and 2022 course were very positive. Adjustment to the course are made to have the course as hybrid activity.