Module code	TG-2309		
Module Title	Electronic Instrumentation		
Degree/Diploma	Bachelor of Engineering Degree		
Type of Module	Major Option		
Modular Credits	2	**Total student workload**	4 hours/week
		Contact hours	2 hours/week
Prerequisite	None		
Anti-requisite	None		

Aims

This module is an intermediate level module for systems engineering students. The module focuses on signal acquisition procedures, instrumentation components, electronic amplifiers, and signal conditioning.

Learning Outcomes:

On successful completion of this module, a student will be expected to be able to:

Lower order :	30%	- understand the basic principles of circuits using diodes and transistors
Middle order :	40%	- analyse the performance of diode and transistor-based circuits by applying basic circuit theorems - collect and analyse data
Higher order:	30%	- design circuits using both passive and active devices to obtain data from sensors - use laboratory equipment to obtain data from electronic circuits - present information and arguments for justification in written communications

Module Contents

- Analyze simple circuits containing ideal diodes.
- Design 1/2-wave & full-wave rectifiers.
- Design and analyze a peak rectifier (battery eliminator) with a specified ripple factor.
- Analyze non-ideal diode circuits using piecewise linear circuit models.
- Analyze and design the dc bias circuit of a one stage transistor circuit, using d.c. circuit models for the transistor, to optimize the performance as an ac amplifier.
- Derive exact formulas for the ac mid-band performance of single-stage FET and BJT circuits using a.c. circuit models for the transistor.
- Design electronic realizations of switching functions using various logic gates.
- Design an eight level simple analogue to digital converter using comparators.
- Analyze the electrical performance of Wheatstone bridges, strain gauges, position & pressure transducers, and thermistors.
- Design integrators, difference amplifiers, and inverting amplifiers using Op-Amps.
- Derive exact formulas for the frequency spectrum of the ramp, the half-rectified wave, the full-rectified wave, and the square wave.
- Design simple passive low-pass and band-pass filters
- Derive exact formulas for oscillations in a second order system with positive feedback.

Assessment	Formative assessment	Online multiple choice questions will be used to test and give feedback on their learning
	Summative assessment	Examination: 50%
		Coursework: 50% - 2 tests (10% each) - 2 assignments (15% each)