



FSG3085 Rörelseanalys och modellering 3,0 hp

Human Movement Analysis and Modeling

Fastställande

Kursplan för FSG3085 gäller från och med HT16

Betygsskala

G

Utbildningsnivå

Forskarnivå

Särskild behörighet

Participants should be enrolled in a PhD program related to biomechanics.

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

After the course, the student should be able to:

- Understand the concepts and implementation of motion analysis in hospital and research settings

- Implement experimental motion analysis data into a computerized musculoskeletal modeling environment
- Understand how experimental errors may translate into numerical errors and possibly propagate
- Have a basic understanding of motion capture software
- Have a good understanding of graphics-based biomechanical modeling software

Kursinnehåll

The course focuses first on the experimental motion analysis of humans, in which active cameras record motion from small markers placed on the subjects, after which a model to calculate actual joint motion and loading is used. This experimental motion analysis can then be implemented into musculoskeletal modeling software, after which muscle activations, anatomical structure, loading conditions and material properties can be modified to represent, for example, presence of pathology, which may change the strategy of the motion.

The motion capture will take place at Karolinska University Hospital and the simulation, at KTH Engineering Science, Mechanics. The course will require familiarity with motion capture and analysis software from Vicon Motion Systems. The program SIMM by Musculographics Inc. is central to the course, with the additional module Dynamic Pipeline, which provides a pipeline between the biomechanical model and the calculated equations of motion in the underlying program SD/Fast.

Kursupplägg

The course begins with a series of experiments in the motion analysis laboratory, after which three modeling assignments based on the experimental data are given. Students can work in groups but must present their material independently. A final project is to be completed individually, according to instructions. A short presentation to the instructor and other students is required.

Kurslitteratur

The instructor will prepare relevant publications and material.

Examination

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enskilda studenter.

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Övriga krav för slutbetyg

Final project. All three assignments and final project are compulsory. The grading scale is Pass/Fail.

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.