

Module code	TE-3303		
Module Title	Introduction to Turbomachinery		
Degree/Diploma	Bachelor of Engineering Degree		
Type of Module	Major Option		
Modular Credits	4	Total student workload	8 hours/week
		Contact hours	4 hours/week
Prerequisite	None		
Anti-requisite	None		
Aims			
<p>This module introduces turbomachinery and the basic equations that govern the performance of turbomachinery. The essential elements of axial and radial turbomachinery design and performance will be covered. The student obtains an insight to thermal and hydraulic turbomachinery and the different engine types in the field and learns basic rules for the design and analyses.</p>			
Learning Outcomes:			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order:	30%	- understand the basic principles of turbomachinery	
Middle order:	40%	<ul style="list-style-type: none"> - analyse the performance of turbomachinery-based systems by applying analytical techniques - analyse the performance of analogue and digital electronics controllers in power systems - collect and analyse data 	
Higher order:	30%	<ul style="list-style-type: none"> - utilise laboratory equipment to obtain data from turbomachinery - select appropriate turbo mechanical equipment to meet a given specification - present information and arguments for justification in written communications 	
Module Contents			
<ul style="list-style-type: none"> - Types of turbomachines - Basic theories of turbomachinery and their applications such as: angular momentum principle, Euler turbomachine equation, velocity diagram, performance parameters, sample applications - Introduction to the basic concepts of gas turbines and cycle analysis including efficiency, turbojets and turbofans, qualitative analysis, compressor and turbine efficiency - Non-rotating components such as: summary of gas dynamics, diffusers, nozzles and combustors - The working principles of compressors such as: Energy exchange, rotor to fluid, the Euler equation, compressor geometry and the flow pattern, subsonic blading, the loss factor and efficiency, limits on stage pressure ratio, multistage compressors, and centrifugal compressors - The concepts of operation of turbines such as their stage characteristics, degree of reactions, pressure ratio, turbine blading, turbine cooling, turbine efficiency and turbine cooling, and turbine similarity 			
Assessment	Formative assessment	Online multiple choice questions will be used to test and give feedback on their learning	
	Summative assessment	Examination: 50% Coursework: 50% <ul style="list-style-type: none"> - 2 assignments (10% each) - 1 class test (10%) - 2 laboratory reports (10% each) 	