



# FSG3084 Musculoskeletal Biomechanics and Human Movement 7.5 credits

## Biomekanik och muskelarbete

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for FSG3084 valid from Spring 2019

## Grading scale

P, F

## Education cycle

Third cycle

## Specific prerequisites

Students are expected to have complete courses in basic mechanics and dynamics. No previous coursework in anatomy or physiology is required.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

After the course, the student should be able to:

- Apply principles of classical mechanics to the study of human motion
- Describe motion with precise, well-defined mechanical and anatomical terminology
- Describe the internal and external forces acting on the body during typical human activities
- Predict muscle actions that control certain movements
- Quantify the forces acting on the body during movement
- Critically understand the limitations of different experimental and analytical techniques used and the accuracy of the solution
- Evaluate studies of human movement and musculoskeletal biomechanics

## Course contents

The course focuses first on the anatomy and physiology of the musculoskeletal system, then on biomechanical applications involved in human movement. Medical faculty will be recruited to lecture on fundamental topics of muscle physiology, anatomy and treatment. From this foundation, the course will focus on methods to analyze biomechanical problems, including kinematics and kinetics of movement and the muscle force system. Finally, relevant topics requiring such analyses will be discussed, including a brief review of relevant scientific literature in the field. Emphasis is placed on interpretation and critical evaluation of results.

## Disposition

Instruction will be in the form of 2-3 lectures per week, a motion lab visit, and computer labs.

## Course literature

The course book will be: *Biomechanics Basis of Human Movement*, 4th ed, by Joseph Hamill, Kathleen M. Knutzen, and Timothy Derrick, ISBN: 9781451194043 or 9781451194043. An additional optional book is: *Research Methods in Biomechanics*, by D.G.E Robertson, G.E. Caldwell, J Hamill, G. Kamen, and S.N. Whittlesey

## Examination

- PRO1 - Project work, 7.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

There is one examination moment, and it is comprised of a series of projects that will be completed throughout the course. The projects are to be reported in written and in oral form, following a scientific writing structure.

## Other requirements for final grade

PRO1 Project work 7,5 hp (P, F)

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.