SYLLABUS

Aerospace Materials 7.5 credits T7005T

Rymdmaterial

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2020-06-18

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LULEÅ TEKNISKA UNIVERSITET

Aerospace Materials 7.5 credits T7005T

Rymdmaterial

Second cycle, T7005T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Polymerteknik	Materials Technology

Main field of study

Materials Science and Engineering

Entry requirements

Basic knowledge in Composite Materials and Mechanics of Fiber Composites example T7012T and T7011T or similar.

Selection

The selection is based on 30-285 credits

Course Aim

After the end of this course the student is supposed to - have deep knowledge about structure and behaviour of high performance materials used in aerospace industry - be able to evaluate properties of composites, ceramic materials and alloys to perform optimal material selection for use in harsh environments and service conditions - will know and understand the most important degradation mechanisms that initiate and evolve due to thermal and mechanical loads and lead to material fatigue and reduced durability - be able to do produce long fiber composites, to measure their mechanical properties, to observe and to quantify damage modes and to analyse their effect on properties - be able to apply composite material degradation models, to perform fracture mechanics analysis in alloys and to predict time dependent material behaviour - be able to perform numerical simulations of structures using commercial software to design optimized structures - have good skills in analysing research papers and writing research reports

Contents

The material classes analyzed in this course are high performance materials like light weight alloys, superalloys, ceramics and different types of composites including materials modified on nanoscale. Methodology will be given to determine properties of these multiscale materials on all considered length scales. The properties most important for design in the aerospace applications are performance at high mechanical loads, extreme temperatures and material aging and fatigue due to extreme environmental effects. Processing methods will be considered in relation to desired material performance. Durability and damage tolerance will be accessed by analyzing degradation, creep and damage mechanisms. Methodology for structural analysis will be given and training performed.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
Lectures combined with seminars. Mandatory home works and large project in groups with report

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.
To pass the course home works must be approved and lab report approved and graded. An oral exam has to be passed and will be graded.

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.

Overlap

The course T7005T is equal to MPC006

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Project	G U 3 4 5	4.5	Mandatory	A07	
0003	Home work assignment	G U 3 4 5	0.8	Mandatory	A07	
0004	Oral exam	G U 3 4 5	2.2	Mandatory	S15	

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 HUL Niklas Lehto 2020-06-18

Syllabus established

by Department of Applied Physics and Mechanical Engineering 2007-12-17