University of Pretoria Yearbook 2022

Biosignals and systems 732 (EBB 732)

Qualification	Postgraduate
Faculty	Faculty of Engineering, Built Environment and Information Technology
Module credits	32.00
NQF Level	08
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.