

Module code	TG-3307		
Module Title	Fluid and Thermal Engineering		
Degree/Diploma	Bachelor of Engineering		
Type of Module	Major Option		
Modular Credits	4	Total student Workload	8 hours/week
		Contact hours	4 hours/week
Prerequisite	None		
Anti-requisite	SP-1203 Thermal Physics and Optics; SP-1303 Thermal Physics and Optics; SP-2304 Thermodynamics, fluids and statistical mechanics		
Aims			
<p>This module integrates knowledge of thermodynamics, heat transfer and fluid mechanics for designing and analysing thermal energy systems. This includes the storage, transfer and conversion of energy. This module is concerned with how energy is utilised to accomplish beneficial functions in industry, transportation, home, etc. Case studies based on real-world thermal systems will be used throughout the class to illustrate the connection between these interdisciplinary subjects.</p>			
Learning Outcomes			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	30%	<ul style="list-style-type: none"> - define fluid flow and energy transfer for thermal systems - comprehend the interrelationship of variables in pumping and piping operations - assess heat exchanger performance and its design consideration - use scientific knowledge for solving engineering problems and their relate fields 	
Middle order :	40%	<ul style="list-style-type: none"> - measure thermodynamic quantities for description of fluid flow and energy transfer - explain physical situations based on the concepts of continuum fluid dynamics - apply the principles of heat transfer in open-ended design problems of relevance to practical engineering systems - analyse energy conversion and cooling/heating problems with the fundamental knowledge of thermodynamics - analyse steady-state error 	
Higher order:	30%	<ul style="list-style-type: none"> - design heat transfer processes and equipment - demonstrate the technical ability for designing prescribed processes or systems involved - work cooperatively in groups when reviewing case studies 	
Module Contents			
<ul style="list-style-type: none"> - Introductory concepts and definitions: defining and describing systems; units and dimensions - Thermodynamics: using energy and the first law of thermodynamics; evaluating properties; control volume analysis using energy; the second law of thermodynamics; vapour power; refrigeration and gas power systems - Fluid Mechanics: fluid statics; the momentum and mechanical energy equations; dimensional analysis and modelling; internal and external flow - Heat transfer: modes, rate equations and energy balances; heat transfer by conduction; heat transfer by convection; heat transfer by radiation 			
Assessment	Formative assessment	Monthly online quizzes will be used to test and to give feedback for their learning	
	Summative assessment	Examination: 50% Coursework: 50% <ul style="list-style-type: none"> - 1 class test (10%) - 3 individual assignments (10% each) - 1 individual laboratory report (10%) 	