Musculoskeletal Biomechanics and Human Movements

Muskuloskelettär biomekanik och rörelseapparaten

6 credits

Programme course

TMME67

Valid from: 2025 Spring semester

Determined by	Main field of study	
Board of Studies for Mechanical Engineering and Design	Mechanical Engineering	
Date determined	**Course level**	**Progressive specialisation**
2024-08-28	Second cycle	A1N
Revised by	**Disciplinary domain**	
	Technology	
Revision date	**Subject group**	
	Mechanical Engineering	
Offered first time	**Offered for the last time**	
Autumn semester 2020		
Department	**Replaced by**	
Institutionen för ekonomisk och industriell utveckling		

Course offered for

- Master of Science in Energy - Environment - Management
- Master of Science in Mechanical Engineering
- Master of Science in Design and Product Development
- 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

| PRA1 | Written Report of Project Work | 3 credits | U, 3, 4, 5 |
| TEN1 | Written examination | 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 could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is "English", the course as a whole is taught in English. Examination language is English.
- 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.

Other

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

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.

The course is campus-based at the location specified for the course, unless otherwise stated under "Teaching and working methods". Please note, in a campus-based course occasional remote sessions could be included.