



COURSE SYLLABUS

Component Casting with Simulation, 7.5 credits

Komponentgjutning med simulering, 7,5 högskolepoäng

Course Code:	TKSB17	Education Cycle:	First-cycle level
Confirmed by:	Dean Jun 27, 2007	Disciplinary domain:	Technology (95%) and social sciences (5%)
Valid From:	Aug 1, 2010	Subject group:	MT1
Version:	1	Specialised in:	GIF
		Main field of study:	Mechanical Engineering

Intended Learning Outcomes (ILO)

On completion of the course, the student should:

- understand the specialty of casting processes and development of properties to be able to make optimal selection of alloy, design and casting process for advanced components
- able to investigate a metallic material in different perspective and able to discuss with a material expert, different ways of development and alloy selection.

Contents

The aim of the course is to give the students knowledge about metallic materials microstructure and its relation to mechanical properties, with focus on cast and heat treated materials. The perspective is to optimize the material and design in engineering applications. Introduction to advanced software and microscopy to explore material characteristics.

The course includes the following topics:

- Overview of casting materials and processes
- Application of fundamental sciences to processing, microstructure evolution, and properties of iron-base-, aluminium- and magnesium-alloys.
- Physic-chemistry of liquid metal as applied to melting, refining and nucleation; solidification science and thermodynamics
- Theoretical analysis and analytical relations for heat capacity, thermal expansion, thermal conduction in solids and liquids etc.
- Microstructure - properties correlation
- Investigation of materials, material preparation and analyzing methods including Scanning Electron Microscopy (SEM)

Type of instruction

Lectures/exercises and hands-on software training. Assignments and projects. Self study and information search can be included.

The teaching is conducted in English.

Prerequisites

General entry requirements and completed courses in Engineering materials 7,5 credits and Manufacturing Technology 7,5 credits (or the equivalent).

Examination and grades

The course is graded Fail (U), 3, 4 or 5.

Registration of examination:

Name of the Test	Value	Grading
Examination ¹	4.5 credits	U/3/4/5
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

Book: Component casting and simulation och laborationshandledningar, JTH