Module Specification

Module Summary Information

1	**Module Title**	Powertrain and Hybrid Vehicles
2	**Module Credits**	20
3	**Module Level**	6
4	**Module Code**	ENG6078

5	**Module Overview**

In times of consumer - and legislation-driven demand for increased fuel efficiency and reduced emissions of vehicles, the complexity in the development of future powertrains increases. A good understanding of powertrain sub-system behaviour is required to solve such complex systems.
The module therefore aims to allow you to gain understanding of current technologies, but also an inside in emerging and future technologies to address the problems of future transportation. Formal lectures, tutorials, hands-on experience in labs and solving of problem based scenarios will enhance the learning process.

6	**Indicative Content**

Combustion Engine Technology
Mechanical Design, Thermodynamic Processes, Engine Fuelling, Gas Exchange Process, Combustion in SI and CI Engines, Emissions Formation and Reduction

Performance Analysis
Engine Testing, Performance Simulation, Data Calibration and Verification

Vehicle Transmission
Design of Transmission, Clutches and Torque Converters, Gearbox Ratio Analysis

Hybridisation
Electric Motor Performance and Behaviour, Batteries, Capacitors, Converter Technologies

7	**Module Learning Outcomes** **On successful completion of the module, students will be able to:**	
	1	Critically appraise the operating principles of different powertrains and their sub-systems as used in modern vehicles.
	2	Critically review vehicle manufacturer data.
	3	Synthesise methods and plans to perform powertrain tests and evaluate data with respect to performance and environmental considerations.
	4	Communicate findings and results from analysis and complex ideas in a professional way.

8	Module Assessment		
Learning Outcome			
	Coursework	**Exam**	**In-Person**
1-4	**100%**		

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