

## Prerequisites and Literature

### Prerequisites

Prerequisites are within Signal Theory and within Anatomy and Physiology. The signal theory will be applied in the laboratory exercise and in the Signal Processing Tasks. The theory is fundamental for understanding the processing methods for bioelectrical signals. Students must have covered most of the topics below prior to this course.

The student should be familiar with and understand the following concepts and terms within **Signal Theory**: sampling, aliasing, zero padding, convolution, digital signal resolution, continuous and discrete Fourier transform, truncation and windowing, power spectrum, spectrogram, spectral leakage, cross correlation, variance, stochastic signals, noise including common sources of noise, filtering, and averaging.

Knowledge of **Anatomy and Physiology** regarding: Electrophysiology, the cell membrane, the nerve, nerve-muscle connection, the heart, the central and peripheral nervous system. This can be obtained from e.g. the Tortora, Derrickson book during the course.

### Literature

In the list below, some recommended literature is listed. Please note that the list only contains suggestions and it is probably a good idea to look for complementary literature.

- Sörnmo L, Laguna P. Bioelectrical Signal Processing in Cardiac and Neurological Applications. Academic Press, Elsevier. 2005. Available electronically via the university library.
- Malmivuo J, Plonsey R. Bioelectromagnetism, principles and applications of bioelectric and biomagnetic fields. Oxford University Press, NY, 1995. <http://www.bem.fi/book/>
- Tortora G, Derrickson B. Principles of Anatomy and Physiology, Wiley. 2014.
- Byrne, J H. Neuroscience Online, the Open-Access Neuroscience Electronic Textbook, Department of Neurobiology and Anatomy at The University of Texas Medical School at Houston, 1997. <http://neuroscience.uth.tmc.edu>