

ADVANCED DIPLOMA OF BIOMEDICAL ENGINEERING

MODULE DETAILS	MODULE 11: BIOMEDICAL SIGNAL PROCESSING
	<p>Nominal duration: 4 weeks (48 hours total time commitment)</p> <p>This time commitment includes the preparation reading, attendance at each webinar (1 hour plus 15-30 minutes for discussion), and the time necessary to complete the assignments and further study.</p>
MODULE PURPOSE	To provide the participants with an overview of signal processing techniques used in biomedical applications. Participants will learn DSP principles such as sampling, quantisation coding, Z-transform, FIR, IIR filtering and DFT and use of DSP tools.
PRE-REQUISITES MODULE, UNITS / CO-REQUISITES	<p>Module 1: Basic Electrical Engineering</p> <p>Module 10: Biomedical Instrumentation</p>
ASSESSMENT STRATEGY	To evaluate the achievement of the learning outcomes; written assignments, group projects and practical exercises are set.
SUMMARY OF LEARNING OUTCOMES	<ol style="list-style-type: none"> 1. Examine and discuss the concepts of A/D conversion and the time domain representation of signals 2. Examine and discuss the frequency-domain representation of signals 3. Examine and discuss digital filter design 4. Examine and discuss DSP implementation
Learning Outcome 1	Examine and discuss the concepts of A/D conversion and the time domain representation of signals
Assessment Criteria	<ol style="list-style-type: none"> 1.1 Discuss basic digital signal processing concepts 1.2 Describe the attributes of digital-to-analogue and analogue-to-digital converters 1.3 Examine the time domain representation of discrete time signals and systems

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Learning Outcome 2	Examine and discuss the frequency-domain representation of signals
Assessment Criteria	<p>2.1 Examine and discuss Fourier Transforms, with emphasis on:</p> <ul style="list-style-type: none"> (a) The Fast Fourier Transform (FFT) (b) The Discrete Fourier Transform (DFT) (c) The inverse DFT <p>2.2 Examine the application of DSP in the biomedical field</p>
Learning Outcome 3	Examine and discuss digital filter design
Assessment Criteria	<p>3.1 Examine and discuss an FIR filter</p> <p>3.2 Examine and discuss an IIR filter</p>
Learning Outcome 4	Examine and discuss DSP implementation
Assessment Criteria	<p>4.1 Examine and discuss the various methods for realizing digital filters</p> <p>4.2 Discuss the features and architecture of commercially available DSP processors</p> <p>4.3 Discuss the use of hardware and software DSP development tools</p>
Delivery Mode	
<p>A combination of asynchronous and synchronous e-learning delivery comprising a judicious mix of interactive online web conferencing, simulation (virtual labs) software, remote online labs, online videos, PowerPoints, notes, reading and study materials (in pdf, html and word format) accessed through the Moodle Learning Management System (LMS).</p>	