

SYLLABUS

Dynamics in mechanical systems 7.5 credits

M7010T

Dynamik i mekaniska system

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-02-14

Dynamics in mechanical systems 7.5 credits M7010T

Dynamik i mekaniska system

Second cycle, M7010T

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Teknisk mekanik	Engineering Physics

Entry requirements

Basic requirements in solid mechanics (e.g. M0011T or matching), basic mechanics/dynamics (e.g. F0004T and F0006T or matching), basic mathematics (M0047M, M0048M och M0049M or matching and good knowledge in English, equivalent to English 6.

Selection

The selection is based on 30-285 credits

Course Aim

After passed course, the student shall be able to;

1. Knowledge and Understanding

- describe basic principles and properties in structure and rotor dynamics.
- describe possibilities and limitations in equations and methods used in mechanics
- explain the cause of vibrations in stationary and rotating systems

2. Skills and Abilities

- Be able to create multi degree of freedom models from real create multi degree of freedom models (MDOF) from real problems
- create own programs and use simulation routines in programs such as Matlab to solve MDOF problems
- create simpler models for rotor dynamic problems and understand the difference between rotating systems and non-rotating systems
- solve and analyze difficult dynamic problems

3. Judgement and Approach

- evaluate the reasonableness of analytical and numerical results
- critically evaluate results from dynamic analyzes.

Contents

The course deals with more advanced dynamic problems through analysis and simulation where the simulation models are developed by the students and solutions are developed through numerical tools such as Matlab. The content is:

- Lagrange's equations for dynamic problems
- the general eigenvalue value problem
- structural dynamics
- FEM in dynamics
- rotor dynamics
- introduction to nonlinear dynamics
- and computer exercises

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 is conducted through lectures where important elements of the course are highlighted and explained. Lessons in the form of some theory review and exercises that complement the lecture elements. Computer exercises give you the opportunity to create own models and simulate problems that an engineer may face.

Computer exercises are reported in a simpler 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 obtain a final grade in the course, approved computer exercises and passed on the written exam are required. The grading of the final grade for the course is based on the grade on the written exam.

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 M7010T is equal to MTM148, MTM173

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0004	Written exam	G U 3 4 5	5	Mandatory	S16	
0005	Computer exercises	U G#	1.5	Mandatory	S16	
0006	Oral examination	U G#	1	Mandatory	S16	

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, Programme Director 2022-02-14

Syllabus established

by Applied Physics and Mechanical Engineering 2007-02-28