COURSE SYLLABUS

Liquid Metal Processing - Aluminum Alloys, 3 credits

Smält metalls processteknik - Aluminiumlegeringar, 3 högskolepoäng

Course Code:	TALS22	**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:**	A1F
		Main field of study:	Product Development

Intended Learning Outcomes (ILO)

After a successful course, the student shall:

Knowledge and understanding

• display knowledge of the common impurities and tramp elements in aluminium and their removal

• demonstrate comprehension of the industrial practice for the treatments of aluminium alloy melts

Skills and abilities

• demonstrate the ability of selecting a suitable treatment process for a specific aluminium alloy and casting process through the use of thermodynamics and kinetics for the intended reactions and process steps

Judgement and approach

• demonstrate the ability to predict the required additional amounts and treatment times for the intended and judging if the process outcome had the intended effect

Contents

The critical content is related to the aluminium alloy preparation including, light metal scrap recycling technologies, melt refining and impurity control to enable sustainable management of circular materials. The practices for microstructural engineering such as grain refinement and microstructural modification.

The course includes following elements:
1. The effect of dissolved impurities and inclusions on the mechanical properties of metal products ;
2. Thermodynamics and transport properties ;
3. Properties of various metals, impurity content, and refining ;
4. Removal of dissolved impurity elements from molten metals ;
5. Removal of inclusions ;

6. Addition of alloy components ;
7. Solidification and refining ;
8. Refining and recycling metallurgy in the future;
9. Industrial practice for aluminium alloys;

Type of instruction

Lectures, assignments and discussion forum.

The teaching is conducted in English.

Prerequisites

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

Examination and grades

The course is graded 5,4,3 or Fail.

Registration of examination:

Name of the Test	Value	Grading
Assignments	0.5 credits	U/G
Quizzes	0.5 credits	U/G
Examination[I]	2 credits	5/4/3/U

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

Course literature

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

Torvald Abel Engh, Principles of Liquid Metal Refining ISBN: 019856337X, ISBN: 9780198563372

Handouts on industrial practice