Musculoskeletal Biomechanics and Human Movements

Programme course

6 credits

Muskuloskelettär biomekanik och rörelseapparaten

TMME67

Valid from: 2021 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2020-09-29

Main field of study
Mechanical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Master of Science in Mechanical Engineering
- Master of Science in Design and Product Development
- Master of Science in Energy - Environment - Management
- Master of Science in Biomedical Engineering
- Master's Programme in Biomedical Engineering
- Master's Programme in Mechanical Engineering

Prerequisites
Calculus, Linear Algebra and Mechanics (or corresponding physics course)

Intended learning outcomes
The course aims to provide an understanding of the loads the human body is exposed to during both daily activities and more physically demanding activities; this from a mechanical and mathematical perspective, with application of principles in engineering mechanics. This provides the student knowledge to be able to take into account the human and her interaction with the environment, for example in product development. The course also gives an introduction to the analysis of sports performance and injury problems with regard to human movement. After completing the course, the student should be able to:

- capture, interpret and analyze kinematic and kinetic variables from human movement during physical activity
- simplify and model the human body as a musculoskeletal system by applying fundamental concepts in applied mechanics
- use biomechanics software and simulate a musculoskeletal system
- understand why a human musculoskeletal system can become part of the product development process
- understand why the musculoskeletal system can become overloaded during physically demanding activities and the medical problems this can cause.

Course content

Biomechanical Measurements, Human Anatomy and Anthropometry, Multibody Dynamics, Muscle Mechanics, and Simulation Methods for Biomechanics.

Teaching and working methods

The course is structured around teacher-led computer exercises together with supporting lectures, laboratory work and supervision. The computer exercises are part of the examining project.

Examination

TEN1	Written examination	3 credits	U, 3, 4, 5
PRA1	Written Report of Project Work	3 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is Swedish, the course as a whole or in large parts, is taught in Swedish. Please note that although teaching language is Swedish, parts of the course could be given in English. Examination language is Swedish.
- If teaching language is Swedish/English, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English (depending on teaching language).
- If teaching language is English, the course as a whole is taught in English. Examination language is English.

Other

The course is conducted in a manner where both men's and women's experience and knowledge are made visible and developed.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent
Peter Schmidt

Examiner
Joakim Holmberg

Education components
Preliminary scheduled hours: 40 h
Recommended self-study hours: 120 h

Course literature

Compendia

Peter Christensen, Computational rigid body mechanics

Other

Föreläsningsanteckningar