KURSPLAN
# Simulering av tillverkningsprocesser, 7,5 högskolepoäng

*Manufacturing Process Simulations, 7.5 credits*

| | | | |
|---|---|---|---|
| **Kurskod:** | TTPS22 | **Utbildningsnivå:** | Avancerad nivå |
| **Fastställd av:** | VD 2022-03-01 | **Utbildningsområde:** | Tekniska området |
| **Gäller fr.o.m.:** | 2022-08-01 | **Ämnesgrupp:** | MT1 |
| **Version:** | 1 | **Fördjupning:** | A1F |
| | | **Huvudområde:** | Produktutveckling |

## Lärandemål

After a successful course, the student shall:

Kunskap och förståelse
• 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

Färdighet och förmåga
• 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

Värderingsförmåga och förhållningssätt
• 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

## Innehåll

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.

## Undervisningsformer

Lectures, computer assignments, project work.

Undervisningen bedrivs på engelska.

## Förkunskapskrav

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 och betyg

Kursen bedöms med betygen 5, 4, 3 eller Underkänd.

Poängregistrering av examinationen för kursen sker enligt följande system:

| Examinationsmoment | Omfattning | Betyg |
|---|---|---|
| Examination[1] | 3,5 hp | 5/4/3/U |
| Inlämningsuppgifter via dator | 4 hp | U/G |

[1] Bestämmer kursens slutbetyg vilket utfärdas först när samtliga moment godkänts.

## Kurslitteratur

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