

SYLLABUS

SIRIUS - Applied product simulation 22.5 credits M7029T

SIRIUS - Tillämpad produktsimulering

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-08-22

SIRIUS - Applied product simulation 22.5 credits M7029T

SIRIUS - Tillämpad produktsimulering

Second cycle, M7029T

Education level

Second cycle

Grade scale

G U 3 4 5

Subject

Maskinteknik

Subject group (SCB)

Mechanical Engineering

Entry requirements

Courses summing up to 180 credits with sufficient depth within the areas that are deemed important for the product development project, which the participant aims to take part in. Courses/knowledge in numerical calculation for product development corresponding to the content of Tillämpad matematik för teknisk mekanik, C7005M och M7009T.

Selection

The selection is based on 30-285 credits

Course Aim

The aim of SIRIUS is for students to acquire, apply and integrate knowledge that is essential for applied product simulation in modern manufacturing industries. Students mainly acquire knowledge in numerical calculations, finite element method of mechanical systems, optimization, computer-aided machine design, flow calculations, dynamics, dimensioning and fatigue. The course's product development project is carried out in close collaboration with industrial companies. The course participant is part of a team that, together with supervisors from both companies and universities, works with the entire product development chain from idea to finished product. After completing the course, the student after the course will be able to show:

1. Knowledge and understanding

- explain how to choose methods for numerical analysis of mechanical engineering processes,
- explain how to efficiently use computers, programs and scientific work in product simulation,
- explain how to combine different numerical methods to simulate different mechanical engineering processes,
- describe how sustainability aspects (gender equality included) in the field of mechanical engineering, how these aspects relate to society and research that addresses these challenges,

2. Skills and abilities

- can analyze mechanical problems with numerical methods,
- apply load and boundary conditions for different systems,
- combine different computer tools to solve complex problems,
- communicate obtained results in written and oral form,
- can document and reflect on both their own and the project's learning process,
- apply insights on sustainability aspects (gender equality included) when implementing product development projects in mechanical engineering,

3. Ability of assessment and attitudinal method study

- evaluate the role of numerical methods in product development,
- summarize today's challenges in numerical simulation of product development,
- demonstrate the ability to collaborate with other people in product development projects,
- reflect on and evaluate their own efforts in project work,
- evaluate the significance of various sustainability aspects (gender equality included) in the implementation of product development projects in mechanical engineering,

Contents

Participants work in groups, going from needs to finished product (or prototype) in close collaboration with industry partners – with the aim to gain understanding and experience of today's and tomorrow's ways of working in integrated product development projects.

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 normally offers 3-6 projects with 4-12 participants in each project team. Every team is supervised by at least one coach (teacher). The coaches' work is aimed at providing support and structure to the students' own learning processes within each product development project.

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. The product development project is presented in written reports, individual logbooks, verbal presentations and at final presentations at LTU and, when applicable, at the industry partner site. The teachers will further carry out verbal design reviews and individual interviews. The final grade is a combination of the above and the participants' contributions to the product development projects.

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.

Remarks

Communication: Canvas is used for internal and external communication. Studios and workplaces for distance-spanning work are also used internally and for collaboration with industry partners. Knowledge of numerical calculations, finite element methodology, optimization and machine construction is desirable. In addition, knowledge of solid mechanics, dynamics, fatigue, fluid mechanics, and ability to create numerical calculation models and analysis of numerical results is desirable. The course requires that participants are able to, on their own and in groups, solve problems and to plan and carry out all phases in a product development project carried out in close collaboration with industry partners.

Cannot be included in the degree together with M7017T or T7026T.

Overlap

The course M7029T is equal to T7026T, M7017T

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Project work	G U 3 4 5	22.5	Mandatory	A18	

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 Niklas Lehto, Head Faculty Programme Director 2022-08-22

Syllabus established

by Mats Näsström 2018-02-15