Lecture on Biological Signal

Special Subjects
Elective 2 credit

OGAWA, Mitsuhiro

1. Course Description

In this lecture course, both the methodology of biological signal measurement and biological signal processing are concerned. In particular, a number of signals such as electrocardiogram (EEG), electromyography (EMG), electroencephalogram (EEG), photoplethysmogram (PPG) and Ballistocardiogram are dealt with.

2. Course Objectives

If one wants to know about living bodies, especially the human body, living bodies have to be measured in some way or another. In this way, biological signals can be the obtained. The aim of this course is to learn about the general and particular ways of handling biological signals.

3. Grading Policy

Students will be required to submit two reports within the 15 weeks (35%+35%). In the end of the course, students will take the final oral assessment exam (70%).

4. Textbook and Reference

Textbook
Two Japanese textbooks (ISBN:978-4339071313 and 978-4339071252) are used.

Reference
One textbook written in English (Tatsuo Togawa, Toshiyo Tamura, P. Ake Oberg, Biomedical Sensors and Instruments, Second Edition, CRC Press) is recommended.

5. Requirements(Assignments)

The knowledge of LMS is required.
Preparation and review will be instructed in class.
Preparation should survey about concept of mathematics, physics and chemistry.
For review, please summarize each class in one paper.

6. Note

If you would have any question, don't hesitate to contact with Ogawa.

7. Schedule

[1] Introduction
[2] Measurement of inner pressure (1)
[3] Measurement of inner pressure (2)
[4] Measurement of flow in the body (1)
[5] Measurement of flow in the body (2)
[6] Measurement of kinematics
[7] Measurement of dynamics
[8] Thermal physiology
[9] Electromagnetic phenomenon and measurement on living body (1)
[10] Electromagnetic phenomenon and measurement on living body (2)
[11] Electromagnetic phenomenon and measurement on living body (3)
[12] Biochemistry measurement (1)
[13] Biochemistry measurement (2)
[14] Digital signal processing for biological signal
[15] Hot-topics on biological signal