COURSE SYLLABUS
Manufacturing Process Simulations, 7.5 credits

Simulering av tillverkningsprocesser, 7,5 högskolepoäng

Course Code:	TTPS22	**Education Cycle:**	Second-cycle level
Confirmed by:	Dean Mar 1, 2022	**Disciplinary domain:**	Technology
Valid From:	Aug 1, 2022	**Subject group:**	MT1
Version:	1	**Specialised in:**	A1F
		Main field of study:	Product Development

Intended Learning Outcomes (ILO)

After a successful course, the student shall:

Knowledge and understanding
• show familiarity with different manufacturing process simulation software and numerical approaches to simulate manufacturing processes
• display knowledge of the application of manufacturing process simulations in the product realization process for efficient and sustainable manufacturing
• demonstrate comprehension of the connection between the manufacturing process and the requirements of the product design and geometry

Skills and abilities
• demonstrate skills of using manufacturing process simulations in an integrated product optimization and product realization process perspective
• demonstrate the ability to perform manufacturing process simulations for products of different material types

Judgement and approach
• demonstrate the ability to critically evaluate and interpret the results of process simulations in order to improve and optimize the manufacturability of the product
• demonstrate an understanding of the strengths and drawbacks with different numerical techniques and approaches found in manufacturing process

Contents

The course is designed to familiarize the student with approaches to simulate, model and optimize for improved manufacturing. Important aspects are the material properties of the manufactured component.

The course includes the following elements:
• Simulation of manufacturing processes.
• Optimization of geometry and process parameters for high quality manufacturing and

minimization of defects.
• Modelling and simulation of microstructure formation.
• Modelling and simulation for the prediction of mechanical properties.
• Modelling and simulation of multiphysics problem including temperature phase change, convection and electrical fields.

Examples are taken from industrial manufacturing process, for instance metal casting, polymer injection moulding and plating operations.

Type of instruction

Lectures, computer assignments, project work.

The teaching is conducted in English.

Prerequisites

Passed courses at least 90 credits within the major subject Mechanical Engineering, 15 credits Mathematics included multivariable calculus and completed courses in Applications of Computational Fluid Dynamics and Heat Transfer, 7,5 credits, FEA and Optimization Driven Design, 7,5 credits and Microstructural Engineering, 7,5 credits, proof of English proficiency is required (or the equivalent).

Examination and grades

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

Registration of examination:

Name of the Test	Value	Grading
Examination[I]	3.5 credits	5/4/3/U
Computer assignments	4 credits	U/G

[I] Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

The literature list for the course will be provided one month before the course starts.