



Course syllabus

Medicinsk mätteknik Biomedical Measurements

EEMF05, 7,5 credits, G2 (First Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED BME

Date of Decision: 2023-04-13

General Information

Elective for: BME4, D5, E4-mt, F4, F4-mt, N4

Language of instruction: The course will be given in English on demand

Aim

The object with the course Biomedical Measurements is to give a broad understanding for the problems that are associated with the use of measurement technology in the medical environment. Applications within health and welfare as well as clinical research will be discussed. In combination with the diploma work, it will lay an excellent foundation for further work within the biomedical engineering as well as for scientific research.

The course is organized as a sequence of lectures given by selected lecturers, all of top quality within their competence areas.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- Give an account for occurrence and use of biomedical equipment in health and welfare as well as in medical research.
- Relate biomedical measurement problems to the students own technical competence.
- Assess the patient and personal safety with reference to occurring legislation and Swedish standard for biomedical equipment.
- Be well acquainted with common sources of error and measurement accuracy.

Competences and skills

For a passing grade the student must

- Analyze real measurement problems within health and welfare and medical research, and thereafter
- Develop safe and accurate biomedical measurement systems, and accomplish
- Assessment of safety.

Judgement and approach

For a passing grade the student must

- Sort important information out of large materials, such as textbooks or manuals, without specific reading directives.
- Be able to verbally communicate results from experiments.
- Acquire sufficient knowledge and professional concepts to be able to describe ideas, problems and solutions to competent persons within the field of activities.

Contents

The course will give a broad outline over modern biomedical engineering. Examples of lecture captions include measurement of blood pressure, ECG, electromedicine, clinical chemistry, anaesthesiology, modern surgical methods, dialysis, audiology, pacemaker, medical laser, x-ray, digital radiography, computed tomography (CT), radiation methods for *in-vivo* measurements, magnetic resonance imaging (MRI), diagnostic ultrasound, dose planning, radiation therapy, telemedicine as well as risk factors and current legislation.

The course contains three laboratory experiment sessions and is finalized with a study tour to Lund University Hospital.

Examination details

Grading scale: UG - (U,G) - (Fail, Pass)

Assessment: The student must pass the compulsory laboratory experiment sessions and the final examination, write and review 1 lecture summaries.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0112. **Name:** Biomedical Measurements.

Credits: 7,5. **Grading scale:** UG.

Code: 0212. **Name:** Laboratory Work.

Credits: 0. **Grading scale:** UG.

Code: 0312. **Name:** Write and Review Lecture Summary.

Credits: 0. **Grading scale:** UG. **Contents:** Write and review one lecture summary

Admission

Assumed prior knowledge: ESSF10 /EEM007 Electrical Measurements, EEM031 /BMEF10 Transducer Technology.

The number of participants is limited to: 32

Selection: Number of credits within the programme. Priority is given to students enrolled on programmes that include the course in their curriculum.

The course overlaps following course/s: EEM040

Reading list

- The lectures and the lecturer's notes constitute the main body of the course.
- The literature mentioned below is optional supplementary reading, which elucidates different parts of the course. However, no single one of these books covers the whole course.
- Enderle J, Blanchard S and Bronzino J: Introduction to Biomedical Engineering. Elsevier, 2005, ISBN: 978-0-12-238662-6.
- Jakobsson B: Medicin och teknik, 5:e uppl. Studentlitteratur, 2006.
- Jacobsson B: Teknik i praktisk sjukvård, Studentlitteratur, 1998.
- Berglund E/Jönsson B-A: Medicinsk fysik, Studentlitteratur, 2007.

Contact and other information

Course coordinator: Universitetslektor Magnus Cinthio, magnus.cinthio@bme.lth.se

Course coordinator: Universitetslektor Tomas Jansson, tomas.jansson@med.lu.se

Course homepage: <http://bme.lth.se/course-pages/medicinsk-maetteknik/medicinsk-maetteknik/>