ENG311 Digital Signal Processing

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JULY

Synopsis:

This course aims to equip students with the basic concepts and knowledge in Digital Signal Processing covering analytical and design concepts, methods and considerations for practical implementation. In the first part of this course, the main characteristics of discrete signals, properties of linear time invariant systems (LTI), z-transform and its properties, and frequency analysis of discrete-time signal are introduced. In the second part of this course, discrete time Fourier transform and realization of digital filters are presented. Design of FIR (Finite Impulse Response) and IIR (Infinite Impulse response) filters will be treated in the last part of this course.

Besides being theoretical on the analytical skill set & methodology, student will also be given the opportunity to work on Industrial well-known Signal Processing Tools in lab session , such as MATLAB (and/or with real Target Digital Signal Processor).

Topics:

- Discrete Time Signal & Systems
- The z-transform
- Discrete Fourier Transform
- Realization of Digital Filters
- FIR Filter Design
- IIR Filter Design

Textbooks:

Proakis, J.G., Manolakis, D. G,: Digital Signal Processing, Principles, Algorithms, and Application (eTextbook) 4th Edition Pearson New International Edition
ISBN-13: 9781292038162

Learning Outcome:

- Discuss the properties of Linear Time-Invariant (LTI) systems.
- Calculate sampling frequency, circular convolution, quantization parameters and other signal parameters.
- Analyze LTI systems and signals in the time and frequency domains.
- Apply the properties of Fourier methods (Fourier Series, Fourier Transform, Discrete Fourier Transform) to examine signals and systems.
- Implement Finite Impulse Response Filters (FIR) using windowing, frequency-sampling and optimal equi-ripple methods.
- Construct Infinite Impulse Response Filters (IIR) using either Impulse Invariance or the Bilinear Transformation.
- Formulate algebraic expressions to represent signals and systems.
- Draw the block diagrams, impulse response, magnitude response, phase response and other characteristics of signals / systems.

Assessment Strategies - Regular Semester (Evening Class):

Components	**Description**	**Weightage Allocation (%)**
Overall Continuous Assessment	CLASS TEST 1	10
	CLASS TEST 2	10
	LAB TEST 1	10
Overall Examinable Components	Written Exam	70
Total		**100**

*The information listed is subject to review and change.