

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 copper 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.

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Jesse Franklin White, jfwhite@kth.se

Assistants:

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 23, 8.00-13.00, Written exam

Re-Exam: December 21, 8.00-13.00, Written exam

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Lecture and exercise schedule

28/8	10.15-12.00	M121 (Blå)	Course introduction. L1. Extractive metallurgy	– Andrey Karasev
30/8	13.15-15.00	Digital	L2. Basic thermodynamic. Enthalpy, Entropy, Gibbs Energy	– Jesse White
01/9	10.15-12.00	M121 (Blå)	L3. Blast furnace metallurgy	– Andrey Karasev
04/9	10.15-12.00	Digital	L4. Basic thermodynamic. Chemical Reaction, Equilibria	– Jesse White
06/9	13.15-15.00	Digital	L5. Basic thermodynamic. Phase Equilibria	– Jesse White
08/9	10.15-12.00	Digital	E1. Recitation, exercises	– Jesse White
11/9	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
15/9	10.15-12.00	M121 (Blå)	E3. Recitation, exercises	– Andrey Karasev
20/9	13.15-15.00	M121 (Blå)	L7. Electric arc furnace metallurgy. Direct reduction of iron.	– Andrey Karasev
22/9	13.15-15.00	M121 (Blå)	L8. Ladle metallurgy	– Andrey Karasev
27/9	13.15-15.00	M121 (Blå)	L9. Casting and Inclusions	– Andrey Karasev
29/9	10.15-12.00	M121 (Blå)	E4. Recitation, exercises	– Andrey Karasev
02/10	10.15-12.00	M121 (Blå)	E5. Recitation, exercises	– Andrey Karasev
04/10	13.15-15.00	M121 (Blå)	L10. Production of copper	- Pär Jönsson
11/10	13.15-15.00	M121 (Blå)	L11. Production of aluminum	- Pär Jönsson
13/10	10.15-12.00	M121 (Blå)	E6. Recitation, exercises Summary. Example of exam	– Andrey Karasev
23/10	08.00-13.00	M121 (Blå)	Written exam	– Andrey Karasev Pär Jönsson
21.12	08.00-13.00	M121 (Blå)	Re-examination	– Andrey Karasev Pär Jönsson