MH2252 Casting Processing 6.0 credits

Gjutningens processteknologi

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for MH2252 valid from Autumn 2007

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Materials Science, Materials Science and Engineering

Specific prerequisites

4H1065 Fundamentals of Materials Science and Engineering, 8 p
4H1951 Thermodynamics of Materials, 6 p; 4H1954 Transport Phenomena, 6 p or equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

To give knowledge of

- Problems in casting of metallic material in iron and steel mills
- How to minimise casting defects and maximise yield.
- A survey of casting processes: ingot casting, continous casting and direct casting in steel and metals industry.

Course contents

After completing the course the student will have knowledge of:

- Solidification processes (thermal conductivity).
- Structure formation.
- Influence of shrinkage on solidification processes as pipe formation in ingots.
- Formation of macro- and micro segregation.
- Precipitation of secondary phases during solidification.
- Structural changes at heating, forming and homogenisation.
- Metallic melts properties related to casting properties.
- Solubility of gases in melts and precipitation of gas during solidification.
- Forced and natural convection at casting and solidification.
- Surface tension gas/liquid and its importance in casting processes.
- Nucleation and inoculation in melts.
- Analytical and numerical modelling of solidification and casting processes.
- Thermal stresses and crack formation at casting of metals.
- Process control and optimization of casting processes.

Course literature

H. Fredriksson, U. Åkerlind, Materials Processing during Casting

Examination

- ÖVN1 - Assignment, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 3.8 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 0.7 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Written examination (TEN1; 2.5 p), Computer assignment (ÖVN1; 1 p)
Lab work and study visit (LAB1; 0.5 p)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.