



Title:	Sustainable Road Transport APPROVED
Long Title:	Sustainable Road Transport
Module Code:	AUTO6032
Duration:	1 Semester
Credits:	5
NFQ Level:	Fundamental
Field of Study:	Automotive Engineering
Valid From:	Semester 1 - 2016/17 (September 2016)
Module Delivered in	3 programme(s)
Module Coordinator:	Michael J. OMahony
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Module Description:	This module will introduce the student to the fundamentals of sustainable road transport related technologies and their environmental impact.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Discuss the effects which road transport has on Irish society, the environment, economy and security of fuel supply.
LO2	Identify the influencing factors which underpin the development of sustainable road transport technologies.
LO3	Illustrate and explain the system layout and operation of sustainable or alternatively fueled road vehicle technologies.
LO4	Prepare and present a short research report relating to a selected sustainable transport technology or alternative fuel related technology.
LO5	Identify how sustainable or alternative road transport technologies can be compared and contrasted.
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named MTU module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Effects of transport on the environment.

Effects of transport on the environment, global warming, green house gasses, fuel transport statistics, transport modes & volume of travel.

Alternative transport technologies (Fundamentals)

Electric Vehicles (battery technology), hydrogen fuel Cells, hybrid technologies, series hybrid, parallel hybrid, series parallel hybrid. (vehicle manufacturing technologies) gas vehicle technologies, LPG, CNG, LNG gas systems.

Transport sustainability

Fuel v food, use of agricultural land for fuel, first generation biofuels, second generation biofuels, ecology and biodiversity.

Emerging and developing technologies

Algae, carbon capture, flywheel technologies, heat & energy recovery systems, (ETC) current and emerging technologies being developed.

Vehicle and emissions testing

Engine and chassis dynamometers. Test cell requirements. Petrol and diesel emission testing to DOE standards.

Sustainable vehicle engine technologies (fundamentals)

Sterling engine, dual engines, atkinson cycle, miller cycle, carnot cycle, heat recovery systems.

Health and safety

Fuels, pressurised systems, electrical systems emergency procedures.

Transport statistics

SEAI, EPA, CSO, EU, UNIPCC,

Assessment Breakdown	%
Course Work	40.00%
End of Module Formal Examination	60.00%

Course Work				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Short Answer Questions	Sustainable road vehicle technologies.	2,3	20.0	Week 6
Project	Research project relating to a selected sustainable road transport technology or developments relating to emerging road transport technologies	2,3,4,5	20.0	Week 9

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	End-of-Semester Final Examination	1,2,3,5	60.0	End-of-Semester

Reassessment Requirement
<p>Repeat examination <i>Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.</i></p>

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Theory and Application	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	Study	4.0	Every Week	4.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

Workload: Part Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Theory and Application	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	Study	4.0	Every Week	4.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

Module Resources

Recommended Book Resources

- William R. Black 2012, *Sustainable Transportation*, Guilford Press [ISBN: 1606234854]
- OECD Organisation for Economic Co-operation and Development,, *Globalisation, Transport and the Environment* [ISBN: 978926407919-9]

Supplementary Book Resources

- 2006, *Decoupling the environmental impacts of transport from economic growth*, OECD Paris [ISBN: 9264027122]
- OECD Organisation for Economic Co-operation and Development,, *Globalisation, Transport and the Environment* [ISBN: 9789264079199]
- Organization for Economic Cooperation an (Corporate Author) 2009, *Transport, Energy and CO2: Moving Toward Sustainability*, Organization for Economic Co-operation and Development [ISBN: 9789264073166]
- Jean-Paul Rodrigue, Claude Comtois, and Brian Slack 2006, *The geography of transport systems* [ISBN: 978-0-415-35440-0]

This module does not have any article/paper resources

This module does not have any other resources

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_EABMT_8	<u>Bachelor of Science (Hons) in Automotive Business Management and Technology</u>	3	Elective
CR_TTMGT_7	<u>Bachelor of Science in Automotive Technology and Management</u>	3	Elective
CR_TTMAT_6	<u>Higher Certificate in Engineering in Automotive Technology and Management</u>	3	Elective