CM2022 Health and Sports Instrumentation 7.5 credits

Mätteknik för hälso- och idrottstillämpningar

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

Establishment

Head of school at the CBH school has decided on 2023-09-28 to determine this course plan to apply from and including HT 2024, diary number: C-2023-1036.

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Medical Engineering

Specific prerequisites

Courses in Mathematics, Physics, Computing and Electronics equivalent to at least 60 ECTS credit, of which at least 7 ECTS programming and 4 ECTS electronics. English B/6.

Language of instruction

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

Intended learning outcomes

The overall goal of this course is to provide a deeper understanding of measurable sport-related signals in the human body and instrumentation, to increase understanding of the function and application of modern sports and medical sensors and measurement principles, processing and presentation of results, and the ability to construct the measuring system for measuring physiological parameters.

After successful completion of the course the student will be able to:
• explain different sport-related signals (e.g. bioelectrical, respiratory gases) origin and significance.
• judge the characteristics of different sensors, the advantages and disadvantages, and choosing appropriate sensors for measuring force, movement, pressure, flow, volume and concentration of blood and respiratory gases.
• evaluate the possibilities, limitations and sources of error in various methods of signal processing applied on sport-related signals.
• use a few sensors, such as accelerometer, thermistors, piezoelectric, optical and magnetic to measure physiological signals.

For higher grades it is also required that the student:

• Given a sport-related problem, is able to identify relevant criterias and design several relevant solutions.
• can work independently to large degree within sport-related instrumentations.

Course contents

The teaching consists of lectures and compulsory laborative experiments.

• Physiological sensors
• Biosignals, its origins and significance
• Characteristics of different sensors
• Instrumentation in physiological measurements
• Methods for measuring temperature, pressure, flow and volume of blood and respiratory gases
• Signal processing applied to sport-related signals
• Possibilities, limitations and sources of error in different methods

Examination

- LAB1 - Laboratory work, 2.0 credits, grading scale: P, F
- RED1 - Written report, 5.5 credits, grading scale: A, B, C, D, E, FX, 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.

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

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.