



COURSE SYLLABUS

Liquid Metal Processing – Ferrous Alloys, 3 credits

Smält metalls processteknik - Järnlegeringar, 3 högskolepoäng

Course Code: TJLS22	Education Cycle: Second-cycle level
Confirmed by: Dean Mar 1, 2022	Disciplinary domain: Technology
Valid From: Aug 1, 2022	Subject group: MA2
Version: 1	Specialised in: A1N
	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
- show familiarity with the industrial practice for the treatments of the ferrous alloys melts
- display knowledge of how to prepare a charge material for casting

Skills and abilities

- demonstrate skills of understanding the data from a cooling curve

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

The course lectures, assignments, laboration and meetings are given entirely online.

The teaching is conducted in English.

Prerequisites

Passed courses at least 90 credits within the major subject in Mechanical Engineering, and 15 credits Mathematics and Component Casting, 6 credits, proof of English proficiency is required (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

Course literature

Literature

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