COURSE SYLLABUS

Surface Technology, 7.5 credits

Ytteknik, 7,5 högskolepoäng

Course Code:	TYTS22	**Education Cycle:**	Second-cycle level
Confirmed by:	Dean Mar 1, 2021	**Disciplinary domain:**	Technology
Revised by:	Director of Education Feb 24, 2022	**Subject group:**	MA2
Valid From:	Jan 1, 2023	**Specialised in:**	A1F
Version:	2	**Main field of study:**	Product Development

Intended Learning Outcomes (ILO)

After a successful course, the student shall;

Knowledge and understanding
- show familiarity with the mechanisms behind corrosion and wear in relation to different application environments.
- display knowledge of surface treatments, process parameters, as well as the relationship among material properties, process parameters and final performances
- show familiarity with cleaner production and environment protection measures and industrial safety aspects related to surface treatment industry.

Skills and abilities
- demonstrate the ability to independently perform written calculations regarding process parameters and coating properties.
- demonstrate the ability to identify and combine appropriate analysis methods for characterization of functional surface coatings, within the given timeframes, both in research and product development environments.
- demonstrate the ability to compare different coating technologies from various perspectives identifying potential and limitation.

Judgement and approach
- demonstrate the ability to a identify the industrial needs and set the requirements for a surface treatment for a specific application
- demonstrate the ability to independently motivate the choice of surface treatment processes and process parameters, based on product requirements, and taking into account functional, environmental, safety and cost efficiency criteria.

Contents

The surfaces must meet the product requirements for both functionality and durability. Based on the understanding of the mechanisms behind the challenges, the surface treatment and coating techniques studied in this course constitute the tool case to achieve tailored surface properties of

products for manifold applications.

The course includes the following elements:
• Surface degradation, corrosion, wear
• Fundamentals of chemistry and electrochemistry
• Pre-treatment
• Electroplating
• Thermal spray, laser-cladding, build-up welding
• Hot-dip coatings
• Enamel
• Organic coatings
• PVD, CVD
• Conversion coatings
• Thermal/mechanical/chemical surface treatment
• Regulations, safety, and sustainability in surface-related processing

Type of instruction

Lectures, labs, project work.

The teaching is conducted in English.

Prerequisites

Passed courses at least 90 credits within the major subject Mechanical Engineering, 15 credits Mathematics, and completed course in Thermodynamics, 7,5 credits, proof of English proficiency is required (or the equivalent).

Examination and grades

The course is graded 5,4,3 or Fail.

The final grade for the course is based upon a balanced set of assessments.
The final grade will only be issued after satisfactory completion of all assesments.

Registration of examination:

Name of the Test	Value	Grading
Examination	4 credits	5/4/3/U
Laboratory work and assignments	3.5 credits	5/4/3/U

Course literature

The literature list for the course will be provided 8 weeks before the course starts.

Title: Advanced Surface Technology vol 1 and 2
Author: Per Møller & Lars Pleth Nielsen
Publisher: M&N, Denmark, 2012
ISBN: 9788792765246 and 9788792765253
Supplementary reading

Hand-outs, Journal papers indicated during the course