

Goals

The overall aims of the course are:

- To develop students' knowledge of current methods to produce steels and base metals from natural ores and recycled materials with focus on steel, which are most relevant for the Swedish steel industry. However, the production of aluminum and silicon is also discussed to exemplify the production other metal as well as other production concepts.
- To develop students' individual skills at performing relevant thermodynamic calculations for the extraction of base metals with focus on steel.
- To develop students' individual skills at interpreting the significance of the results of these calculations.

Teachers: Pär Jönsson, parj@kth.se
Andrey Karasev, karasev@kth.se
Jesse Franklin White, jfwhite@kth.se

Assistants: Josefin Mvele Svensson, jossven@kth.se

Course requirements: Exam (TEN1), 4 p.
Home assignment (ÖVN1: 2p) – Thermodynamic calculations

Literature: Chapters on thermodynamic and ironmaking, steelmaking, ladle refining, production of aluminum and silicon are available on the canvas system.

Period: 1

Exam: October 24, 8.00-13.00, Written exam

Re-Exam: December 22, 8.00-13.00, Written exam

Student office, ITM
Brinellvägen 68
100 44 Stockholm
Phone: 08-7908200
e-mail: expnord@itm.kth.se

Lecture and exercise schedule

31/8	10.15-12.00	M121 (Blå)	Course introduction. L1. Extractive metallurgy	– Andrey Karasev
31/8	13.15-15.00	Digital	L2. Basic thermodynamic. Enthalpy, Entropy, Gibbs Energy	– Jesse White
01/9	08.15-10.00	M121 (Blå)	L3. Blast furnace metallurgy	– Andrey Karasev
07/9	13.15-15.00	Digital	L4. Basic thermodynamic. Chemical Reaction, Equilibria	– Jesse White
08/9	08.15-10.00	Digital	L5. Basic thermodynamic. Phase Equilibria	– Jesse White
09/9	10.15-12.00	Digital	E1. Recitation, exercises	– Jesse White
12/9	10.15-12.00	M121 (Blå)	L6. Refining of hot iron. Converter metallurgy.	– Andrey Karasev
13/9	13.15-15.00	Digital	E2. Recitation, exercises	– Jesse White
16/9	10.15-12.00	Digital	E3. Recitation, exercises	– Josefin Svensson
19/9	10.15-12.00	M121 (Blå)	L7. Electric arc furnace metallurgy. Direct reduction of iron.	– Andrey Karasev
23/9	10.15-12.00	M38	L8. Ladle metallurgy	– Andrey Karasev
28/9	13.15-15.00	Rinman	L9. Casting and Inclusions	– Andrey Karasev
30/9	10.15-12.00	M121 (Blå)	E4. Recitation, exercises	– Josefin Svensson
05/10	13.00-15.00	M121 (Blå)	E5. Recitation, exercises	– Josefin Svensson
07.10	10.15-12.00	M121 (Blå)	L10. Production of copper	- Pär Jönsson
10.10	10.15-12.00	M121 (Blå)	E6. Recitation, exercises	– Josefin Svensson
13/10	08.15-10.00	M121 (Blå)	L11. Production of aluminum Summary. Example of exam	- Pär Jönsson – Andrey Karasev
24/10	08.00-13.00	M121 (Blå)	Written exam	– Andrey Karasev
22.12	08.00-13.00	M121 (Blå)	Re-examination	– Andrey Karasev