SYLLABUS

Multifunctional Polymer Composites; Advanced Processing and Manufacturing 7.5 credits T0024T

Multifunktionella polymera kompositer; avancerad tillverkning och bearbetning

Course syllabus admitted: Autumn 2018 Sp 1 - Spring 2023 Sp 4

DECISION DATE
2018-02-15

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LULEÅ TEKNISKA UNIVERSITET

Multifunctional Polymer Composites; Advanced Processing and Manufacturing 7.5 credits T0024T

Multifunktionella polymera kompositer; avancerad tillverkning och bearbetning

First cycle, T0024T

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

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and a total of at least 60 ECTS in the area of mechanical engineering, material science, physics or chemistry. Good knowledge in English, equivalent to English 6.

Selection

The selection is based on 1-165 credits.

Examiner

Nazanin Emami

Course Aim

The course aim is that the student, after finished course, will have achieved (divided in three categories):

1. Knowledge and Understanding

- Basic polymer-chemistry knowledge
- Thorough knowledge of polymer- and polymeric composite materials structure and properties and the manufacturing process.
- Multifunctional polymer composites and their applications
- Knowledge of different manufacturing methods and processesing that affect the properties of multifunctional hybrid composites
- Updated knowledge on modern polymer composites

2. Skills and Abilities:

- Planning for correct manufacturing and implementation of the process for the chosen type of the polymeric composite.
- Design of innovative and new hybrid polymeric composites for multifunctional applications
- Plan and implement of correct characterization methods for right applications
- Planning and implement of risk and failure analysis
- Have developed abilities in database searching and referenc cross check through reliable scientific databases such as e.g. Scopus, Web of Science etc.
- Have developed abilities in writing technical reports and scientific reports in English
- Be able to present the obtained results in a clear and comprehensible manner to other engineers.

3. Judgment and Assessment Abilities:

- Be able to relate the fundamental knowledge to application
- Assess the processing and manufacturing methodic in industrial environment
- Be able to use the basic knowledge in polymer science to promote advance development in relevant industry
- Assess the sustainability of the advanced composite materials

The purpose of this course is to cover both basic and more advanced aspects of the manufacturing, process parameter and characterization methods in the "multi-functional" and “multi-scale” (hybrid) polymer composites.

Contents

Summary of polymer chemistry, various polymerization methods, the parameter affecting the properties of polymeric materials. Processing and manufacturing of polymer composites materials.

Overview of advanced multifunctionall composites with high strength, high stiffness and other physical properties for applications where more than one functions is required, such as energy storage, autonomic responses, signal transmission, heat transfer and so much more. Multi-functionality of the polymer composites has applications in many areas such as biomedical application, aerospace, automotive and other industries.

Realization

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

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.

Assignments (technical and or scientific report), seminars and oral presentations in English. compulsory attendance for all the seminars and final oral presentation. Alternative forms of examination may occur.

Examination is divided in three parts: Seminars, Final report and Oral examination. In order to receive 7,5 ECTS total credit in this course, the student must have been presented at seminars and oral presentation and also got approved from examiner for all thre parts.

Literature. Valid from Autumn 2017 Sp 1

Selection of book chapters and hand-out.

Course offered by

Department of Engineering Sciences and Mathematics

Items/credits

Number	Type	Credits	Grade
0004	Compulsory assignments	7.5	TG G U 3 4 5

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 Mats Näsström 2018-02-15

Syllabus established

by Mats Näsström 2017-02-13