



## COURSE SYLLABUS

### Simuleringsdriven produktutveckling Simulation-driven Design 7.5 credits (7,5 högskolepoäng)

**Course code:** MT2559  
**Main field of study:** Mechanical Engineering  
**Disciplinary domain:** Technology  
**Education level:** Second cycle  
**Specialization:** AIF - Second cycle, has second cycle course/s as entry requirements

**Subject area:** Mechanical Engineering  
**Language of instruction:** English  
**Applies from:** 2018-03-01  
**Approved:** 2018-03-01

#### 1. Decision

This course is established by Dean 2018-01-24. The course syllabus is approved by Head of Department of Mechanical Engineering 2018-03-01 and applies from 2018-03-01.

#### 2. Entry requirements

Admission to the course requires taken course Computational Engineering I, 7,5 credits.

#### 3. Objective and content

##### 3.1 Objective

The purpose of the course is to give students knowledge to understand, as well as ability to implement and use, theories and methods for simulation support in product development

##### 3.2 Content

The course includes the following main parts:

- Simulation-driven design
- Introduction to optimization and its use in product development.
- Simulation process automation: Setup and execute chained simulation process flows containing several different software packages.
- Methods for structured and efficient design space exploration using mathematical models.

Theory will be exemplified using real-life design or decision-making situations within applications such as solid mechanics, structural dynamics and heat conduction.

#### 4. Learning outcomes

The following learning outcomes are examined in the course:

##### 4.1 Knowledge and understanding

On completion of the course, the student will be able to:

- Be able to describe and explain the principles for how optimization methods and algorithms dealt with in the course works.
- Be able to interpret, analyse and communicate simulation results.
- Show insight in advantages and drawbacks of a model-driven approach in relation to product development.

##### Skills and abilities

- Be able to define, set-up and solve design optimization problems using methods dealt with in the course.
- Be able to setup and execute chained simulation process flows using methods dealt with in the course.
- Show ability to plan and execute experiments with mathematical models using methods dealt with in the course.
- Show ability to critically, independently and creatively identify, formulate and deal with complex problems.
- Show ability to design, analyze and evaluate different technical solutions.
- Show ability to plan and with suitable methods accomplish qualified tasks within given constraints.
- Show ability to model, simulate, predict and assess behavior even with limited information.
- Show ability to clearly present and discuss drawn conclusions and the knowledge and argument they are based on.

#### 4.2 Judgement and approach

On completion of the course, the student will be able to:

- Show ability to critically evaluate calculated results and assess if they are reasonable.

#### 5. Learning activities

The teaching comprises lectures, laboratory work, project work, seminars and exercises.

#### 6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
1810	Written assignment 1	2.5 credits	GU
1820	Written assignment 2	1.5 credits	GU
1830	Written assignment 3	3.5 credits	GU

The course will be graded G Pass, UX Fail, supplementation required, U Fail.

The course information for each course revision should include the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

#### 7. Course evaluation

The course evaluation should be carried out in line with BTH:s course evaluation template and process.

#### 8. Restrictions regarding degree

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

#### 9. Course literature and other materials of instruction

Material from the department.

#### 10. Additional information

This course replaces the course MT2549