



COURSE SYLLABUS

Melting and Casting of Ferrous Alloys, 3 credits

Smältning och gjutning av järnlegeringar, 3 högskolepoäng

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|---------------------------------------|---|
| Course Code: TSGR26 | Education Cycle: Second-cycle level |
| Confirmed by: Dean Mar 1, 2016 | Disciplinary domain: Technology (95%) and social sciences (5%) |
| Valid From: Aug 1, 2016 | Subject group: MA2 |
| Version: 1 | Specialised in: A1N |
| Reg number: JTH 2016/1126-313 | Main field of study: Product Development |

Intended Learning Outcomes (ILO)

After a successful course, the student shall

Knowledge and understanding

- show familiarity with different methods of melting and casting steel and cast iron
- display knowledge of how to prepare a charge material for casting

Skills and abilities

- demonstrate skills of understanding the data from a cooling curve
- demonstrate the ability to perform quality control of cast iron

Judgement and approach

- demonstrate an understanding of how to add alloying at the preparation of a cast iron alloy.

Contents

The course is designed to familiarize students with theoretical/practical contexts for the manufacture of iron and steel castings, the important characteristics of iron-based alloy casting. The students will get familiar with different methods of melting and casting steel and cast iron. The course is also focusing on the quality control methods.

The course includes the following elements:

- Fundamentals of Ferrous Metallurgy.
- Melting technology of Cast Iron.
(Melting furnaces, melting methods, charge optimization,)
- Liquid treatment and Ladle metallurgy.
(Alloying, desulfurization, inoculation, modification.)
- Quality control of the liquid iron
(Chemical analyses, dissolved gas analyses, test of fluidity, cooling curve and volume change analyses).
- Quality control by characterization of cast iron.
(Wedge tests, characterization of cast iron by morphology)
- Elaboration of steel for shape casting

(Melting, charge, de-oxidation and other treatments, control methods)

Type of instruction

Lectures and assignments are given entirely online. There is intended one seminar that it will be in JU-Cast foundry planet.

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, 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 for the course is based upon a balanced set of assessments. 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 |

Other information

Exemption from entry requirement allowed under the program selection group where the course is included.

Course literature

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