General Sir John Kotelawala Defence University
Department of Electrical, Electronics and Telecommunication Engineering
Module Descriptor – Digital Signal Processing

Module Code	ET 3142	**Module Title**	**Digital Signal Processing**			
Credits	2	**Hours/ Semester**	**Lectures**	24	**Prerequisites**	ET2103
GPA/ NGPA	GPA		**Continuous Assessments/ Tutorials**	12		
Module Objectives		To provide the students with the knowledge of Digital Signal processing				
Learning Outcomes		After the completion of this module, the learner will be able to, **LO1:** **Discuss** the fourier transform in discrete time and discrete frequency domain **LO2:** **Design** digital FIR filters for given specifications **LO3:** **Design** digital IIR filters for given specifications **LO4:** **Analyze** a given filter for performance and stability				
Contents		**Fourier transforms, sampling** A/D conversion and quantization, D/A conversion, Polyphase decomposition, Polyphase DFT filter banks, Bandpass sampling				**LO1**
		The Discrete Fourier Transform Definition of DFT and relation to Z-transform, Properties of the DFT, Linear and periodic convolution using the DFT, Zero padding, spectral leakage, resolution and windowing in the DFT				**LO1**
		Filters Averaging filter, Recursive smoother, First-order notch filter, Second-order unity gain resonator, All-pass filters, Comb filters, Equalization filters, Group delay, linear phase, all-pass, minimum phase, Stability and stability verification methods.				**LO4**
		Digital filter design Finite impulse response (FIR): Window design techniques, Kaiser window design technique, Equiripple approximations				**LO2**
		Infinite impulse response (IIR): Bilinear transform method, Examples of bilinear transform method, Structures and properties of FIR and IIR filters and review: IIR - Direct, parallel and cascaded realization, FIR – Direct and cascaded realizations, Coefficient quantization effects in digital filters				**LO3**
Laboratory/ Practical Sessions		• Filter design using IIR, FIR • Signal Processing Using FFT • Testing filter stability in MatLab				**LO1-4**
Method of Assessment		Continuous assessments : 30% End semester examination : 70%				
References		1. Alan V. Oppenheim, (2009). Discrete-Time Signal Processing,3rd Edition, Pearson. 2. Monson Hayes, (2011). Schaums Outline of Digital Signal Processing, 2nd Edition, McGraw-Hill Education.				

		Programme Outcomes										
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**