AUTO6002: Auto-electrical Fundamentals

Title:	Auto-electrical Fundamentals APPROVED
Long Title:	Automobile Electrical Fundamentals

Module Code:	AUTO6002	**Duration:**	1 Semester

Credits:	5
NFQ Level:	Fundamental
Field of Study:	Automotive Engineering
Valid From:	Semester 1 - 2013/14 (September 2013)
Module Delivered in	3 programme(s)
Module Coordinator:	Michael J. OMahony
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Module Description:	This module is designed to aid students in their understanding of the fundamentals of vehicle electrical circuits.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Compile a list of safety precautions to be observed before and whilst carrying out electrical maintanance work and repairs.
LO2	Identify the electrical principles which apply to individual circuits and components.
LO3	Explain the operation of basic automotive electrical circuits and their included components.
LO4	Using electrical formulae and equations to calculate electrical quantities relating of voltage, current flow, resistance, power and capacitance.
LO5	Design and construct a fundamental automotive electrical circuit and execute practical use of core automotive electrical test equipment.

Pre-requisite learning
Module Recommendations *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).*
Incompatible Modules *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.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *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.*
No requirements listed

Module Content & Assessment

Indicative Content
Magnetism Principles of magnetism, origins of electricity.
Basic Circuit fundamentals Water analogy,voltage,current flow, resistance, wattage, capacitance, Ohms law.
Circuit Construction Circuit layout,supply,conductors,insulators,switches,resistance,circuit protection,Cable sizes,earth return,insulated return,battery design & construction,circuit symbols,series & Parallel circuits.
Circuit Electronics Operation of a diodes(P-N)junction, zener diode, switching action of transistors, variable resistors,resistors, thermistors, optoelectronic sensor, capacitors, analogue & digital signals.
Electro-magnetic components Solenoid construction & application, electromagnetic relays.

Assessment Breakdown	%
Course Work	30.00%
End of Module Formal Examination	70.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Short Answer Questions	Mid-module written assessment	1,2,3	15.0	Week 6
Practical/Skills Evaluation	Construct fundamental automotive electrical circuit and record various electrical values	4,5	15.0	Week 9

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End-of-Semester Final Examination	1,2,3,4	70.0	End-of-Semester

Reassessment Requirement
Repeat examination *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.*

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

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Automobile Electrical Fundamentals	3.0	Every Week	3.00
Independent & Directed Learning (Non-contact)	No Description	3.0	Every Week	3.00
Lab	Practical use of electrical components	1.0	Every Week	1.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

This module has no Part Time workload.

Module Resources

Recommended Book Resources

- **Tom Denton, 2011, *Automobile Mechanical and Electrical Systems: Automotive Technology: Vehicle Maintenance and Repair*, Butterworth-Heinemann [ISBN: 978-0-08-096945-9]**
- **Robert Bosch GmbH, 2011, *Bosch Automotive Handbook - 8th Edition*, 8 nd Edition Ed., Bently Publishers [ISBN: 978-0837616865]**
- **Ken Freund, Jon Lacourse, Mike Stubblefield, Bob Worthy, John Haynes, *Haynes' Automotive Electrical Manual*, Haynes London [ISBN: 1-85010-654-1]**
- **Tracy Martin 2005, *How to diagnose and repair automotive electrical systems*, Motorbooks St. Paul, Minn. [ISBN: 0760320993]**

This module does not have any article/paper resources

Other Resources

- **Website: Kevin O Sullivan 2012, *Electrical Fundamentals* http://www.autoshop101.com/**
- **website: Khanacademy.org 2012, *Electricity and magnetism* http://www.khanacademy.org/science/physi cs/electricity-and-magnetism**

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_EABMT_8	Bachelor of Science (Hons) in Automotive Business Management and Technology	1	Mandatory
CR_TTMGT_7	Bachelor of Science in Automotive Technology and Management	1	Mandatory
CR_TTMAT_6	Higher Certificate in Engineering in Automotive Technology and Management	1	Mandatory