Experimental Mechanical Engineering

Programme course

6 credits

Experimentell maskinteknik

TMMT04

Valid from: 2019 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2018-08-31

Main field of study
Product Development, Mechanical Engineering

Course level
First cycle

Advancement level
G1X

Course offered for
- Master of Science in Mechanical Engineering

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Linear algebra, thermodynamics, CAD.

Intended learning outcomes

The course aims to give understanding and skills to perform, document and analyse experiments in the area of engineering mechanics. The learning outcomes are fulfilled if the student can:

- recognize and present basic principles in engineering mechanics experiments.
- use physical quantities within the area of engineering mechanics and present the underlying phenomena which both historically and contemporary constitutes the basics for engineering quantification of properties of machines.
- summarize and present information collected from experiments by use of modern measurement methodology, statistics and evaluation.
    - The skill based outcomes aim to give the student the ability to:
        - show good skills when using measurement methods and instruments typical for mechanical workshops, production control and data collection.
        - design and realize experiments in a scientific manner.
        - realize experiments in a safe manner and according to existing directives.
        - document, report and communicate achieved results in for an engineer adequate way.

Course content

Basic theory: mechanical principles for force, moment, energy, temperature and influence on materials. Statistical measures. Outcomes of observations, accuracy and variance.
Properties of materials in engineering applications.
Evaluation of the energy losses in machines.
Computer based measuring methodology: practical handling and function of different electrical and mechanical measuring instruments such as micrometer, indicator, multimeter and oscilloscope. Handling of sampled information in computer based data collection systems.
Documentation and compilation of observations. Traceability and calibration.
History of technology behind some of the experiments.

Teaching and working methods

The main part of the course composes 6 different modules where each module illustrates a different part within the area of experimental engineering mechanics. Each module can contain one or more laboratory works. In some of the modules the experiments won't be available without preparation work from the students. Each module contains a presentation, either written, oral, poster or through digital media.
In addition to the modules, the course contains a number of lectures/seminars illustrating the area of experimental engineering mechanics where subjects such as science, measurement methodology, statistics and safety are presented.
The course runs over the entire spring semester.

Examination

LAB6	Module 6	1 credits	U, G
LAB5	Module 5	1 credits	U, G
LAB4	Module 4	1 credits	U, G
LAB3	Module 3	1 credits	U, G
LAB2	Module 2	1 credits	U, G
LAB1	Module 1	1 credits	U, G

Grades

Two grade scale, older version, U, G

Course literature

Instructions for the laboratory works will be available at LISAM. Possible additional course literature will be announced and available at LISAM.

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent

Mikael Segersäll

Examiner

Mikael Segersäll

Education components

Preliminary scheduled hours: 0 h
Recommended self-study hours: 160 h

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.