



MODULE DIRECTORY

FOUNDATION LEVEL

ACADEMIC DISCIPLINE OF ENGINEERING

WALES INSTITUTE OF SCIENCE AND ART

2025-2026

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INTRODUCTION

This Module Directory includes all the modules for Foundation Level within the discipline of Engineering, Wales Institute of Science & Art in the academic year 2025-2026.

This directory accompanies the Programme of Study Handbook, which will provide you with details of which modules you will be studying for your programme this year in the 'Programme of Study' section. This directory may include modules that are running on other programmes of study within your Academic Discipline/Institute. If you require assistance in identifying the modules for your programme of study, please contact the Programme Manager (whose name and contact details are provided in the accompanying Programme of Study Handbook), or the relevant Institute Office.

The University has made every effort to make the information as full and as accurate as possible, but you should note that minor changes in the organisation of modules between the planning stage and the actual teaching are inevitable. We shall try to keep any such changes to a minimum, and you will receive plenty of advance warning in the event of any alteration. We would also be grateful if you would let us know about any changes that you think might be helpful if introduced into future handbooks.

MODULES

Module Code	ACHA3000
Title	Introduction to Mathematics and Science
Date	14/05/2020
Level	3
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a sound understanding of mathematical and scientific principles.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Apply fundamental mathematical principles to a level that underpins the knowledge required for further study at a higher level.
- Identify and apply appropriate physical principles and relationships in the solution of problems

INDICATIVE CONTENT

- Introduction to basic fractions, indices and standard form
- Introduction to the transposition of formulae
- Solution of linear equations
- Solution of quadratic equations
- Solution of simultaneous equations
- Introduction to trigonometry and right-angled triangles (SOHCAHTOA)
- An introduction to vectors
- Units - basic SI units of length, mass and time, area and volume, density and relative density, mass and weight, force, work and power.
- Forces and moments - conditions of static equilibrium, forces and reaction, especially simply supported beams. Moments of a form. Resultant, couples, centre of gravity. Vector rotation. Resolution of forces. Polygon of forces.
- Electrical current/voltage. Mechanical analogies. Resistors in series and parallel. The heating effect of current, variation of resistance with temperature incandescent lamp.
- Voltage divider and current divider. Simple circuit calculations, use of Ohm's law and Kirchhoff's laws.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	1 hour	50%

Assessment Component 2

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	1 hour	50%

Assessment Summary

Activity type	Percentage
Written exam	100%
Coursework	0%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA3000	
Module Title	Introduction to Mathematics and Science	
Classification	Reading List entry	Electronic*
Essential	Smedley, R., Wiseman, G., Introducing Pure Mathematics (Oxford, 2001)	☐
Essential	Stroud, K.A. - <i>Engineering Mathematics</i> , (Palgrave Macmillan, 2013)	☒
Further	Davies, H; Hicks, A, Mathematics for Scientific and Technical Students (1998)	☐
Further	Stroud, K A, (2007) Engineering Mathematics, Industrial Press	☐
Further	McDonagh, I. and Waterworth (2015), G. Engineering Science Volumes 1 and 2, Arnold	☒
Further	Bird, J. O. and Ross, C. (2012) Mechanical Engineering Principles, Routledge	☐

Further	Bird, J, (2006) Higher Engineering Mathematics, Newnes	☐
Further	McDonagh, I., Mechanical Science for Technicians Volume 1, Arnold	☐
Further	Hannah, J. and Hillier, M.(1999) Mechanical Engineering Science, Longman	☐
Further	Bird, J. O. and Ross, C.(2012) Mechanical Engineering Principles, Routledge	☐
Reference	www.khanacademy.org	☒

Module Code	ACHA3001
Title	Mathematics and Science Fundamentals
Date	29/07/2025
Level	3
Credits	20
Pre-Requisites	None
DBS Check	May be required ☐ Not required ☒

AIM(S)

- To provide students with a sound understanding of mathematical and scientific principles.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- apply fundamental mathematical principles to a level that underpins the knowledge required for further study at a higher level;
- identify and apply appropriate physical principles and relationships in the solution of scientific problems.

INDICATIVE CONTENT

- Introduction to algebraic principles.
- Solution of linear equations.
- Solution of quadratic equations.
- Solution of simultaneous equations.
- Introduction to trigonometry.
- Transposition of formulae.
- Introduction to vectors.
- Units: Basic SI units of length, mass, time, weight, force, area, volume, etc.
- Forces and moments: Equilibrium, simply supported beams, moments, resultants, couples.
- Vector rotation, resolving of vectors, components of vectors, resolution of forces, bearings.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	1 hour	50%

Assessment Component 2

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	1 hour	50%

Assessment Summary

Activity type	Percentage
Written exam	100%
Coursework	0%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA3001	
Module Title	Mathematics and Science Fundamentals	
Classification	Reading List entry	Electronic*
Essential	Smedley, R. and Wiseman, G., 2001. <i>Introducing Pure Mathematics</i> . Oxford: Oxford University Press.	☐
Essential	Stroud, K.A. and Booth, D.J., 2020. <i>Engineering Mathematics</i> . 8 th Ed. Basingstoke: Macmillan.	☐
Further	McDonagh, I. and Waterworth, G., 2015. <i>Engineering Science: Volumes 1 and 2</i> . London: Arnold.	☒
Further	Bird, J.O. and Ross, C., 2021. <i>Mechanical Engineering Principles</i> . 3 rd Ed. Abingdon: Routledge.	☐

Module Code	ACHA4005
Title	Academic Skills
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to communicate effectively in a written form when describing concepts or constructing arguments
- To enable students to use a range of suitable academic to help them present information and data.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Write clearly and effectively when describing ideas and concepts relevant to their field and consulting and reference appropriate resources to support their analysis or findings.
- Use a range of suitable academic tools (theoretical, computational or practical) to help solve problems and communicate the results in a professional manner.

INDICATIVE CONTENT

- The learning process and the skills required to develop an understanding of a concept or principle.
- Gathering information, planning and researching a topic
- Strategies for taking notes, writing essays and reports
- Understanding the elements of non-verbal communication, constructing and documenting arguments
- Developing confidence in tackling communication tasks and being able to debate effectively
- The importance of referencing and the standard referencing systems
- Apply professional skills learned to area of study
- Developing knowledge of suitable computational software that can help with academic work, such as Microsoft Word and Microsoft Excel
- Gaining relevant additional skills specific to programme stream.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	1500 words	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	1500 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4005	
Module Title	Academic Skills	
Classification	Reading List entry	Electronic*
Essential	Osmond, A (2015) Academic Writing and Grammar for Students 2 nd Edition, Palgrave Macmillan	☐
Essential	Pears, R, Sheilds, G (2019) Cite Them Right: The Essential Referencing Guide, Palgrave Macmillan	☒
Essential	UWTSD Library Referencing Handbooks, available at: https://www.uwt.ac.uk/library/student-essentials/referencing-handbooks/	☒
Further	Cottrell, S (2019) The Study Skills Handbook, SAGE Publications Ltd	☒
Further	Gillett, A (2009) Inside Track to Successful Academic Writing, Longman	☐
Further	Greetham, B (2013) How to Write Better Essays, Palgrave Macmillan	☐

	Cottrell, S (2011) Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Macmillan	☐
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Module Code	ACHA4006
Title	Further Mathematics
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a sound understanding of mathematical principles and the application of these principles to concepts in engineering.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Demonstrate understanding in aspects of mathematical principles to a level that underpins the knowledge required for further study at a higher level; and
- Use mathematics as an instrument for the solution of basic engineering problems.

INDICATIVE CONTENT

- Differential Calculus
- The concept of calculus and the gradient at a point on curve
- Differentiation of basic functions
- Integral Calculus
- Integration of functions and the relationship with differential calculus
- Standard integrals
- Logarithms
- Solution of any triangle and angles of any magnitude (Sine/Cosine rule)
- Basic trigonometric identities
- Solution of basic trigonometric equations

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	2 hours	100%

Assessment Summary

Activity type	Percentage
Written exam	100%
Coursework	0%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4006	
Module Title	Further Mathematics	
Classification	Reading List entry	Electronic*
Essential	Smedley, R., Wiseman, G., Introducing Pure Mathematics (Oxford, 2001)	☐
Essential	Davies, H; Hicks, A, Mathematics for Scientific and Technical Students (1998)	☐
Essential	Stroud, K.A. - <i>Engineering Mathematics</i> , (Palgrave Macmillan, 2013)	☒
Further	Bird, J. O. and Ross, C. (2012) Mechanical Engineering Principles, Routledge	☐
Further	Bird, J, (2006) Higher Engineering Mathematics, Newnes	☐

Module Code	ACHA4007
Title	Further Science for Engineering
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide an introduction to the fundamental principles of solid mechanics, fluid mechanics and thermal energy.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Identify and apply appropriate physical principles and relationships in the solution of engineering problems;
- Manipulate equations to produce numerical values in engineering units.

INDICATIVE CONTENT

- Mechanics of materials - types and basic structures of materials. Direct stress and strain. Elasticity. Shear stress and strain. Miscellaneous simple problems, including factor of safety.
- Equations of linear motion
- Angular velocity and equations of motion
- Motion and friction - displacement, velocity and uniform acceleration. Newton's laws of motion. Torque and angular motion and acceleration. I values ($T = I\alpha$). Work, energy and power, including effects of friction. Basic vibrations - simple harmonic motion (spring - mass systems).
- Thermal energy - temperature scales. Phases and states. Vapours and gases. Specific heats and latent heats. Gases. Boyle's law, Charles' Law and Combined Gas Law $pV/T = c$ and $pV = mRT$.
- Fluids - concepts of viscosity. Hydrostatics - pressures in liquids. volumetric flow calculations and principles of continuity.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Report	1200 words	30%

Assessment Component 2

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	1.5 hours	70%

Assessment Summary

Activity type	Percentage
Written exam	70%
Coursework	30%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4007	
Module Title	Further Science for Engineering	
Classification	Reading List entry	Electronic*
Essential	Bolton, W. (2007) Engineering Science, Arnold	☐
Essential	McDonagh, I. and Waterworth, G. (2015) Engineering Science Volumes 1 and 2, Arnold	☒
Essential	McDonagh, I., Mechanical Science for Technicians Volume 1, Arnold	☐
Further	Bird, J. (2012) Science for Engineering, Routledge	☐
Further	Bird, J. O. and Ross, C.(2012) Mechanical Engineering Principles, Routledge	☐

Module Code	ACHA4008
Title	Integrating Project
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to apply the knowledge they have gained through the modules they have studied, in the development of project. The product of the project will take the form of a subject related application which may be a software application, electronics application, design, etc.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- To implement an application/design synthesizing their knowledge from a number of modules
- To analyse a well-defined scenario, establish the requirements and develop an appropriate solution

INDICATIVE CONTENT

- Overview of research and development methodologies suitable for student projects.
- Ethical issues
- Sustainability issues
- Contingency planning
- Development of documentation for academic projects
- Presentation of work produced to an academic audience
- Subject-specific content as required

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written assessment	2000 words	60%

Assessment Component 2

(Tick one)

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Presentation or Demonstration	Approx 10 minutes	40%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	60%
Practical	40%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4008	
Module Title	Integrating Project	
Classification	Reading List entry	Electronic*
Essential	Larson, E.W. (2017) 7th Edition, Project Management. McGraw-Hill	☒
Further	Newton, R. (2016), Project Management Step by Step, FT Publishing International	☒
Further	Hughes, B. (2015), 5th Edition Project Management for IT-Related Projects, British Computer Society	☒
Further	Christopher, D (2013) Computing Projects, Pearson Education	☐
Further	Berndtsson, T (2012) Planning and Implementing your Project, Springer Verlag	☐
Further	Cottrell, S.(2011) Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Macmillan	☐
Further	Collis, J., Hussey, R (2009) Business Research: a Practical Guide for Undergraduate and Postgraduate Students, Palgrave Macmillan	☐

Module Code	ACHA4032
Title	Academic and Laboratory Skills
Date	29/07/2025
Level	4
Credits	20
Pre-Requisites	None
DBS Check	May be required ☐ Not required ☒

AIM(S)

- To enable students to communicate effectively and use a range of suitable academic tools when describing concepts or constructing arguments.
- To introduce students to relevant software tools and applications used in automotive engineering and to provide them with a sound understanding of the application of scientific principles to experimental laboratory procedures.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- apply appropriate academic and software tools to solve automotive engineering problems and present data in a professional manner;
- identify and apply appropriate physical scientific principles and relationships in the solution of scientific problems using laboratory equipment.

INDICATIVE CONTENT

- Strategies for taking notes, writing essays and reports.
- Apply professional skills learned to area of study.
- Developing knowledge of suitable computational software that can help with academic work, such as Microsoft Word and Microsoft Excel.
- Presenting data via graphical methods, error analysis.
- Gathering information, planning and researching a topic.
- Understanding the elements of non-verbal communication, constructing and documenting arguments.
- Use of experimentation in the Engineering Science laboratory, which can include but is not limited to: Beams/supports/loads, Bar Linkages (Ackerman steering/4 bar/straight/pantograph), Friction and inclined planes.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	2 elements	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Laboratory Workbook	1500 words or equivalent	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4032	
Module Title	Academic and Laboratory Skills	
Classification	Reading List entry	Electronic*
Essential	Cite Them Right, <i>The essential referencing guide</i> [online]. Available at: https://www.citethemrightonline.com	☒
Essential	Cottrell, S., 2024. <i>The Study Skills Handbook</i> . 6 th Ed. London: Bloomsbury Academic 1.	☒
Essential	University of Wales Trinity Saint David (UWTSD), <i>Referencing Handbooks</i> . [online]	☐
Essential	Bird, J., 2021. <i>Science for Engineering</i> . 6 th Ed. Abingdon: Routledge.	☒
Further	Lambert, J. and Frye, C., 2022. <i>Microsoft Excel Step by Step</i> . Indianapolis: Pearson Education, Inc.	☒
Further	Atkinson, C., 2018. <i>Beyond Bullet Points: Using Microsoft PowerPoint to create presentations that inform, motivate and inspire</i> . 4 th Ed. Redmond: Microsoft Press.	☒

Further	Wilson, K. (2022) <i>Essential Office 365: the illustrated guide to using Microsoft Office</i> . 5th Ed. No place of publication: Elluminet Press.	☒
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Module Code	ACHA4033
Title	Analytical Methods
Date	29/07/2025
Level	4
Credits	20
Pre-Requisites	None
DBS Check	May be required ☐ Not required ☒

AIM(S)

- To provide students with an introduction to the fundamental principles involved in analytical techniques involved in the engineering discipline.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- demonstrate understanding in aspects of mathematical principles to a level that underpins the knowledge required for further study at a higher level;
- use mathematics as an instrument for the solution of engineering problems.

INDICATIVE CONTENT

- Real-world applications of calculus (differentiation/integration) and their use in engineering systems.
- Fundamental principles of differential equations and their relationship with engineering problems.
- The use of the Sine and Cosine rule in the solution of non-right angled triangles.
- Transposition of engineering formulae.
- Logarithms and their relationship with engineering applications.
- Trigonometric equations and functions.
- An introduction to Complex Numbers and their relationship with dynamic systems.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	2 hours	100%

Assessment Summary

Activity type	Percentage
Written exam	100%
Coursework	0%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4033	
Module Title	Analytical Methods	
Classification	Reading List entry	Electronic*
Essential	Smedley, R. and Wiseman, G., 2001. <i>Introducing Pure Mathematics</i> . Oxford: Oxford University Press.	☐
Essential	Stroud, K.A. and Booth, D.J., 2020. <i>Engineering Mathematics</i> . 8 th Ed. Basingstoke: Macmillan.	☐
Essential	Gaulter, B. and Gaulter, M., 2001. <i>Further Pure Mathematics</i> . Oxford: Oxford University Press.	☐

Module Code	ACHA4034
Title	Engineering Projects
Date	29/07/2025
Level	4
Credits	20
Pre-Requisites	None
DBS Check	May be required ☐ Not required ☒

AIM(S)

- To enable students to work collaboratively and engage with a problem-solving exercise within the field of engineering. Students will draw knowledge from other modules within the course and apply this to an engineering challenge.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- solve an engineering problem through effective communication and collaboration within a team;
- provide an analysis and solution to an engineering problem via a group presentation.

INDICATIVE CONTENT

- Introduction to the concept of engineering challenges and the importance of teamwork in problem-solving.
- Group formation and role selection.
- Project proposals and outlining approaches to solving an engineering problem, using appropriate project planning techniques.
- Time management, outlining objectives and time scales.
- Costing, manufacturing and sustainability.
- Effective presentations to provide solutions and conclusions to an engineering problem.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	2 elements	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	2 elements	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4034	
Module Title	Engineering Projects	
Classification	Reading List entry	Electronic*
Essential	Maylor, H., 2022. <i>Project Management</i> . 5th ed. Harlow: Pearson Education Limited.	☐
Further	Seppala, N., 2010. <i>Business Ethics and Corporate Social Responsibility</i> . Boston: Cengage Learning.	☐
Further	Masterman, G., 2007. <i>Sponsorship: For a Return on Investment</i> . Oxford: Butterworth-Heinemann.	☐

Module Code	ACHA4035
Title	Introduction to Vehicle Engineering
Date	29/07/2025
Level	4
Credits	20
Pre-Requisites	None
DBS Check	May be required ☐ Not required ☒

AIM(S)

- To introduce students to the varied disciplines in the field of Automotive, Motorsport and Motorcycle Engineering.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- identify and explain the key disciplines within the fields of Automotive, Motorsport and Motorcycle Engineering;
- consider practical experimentation of automotive systems and explain findings to demonstrate awareness of engineering principles.

INDICATIVE CONTENT

- Introduction to the Automotive, Motorsport and Motorcycle sectors.
- Challenges and legislative drivers for development in the industry.
- Introduction to engine performance and efficiency.
- Introduction to vehicle handling and dynamics.
- Introduction to data acquisition and the importance of metrology.
- Introduction to Aerodynamics and CFD.
- Introduction to CAE and simulation.
- Sustainability, green technology and vehicle life cycles.
- Workshop experience (springs and dampers, simulator suite, fabrication, wind tunnel, vehicle setup, composites).

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written report	1500 words	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written report	1500 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4035	
Module Title	Introduction to Vehicle Engineering	
Classification	Reading List entry	Electronic*
Essential	Cocco, G., 2005. <i>Motorcycle Design and Technology</i> . Milan: Giorgio Nada Editore.	☐
Further	Hillier, V. and Coombes, P., 2014. <i>Hillier's Fundamentals of Motor Vehicle Technology</i> . 6 th Ed. Oxford: Oxford University Press.	☐
Further	Society of Automotive Engineers (SAE), 2019. <i>Journal of Automotive Engineering</i> . Warrendale, PA: SAE International.	☒

Module Code	ACHA4036
Title	Motor Vehicle Engineering Science
Date	29/07/2025
Level	4
Credits	20
Pre-Requisites	None
DBS Check	May be required ☐ Not required ☒

AIM(S)

- To provide an understanding of the principles associated with Engineering Science and their application to Motor Vehicles.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- demonstrate knowledge and understanding of the key engineering principles within Motor Vehicle technology;
- apply key transferable skills, theoretical and practical methods to the analysis of Motor Vehicle Engineering Science problems including decision making and interpreting experimental results.

INDICATIVE CONTENT

- Mechanics and structures of materials. Direct stress and strain, elasticity, shear stress and strain. Factor of safety.
- Equations of linear motion.
- Angular velocity and equations of motion.
- Motion and friction. Newton's laws of motion. Torque and angular acceleration. Work, energy and power, Friction. Simple harmonic motion.
- Thermal energy – temperature scales. Phases and states of vapours and gases. Specific heats and latent heats. Boyle's law, Charles' law and Combined Gas Law.
- Electrical principles, Voltage, current, Ohm's Law, electrical power.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Report	1500 words	50%

Assessment Component 2

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	1.5 hours	50%

Assessment Summary

Activity type	Percentage
Written exam	50%
Coursework	50%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACHA4036	
Module Title	Motor Vehicle Engineering Science	
Classification	Reading List entry	Electronic*
Essential	Zammit, S.J., 1987. <i>Motor Vehicle Engineering Science for Technicians</i> . Harlow: Longman Technical Series.	☐
Further	Twigg, O., 1995. <i>Science for Motor Vehicle Engineers</i> . Oxford: Butterworth-Heinemann.	☐
Further	Bird, J., 2021. <i>Science for Engineering</i> . 6 th Ed. Abingdon: Routledge.	☒

Module Code	ACMA4005
Title	Manufacturing and Materials
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To enable the student to understand current manufacturing and design technologies including CAD, materials selection, manufacturing processes and rapid prototyping.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Select suitable manufacturing technologies for real parts.
- Demonstrate an understanding of material properties and selection.

INDICATIVE CONTENT

- CAD fundamentals.
- Introduction to material properties and selection.
- Introduction to manufacturing processes and selection.
- Introduction to engineering design principles.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written report	1500 words	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written report	1500 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	100%

INDICATIVE READING LIST

Module Code	ACMA4005	
Module Title	Manufacturing and Materials	
Classification	Reading List entry	Electronic*
Essential	Kalpakjian, S. and Schmid, S. (2015) Manufacturing Processes for Engineering Materials (5 th Edition)	☒
Essential	Edwards, L. and Endean, M.(1990) Manufacturing with Materials, Butterworth Heinemann	☐
Essential	Pao, Y. C. (1984) Elements of Computer-aided Design and Manufacturing: CAD/CAM, Wiley	☐
Further	Bird, J. O. and Ross, C.(2012) Mechanical Engineering Principles, Routledge	☐
Further	Haigh, M. (1985) An Introduction to Computer-Aided Design and Manufacture, Blackwell Scientific.	☐