

SYLLABUS

High Temperature Materials

7.5 credits P7006K

Högtemperaturmaterial

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2023-06-02

High Temperature Materials 7.5 credits P7006K

Högtemperaturmaterial

Second cycle, P7006K

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Processmetallurgi	Chemical Engineering

Main field of study

Chemical Engineering

Entry requirements

90 credits in Chemical Engineering. Good knowledge in English, equivalent to English B/6.

Selection

The selection is based on 30-285 credits

Course Aim

After completing the course, the student should be able to:

Knowledge and understanding

- 1 describe the thermodynamics, crystallography and kinetics of melts and high temperature materials.
- 2 explain the meaning of the term sintering.
- 3 describe the manufacturing methods of ceramics, their microstructure, technical applications and physical and mechanical properties.

Competence and skills

- 4 independently analyze and construct phase diagrams.
- 5 use thermodynamic calculation programs and models and predict thermodynamic events
- 6 use different types of material characterization equipment and analyze experimental data from these.
- 7 Demonstrate the ability to formulate and solve problems within set time frames.
- 8 Demonstrate the ability to orally and in writing evaluate, compile and present results from experimental experiments.
- 9 Identify, formulate and treat complex engineering questions

Judgement and approach

- 10 Assess, evaluate and compare different types of experimental data and theoretical information.

Contents

The course consists of thermodynamics, crystallography, phase analysis and kinetics. Basic thermodynamics as well as the crystal structures of metals and oxides, amorphous structures, defects, diffusion processes and basic reaction kinetics. In addition, phase transformations, grain growth and solid phase reactions are treated. The concepts of sintering and methods for manufacturing high-temperature materials are also covered in the course. The course contains thermodynamic computer simulations and a shorter material characterization project.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course has both theoretical and practical elements consisting of lectures, exercises, computer labs, material characterization, metallurgical laboratory work and written and oral reporting.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. Goals/ILOs are assessed through written exam, oral and written project presentation and written laboratory report/assignment

Exam asses ILOs 1-4,6,7,9

Project work+ laboratory work asses ILOs 4-10

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Transition terms

2500

Course offered by

Department of Civil, Environmental and Natural Resources Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	5.3	Mandatory	A07	
0002	Project work + Laboratory work	G U 3 4 5	2.2	Mandatory	A07	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2023-06-02

Syllabus established

by the Department of Chemical Engineering and Geosciences 2007-02-28