Module Specification

Module Summary Information

1	**Module Title**	Thermodynamics and Energy Systems
2	**Module Credits**	20
3	**Module Level**	6
4	**Module Code**	ENG6079

5	**Module Overview**

The dependency of the current economy of fossil fuels as source of power requires a shift in thinking by engineers and companies to design and develop more efficient machines, processes and systems. The module therefore aims to provide you with the knowledge and understanding required to analyse thermodynamic systems concerned with conversion processes between heat and work. In addition the issues and limitations of the energy generation process play also a vital part and how energy can be recovered from processes to improve the overall efficiency.

The module follows the Mechanical Engineering programme philosophy of developing your intellectual and practical competence in the thermodynamic, power generation and energy conversion aspects of mechanical engineering. Formal lectures, tutorials, hands-on experience in labs and solving of problem based scenarios will enhance the learning process.

6	**Indicative Content**

Heat Engines and Heat Pumps
Use of thermodynamics tables and charts, refrigeration cycles and advanced vapour cycle, Rankine with re-heating, means of increasing cycle efficiency, efficiencies and power requirements

Turbines
Combined gas-vapour cycles and momentum equation for steady flow, water turbines and momentum equation for steady flow, energy conversion in gas turbines, gas power cycles (open and closed systems), cycles with inter-cooling and reheating

Compressors
energy conversion in compressors, types and performance characteristics of positive displacement compressors

Air Conditioning
Air conditioning systems, psychrometric terms and chart, typical air conditioning plant

7	Module Learning Outcomes On successful completion of the module, students will be able to:	
	1	Critically evaluate the performance and efficiency of thermodynamic systems and the sustainability principles in energy generation and conversion processes.
	2	Synthesise solutions to engineering problems involving basic thermodynamics and fluid mechanics.
	3	Appraise the assumptions and limitations inherent in the application of thermodynamic system calculations.

8	Module Assessment		
Learning Outcome			
	Coursework	**Exam**	**In-Person**
1-3	**30%**	**70%**	

9	Breakdown Learning and Teaching Activities
Learning Activities	**Hours**
Scheduled Learning (SL) includes lectures, practical classes and workshops, peer group learning, Graduate+, as specified in timetable	48
Directed Learning (DL) includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning, as directed on VLE	0
Private Study (PS) includes preparation for exams	152
Total Study Hours:	200