



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Högtemperaturmaterial High Temperature Materials

FKMN10, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED M

Date of Decision: 2023-04-11

General Information

Elective for: M4, N4, MPRR1

Language of instruction: The course will be given in English

Aim

The course aims to provide the student with a deep and broad understanding of high temperature materials and their behaviour under different operating conditions.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- demonstrate an understanding of high temperature phenomena, their mechanisms and associated problems and difficulties in the use of materials at elevated temperatures.

Competences and skills

For a passing grade the student must

- demonstrate the ability to plan and conduct experimental studies on the mechanical behaviour of materials and their interactions with the environment at elevated temperatures.
- demonstrate the ability to develop engineering materials with desired properties at high temperatures.

Judgement and approach

For a passing grade the student must

- show the ability to analyse the high temperature behaviour of materials.
- show the ability to find the necessary data for using materials at high temperatures.
- show the ability to carry out projects in collaboration with others in a group.

Contents

The course deals with materials for high temperature applications and considers the phenomena and problems associated with the use of materials at high temperatures. High Temperature behaviour of Materials: Plasticity, Fatigue, Creep, Oxidation and Corrosion. Refractory Metals, Inter-metallic, Stainless Steel, Nickel and Cobalt-based Superalloys, Ceramics and Cermets for High Temperature Applications. Alloy Theory, Heat Treatment and Hardening Mechanisms. Oxidation Resistant and Thermal Barrier Coatings.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Examination takes place through compulsory assignments and projects with oral and written presentation. Optional quizzes for continuous knowledge assessment. In the assignments, the students work individually and in the projects in groups of 3–5 students. Approved assignments and projects are required for a passing grade.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: Materials Engineering, Basic Course and/or Advanced Materials Technology and Linear Algebra, Calculus in One Variable, Thermodynamics and Fluid Mechanics and a course in Physics.

The number of participants is limited to: No

The course might be cancelled: If the number of applicants is less than 12.

Reading list

- Meetham, G. W. & M. H. Van de Voorde: Materials for High Temperature Engineering Applications. Springer-Verlag New York, 2000, ISBN: 3-540-66861-6.

Contact and other information

Course coordinator: Filip Lenrick, filip.lenrick@iprod.lth.se

Course homepage: <http://www.material.lth.se>

Further information: The course is offered every alternate year (2024, 2026 ...) during the the spring term.