

# University of Pretoria Yearbook 2020

## Biosignals and systems 732 (EBB 732)

**Qualification** Postgraduate

**Faculty** Faculty of Engineering, Built Environment and Information Technology

**Module credits** 32.00

**Programmes** BEngHons Bioengineering  
BEngHons Electronic Engineering

**Prerequisites** Bio-engineering: Bioelectricity and Electronics EBE 732

**Contact time** 32 contact hours per semester

**Language of tuition** Module is presented in English

**Department** Electrical, Electronic and Computer Engineering

**Period of presentation** Semester 2

### Module content

The objective of the module is to teach the engineering student how to apply engineering tools to the analysis of biological systems for the purpose of (i) developing understanding of the anatomy and physiology of specific biological systems from an engineering perspective, (ii) deriving appropriate mathematical descriptions of biological systems, and (iii) engineering applicable therapeutic interventions. We will expand on the single nerve fibre studies considered in bioelectricity and electronics: where the latter examined the biophysics of single excitable cells (and electrostimulation thereof), this module will develop it into an analysis of the characteristics of populations of neurons. We will systematically develop a systems-level perspective, working our way through the hierarchical organisation of neural encoding and computation. Furthermore, we will discuss how to measure characteristics and parameters of a particular system (the auditory system) and how to glean information about lower hierarchical levels from these measurements. This is a course in modelling and measurement, using tools from signal processing, control systems, dynamics, probability theory, systems engineering and psychoacoustics.

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