



COURSE SYLLABUS **Component Casting, 6 credits**

Komponentgjutning, 6 högskolepoäng

Course Code: TGJK17	Education Cycle: First-cycle level
Confirmed by: Dean Feb 1, 2017	Disciplinary domain: Technology (95%) and social sciences (5%)
Valid From: Autumn 2017	Subject group: MT1
Version: 1	Specialised in: G1F
Reg number: JTH 2017/564-313	Main field of study: Product Development

Intended Learning Outcomes (ILO)

On completion of the course, the student should

Knowledge and understanding

- Have knowledge of and be able to explain how different casting processes and equipment work
- Have a detailed knowledge of the molded material microstructure
- Have a good understanding of shape and form materials
- Have a basic understanding of design and defects in casting

Skills and abilities

- Be able to explain and analyze how different the cast components are manufactured and how material properties depend on manufacturing process
- Be able to formulate heat balances for molds and setting materials
- Be able to calculate the mold filling
- Apply heat balances for mathematical relationship between heat flow and microstructure

Judgement and approach

- Be able to compare and select the appropriate alloy / materials, proper design / design and casting process to get the right properties
- Be able to evaluate different solutions through process simulation

Contents

The course aims to give the student basic knowledge and deepening of component production of the casting of metallic materials, including design, material properties and manufacturing processes. In each step, a scientific approach to technology both in terms of systematic approaches and mathematical language to be able to analyze and evaluate process solutions and the problems that are associated.

The course includes the following topics:

- Manufacturing of components by casting.
- Applications of heat transfer, including conduction, convection, radiation to calculate the solidification and feeding.

- Applications of fluid flow, Bernoulli's equation, the continuity equation, lamellar and turbulent flow
- Cast materials, solidification and microstructure and properties. Phase diagrams. The relation casting process, microstructure and properties of cast alloys. Shrinkage and gas porosity.
- Design for casting and cast materials
- Introduction to computer simulation of the casting process. The integration of CAD / CAM

Type of instruction

Lectures, labs and assignments. Teaching can be done both on campus as well as distance learning.

The teaching is conducted in English.

Prerequisites

General entry requirements and completed courses Engineering Material, 6 credits and Manufacturing Technology, 9 credits (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 ¹	3 credits	5/4/3/U
Laboratory work and Assignments	3 credits	U/G

¹ Determines the final grade of the course, which is issued only when all course units have been passed.

Course literature

Literature

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

Component Casting with Simulation, School of Engineering, Jönköping och Webbased material.

Complementary texts: J., Campbell, "Complete Casting Handbook", D. M. Stefanescu, "Science and Engineering of Casting Solidification", H. Fredriksson & U., Åkerlind, "Materials Processing During Casting