



## COURSE SYLLABUS

# Cast Design and Calculation, 3 credits

*Gjutdesign och kalkylering, 3 högskolepoäng*

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<b>Course Code:</b> TGKS26	<b>Education Cycle:</b> Second-cycle level
<b>Confirmed by:</b> Dean Mar 1, 2016	<b>Disciplinary domain:</b> Technology (95%) and social sciences (5%)
<b>Revised by:</b> Director of Education Oct 28, 2021	<b>Subject group:</b> MA2
<b>Valid From:</b> Jan 1, 2022	<b>Specialised in:</b> A1F
<b>Version:</b> 2	<b>Main field of study:</b> Product Development

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### Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- demonstrate comprehension of factors that control the economic and environmental cost of castings
- display knowledge of how a casting should be designed to enable cost and material efficient manufacturing
- show familiarity with advanced product development methods as Finite Element Analyses and Topology optimization

Skills and abilities

- demonstrate the ability to apply basic and advanced methods for design and manufacturing of castings with a low economic and environmental cost

Judgement and approach

- demonstrate an understanding of important factors that affects the economic cost and the environmental impact of a casting and a foundry

### Contents

The course aims to provide knowledge about how to design castings and casting processes in order to provide optimal functionality at a low economical cost and environmental impact. The students will learn about drivers for economic cost and environmental impact in a casting and in a foundry. Design and product development methods are introduced, both basic methods and advanced computer based simulation methods as Finite Element Analyses and Topology Optimization.

The course includes the following topics:

- Drivers of economic and environmental cost in a casting and in a foundry
- Basic design rules and casting process simulations
- Product development and simulation methods

- Advanced product development and structural optimization methods

### **Type of instruction**

The teachings consists of lectures and assignments.

The teaching is conducted in English.

### **Prerequisites**

Passed courses at least 90 credits within the major subject in Mechanical Engineering, and 21 credits Mathematics and Component Casting, 6 credits, Manufacturing Technology, 9 credits, and Failure Analysis, 6 credits, and English Language requirements corresponding to English 6 or English B in the Swedish upper secondary school (or the equivalent).

### **Examination and grades**

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

The final grade will only be issued after satisfactory completion of all assessments.

Registration of examination:

Name of the Test	Value	Grading
Examination	3 credits	5/4/3/U

### **Course literature**

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

*Recommended literature:*

“Design of Experiments: Principles and Applications” by L. Eriksson.