Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

MODULE DIRECTORY

LEVEL 4

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 Level 4 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	ACDB4002
Title	Electrical and Electronic Principles
Date	12/07/2024
Level	4
Credits	20
Pre-Requisites	None

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
SM1b	Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies
SM3b	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline
EA1b	Understanding of engineering principles and the ability to apply them to analyse key engineering processes
P1	Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc)
P3	Ability to apply relevant practical and laboratory skills

AIM(S)

- To understand the fundamental operation of common analogue and digital components and circuits.

LEARNING OUTCOMES

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

- Analyse specified circuits and networks using appropriate analysis tools.
- Perform electrical / electronic measurements, record and analyse data and produce a report.

INDICATIVE CONTENT

- Ohm's Law
- Series/parallel connections for R, L and C
- KVL and KCL
- Potential and Current divider networks
- Voltage and Current sources
- Thevenin and Norton equivalent circuits
- Principle of Superposition
- Mesh and Nodal analysis
- AC fundamentals
- Sinusoidal properties
- Resistance, Reactance and Impedance
- Complex notation
- Single phase AC circuits
- Maximum Power Transfer
- Tuned Circuits

- Semiconductors, diodes and transistors, Thyristors, Diacs and Triacs
- Electromagnetism, Electromagnetic Induction, Faraday's, Lens' Laws etc
- Principles of motors and generators
- Use of simulation software such as Mutisim or Proteus
- Transistor as a switch
- Commonly used ICs as building blocks, 555, 741, 7805 etc.
- Basic logic gates and configurations • Boolean Algebra • Combinational logic applications

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

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM1b, SM3b, EA1b, P1

Assessment Component 2

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	2,000 words	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM1b, SM3b, EA1b, P1, P3

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACDB4002**	
Module Title	**Electrical and Electronic Principles**	
Classification	**Reading List entry**	**Electronic***
Essential	Bird, J., Electrical circuit Theory and Technology, 6th Edition (Routledge, 2017)	☒
Essential	Floyd, T., DC / AC Fundamentals: A System Approach (Pearson, 2012)	☐
Further	Sinclair, I., Practical Electronics Handbook, 6th Edition (Newnes, 2007)	☐
Further	Warnes, L., Electronic and Electrical Engineering: Principles and Practice, 3rd Edition (Palgrave,13 Dec. 2002)	☒

Module Code	**ACHA4018**
Title	**Automotive Technology**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To allow the student to acquire knowledge of a range of automotive chassis technologies through lectures and practical investigations.

LEARNING OUTCOMES

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

- describe the fundamental principles of vehicle chassis technologies and explain how they are applied in the analysis of automotive systems;

- demonstrate subject specific practical and cognitive skills applied to an automotive application problem, obtaining and interpreting data in a laboratory environment and drawing relevant conclusions.

INDICATIVE CONTENT

- Chassis:
  - Chassis requirements and constructions.
  - Advantages and disadvantages of chassis types.

- Tyres:
  - Construction and performance characteristics.
  - Friction and grip (with load and temperature).
  - Slip angles and an introduction to tyre data.

- Suspension Systems:
  - Design parameters and performance characteristics.
  - Suspension types and layouts, including various geometries.
  - Springs and Dampers.
  - Kinematics including instant centres, roll centres and characteristic responses.

- Load transfer:
  - Introduction to basic load transfer under lateral and longitudinal acceleration.
  - Effect of load transfer on vehicle performance.

- Steering & Braking systems:
  - Steering system requirements and types.
  - Steering geometry including Akerman principles.
  - Drum Brakes.
  - Disc Brakes.
  - ABS principles.

- Aerodynamics:

- Vehicle Shapes.
- Pressure.
- Bernoulli's Principle.
- Lift and Drag.
- Effect on cornering performance.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Technical Report	2000 Words	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C6: Apply an integrated or systems approach to the solution of complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

C13: Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

C17: Communicate effectively on complex engineering matters with technical and non-technical audiences.

INDICATIVE READING LIST

Module Code	**ACHA4018**	
Module Title	**Automotive Technology**	
Classification	**Reading List entry**	**Electronic***

Essential	Hillier, V.A.W., Calex UK. and Institute of the Motor Industry (2012) *Hillier's fundamentals of motor vehicle technology Book 1.* 6th ed. / revised by Calex UK. Cheltenham: Nelson Thornes.	☒
Essential	Schuetz, T. (2016). *Aerodynamics of road vehicles* (5th ed.). SAE International.	☒
Further	Hillier, V.A.W. *et al.* (2006) *Fundamentals of Motor Vehicle Technology. Bk. 2*. Cheltenham. Nelson Thornes Limited.	☒
Further	Barnard, R. (2010). Road vehicle aerodynamic design: An introduction (3rd ed.). St Albans: Mechaero.	☐
Further	Pacejka, H. B., & Besselink, I. (2012). *Tire and vehicle dynamics* (3rd ed.). Elsevier/BH.	☒
Further	Smith, C. (2004). *Tune to Win: The Art and Science of Race Car Development and Tuning.* Fallbrook, Calif.: Motorbooks International.	☐
Further	SAE Mobilus (SAE Journal Papers)	☒

Module Code	**ACHA4019**
Title	**Electrical Principles**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To introduce the fundamental concepts of electrical engineering, focusing on the principles that govern the behaviour of electrical circuits. Students will explore the core theories and practical applications of electricity, including circuit analysis, and power systems. The module is designed to provide a solid foundation for further study in electrical and electronic engineering.

LEARNING OUTCOMES

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

- evaluate the appropriateness of different approaches to solving problems related to Electrical Circuits;

- describe and apply the fundamental principles of Ohm's Law, Kirchhoff's laws, and basic network theorems in circuit analysis;

- present, evaluate and interpret quantitative data to make judgements on theories in DC and AC circuits.

INDICATIVE CONTENT

- Basic Concepts of Electricity
  - Understanding charge, current, voltage, and resistance.
  - Introduction to electrical power and energy.

- Ohm's Law and Kirchoff's Laws;
  - Applying Ohm's Law in circuit analysis.
  - Utilizing Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL) in solving complex circuits.

- Circuit Theorems;
  - Thevenin's and Norton's theorems.
  - Superposition theorem and maximum power transfer theorem.

- DC and AC Circuit Analysis;
  - Analysing series and parallel circuits.
  - Understanding impedance, reactance, and resonance in AC circuits.

- Basics of semi-conductors;
  - Understanding doped regions.
  - Bias principles and voltage drop.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Portfolio, 3 Moodle Quizzes	3 elements	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.

C6: Apply an integrated or systems approach to the solution of complex problems.

INDICATIVE READING LIST

Module Code	**ACHA4019**	
Module Title	**Electrical Principles**	
Classification	**Reading List entry**	**Electronic***
Essential	Bird, J. O. (2021). *Bird's electrical and electronic principles and technology* (Seventh edition.). London. Routledge.	☐
Essential	Bird, J. O. (2021). *Bird's electrical circuit theory and technology* (Seventh edition). London. Routledge.	☐
Essential	Ehsani, M. *et al.* (2018) *Modern electric, hybrid electric, and fuel cell vehicles*. Third edition. Boca Raton, Fla: CRC Press. Available at: https://doi.org/10.1201/9780429504884.	☒

Further	Robert Bosch GmbH, issuing body (2022) *Automotive handbook.* Eleventh edition, revised and extended. Karlsruhe: Robert Bosch GmbH.	☒
Further	Hughes, E. *et al.* (2016) *Hughes electrical & electronic technology*. 12th ed. Harlow: Pearson.	☒

Module Code	**ACHA4022 / ACHA4022A**
Title	**Engineering Skills**
Date	**29/07/2025**
Level	**4**
Credits	**20**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To develop a reflective, proactive and optimistic attitude towards learning, while assuming ownership of their educational journey. These skills facilitate understanding of program topics, promoting life-long learning and adopting a proportionate approach to the mitigation of security risks relevant to their academic and professional careers. This module will develop students' transferable skills which are valued in the professional industry.

- To introduce students to workshop and laboratory skills alongside safety practices through the media of degree pathway specific technology.

LEARNING OUTCOMES

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

- demonstrate a proficient ability to apply reflective, proactive and responsible learning strategies, fostering a deeper understanding of mitigating security risks, in academia and industry, and also key transferable skills, in terms of presentation of information, personal development, reflective abilities and proficiency in appropriate technical software;

- apply practical technical skills and demonstrate know-how of practices, skills, safety and standards with respect to laboratory and workshops, and key transferable skills in terms of written presentation, personal development, reflective abilities and proficiency in appropriate technical software.

INDICATIVE CONTENT

- Understanding the learning process and identifying skills (e.g. Self-evaluation, skills needed for higher education, transferable skills, action plans for personal development).

- Organising study (e.g. time management, organising space, organising resources).

- Structuring study and sourcing information – effective note taking, using the library and the internet, referencing convention. Revision and examination techniques.

- Developing an appropriate presentation style (e.g planning and structuring essays and reports, presentations, posters, linking ideas together, using facts, opinions or arguments, analytical thinking etc).

- Understanding a holistic and proportionate approach to the mitigation of security risks for engineering (cybersecurity, data privacy, resource risk etc).

- An awareness of and practice in, the use of equipment for the measurement of fundamental quantities.
- Familiarity with basic stream relevant components, laboratory and workshop equipment and their real-world applications and behaviour.
- Health & Safety procedures and legislations, personal protective equipment and safe working practice.
- Develop proficiency of appropriate general and technical specific software (Microsoft Word, Microsoft Excel etc.).

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 Technical Report	2000 words	50%

Engineering Council AHEP4 Learning Outcomes **assessed** in this assessment:

C10: Adopt a holistic and proportionate approach to the mitigation of security risks.

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

C4: Select and evaluate technical literature and other sources or information to address complex problems.

C5: Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.

C7 - Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts.

C9 - Use a risk management process to identify, evaluate, and mitigate risks associated with a particular project or activity.

C11 - Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits, and importance of supporting equality, diversity, and inclusion.

C12: Use practical, laboratory, and workshop skills to investigate complex problems.

C14: Discuss the role of quality management systems and continuous improvement in the context of complex problems.

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Logbook	Equivalent to 2000 words	50%

Engineering Council AHEP4 Learning Outcomes **assessed** in this assessment:

C18: Plan and record self-learning and development as the foundation for lifelong learning / CPD.

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C5: Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.

C9 - Use a risk management process to identify, evaluate, and mitigate risks associated with a particular project or activity.

C12: Use practical laboratory and workshop skills to investigate complex problems.

C14: Discuss the role of quality management systems and continuous improvement

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACHA4022 / ACHA4022A**	
Module Title	**Engineering Skills**	
Classification	**Reading List entry**	**Electronic***
Essential	Cottrell, S. (2024) *The study skills handbook*. Sixth edition. London: Bloomsbury Academic.	☒
Essential	Van Emden, J. and Becker, L.M. (2018) *Writing for engineers*. Fourth edition. London: Palgrave.	☒
Essential	Harkins, M. (2016) *Managing risk and information security : protect to enable*. Second edition. Place of publication not identified: Apress Open.	☒
Essential	Robert Bosch GmbH. (2022) *Automotive handbook*. 11th edition. Postfach, Karlsruhe: Robert Bosch Gmbh.	☒
Essential	Health and Safety Executive www.hse.gov.uk	☒
Essential	Mueller, J. and Sizemore, J. (2021) *MATLAB*. 2nd edition. Hoboken, New Jersey: John Wiley & Sons, Inc.	☐

Further	Alcón, F., Brzoska, M. and Scheffran, J. (2020) *Climate Change, Security Risks, and Violent Conflicts: Essays from Integrated Climate Research in Hamburg*. Hamburg: Hamburg University Press. Available at: https://doi.org/10.15460/HUP.208.	☒
Further	Taebi, B. (2021) *Ethics and engineering : an introduction*. 1st ed. Cambridge, United Kingdom ; New York, NY, USA: Cambridge University Press.	☒
Further	Nasser, A. (2023), *Automotive Cybersecurity Engineering Handbook: The automotive engineer's roadmap to cyber-resilient vehicles* Birmingham. Packt Publishing	☒
Further	Cottrell, S. (2021) *Skills for success: personal development and employability*. 4th edition. London: Red Globe Press.	☒
Further	Marjieh, S. and linkedin.com (2019) *Introduction to Mill and Lathe Operation.* Carpenteria, CA: linkedin.com.	☒
Further	White, J. (2018) *Health and safety management : an alternative approach to reducing accidents, injury, and illness at work*. Boca Raton: Taylor & Francis, CRC Press.	☒
Further	Kelly Bennett (2014) *MATLAB applications for the practical engineer*. Edited by K. Bennett. Rijeka, Croatia: IntechOpen.	☒

Module Code	**ACHA4024**
Title	**Introduction to Thermodynamics and Fluids**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To introduce students to the fundamental concepts of thermodynamics and fluid mechanics, essential for various fields of engineering. It aims to provide a solid foundation in the principles governing energy systems, heat transfer, and the behaviour of fluids under various conditions. Through theoretical understanding and practical applications, students will learn to analyse and solve problems related to energy conversion, fluid flow, and thermal systems in engineering.

LEARNING OUTCOMES

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

- describe the basic principles and laws of thermodynamics and their applications to energy systems and processes;

- explain the fundamental concepts of fluid mechanics, including fluid statics, dynamics, and flow through pipes and channels.

INDICATIVE CONTENT

- Introduction to Thermodynamics: Basic concepts, system definitions, and the laws of thermodynamics.

- Heat and Work: Gas Laws Energy conversion processes, energy conversion in engines, fuel efficiency, and thermal management systems.

- Properties of Pure Substances: Phase change, property diagrams, and tables for water, air, and coolant.

- Fluid Properties: Density, viscosity, and compressibility.

- Fluid Dynamics: Continuity equation, Bernoulli's equation.

- Flow in Pipes: Laminar and turbulent flow.

- Heat Transfer: Basic modes of heat transfer, conduction, convection, and radiation principles.

- Practical Applications: Application of thermodynamics and fluid mechanics principles in engineering systems such as ICE, EV & Hybrid powertrains.

- Problem-Solving Sessions: Workshops focused on solving practical thermodynamics and fluid mechanics problems to reinforce theoretical knowledge.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	1.5 hours	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

C12: Use practical, laboratory, and workshop skills to investigate complex problems.

INDICATIVE READING LIST

Module Code	**ACHA4024**	
Module Title	**Introduction to Thermodynamics and Fluids**	
Classification	**Reading List entry**	**Electronic***
Essential	Zammit, S.J. (1987) *Motor vehicle engineering science for technicians, level 2*. Harlow: Longman.	☐
Essential	Twigg, P. (1996) *Science for motor vehicle engineers*. Waltham, Mass: Butterworth-Heinemann.	☐
Further	Bird, J, (2019) *Science for Engineering* Sixth Edition. London. Routledge	☒
Further	Bolton, W. (2021) *Engineering science*. Seventh edition. Abingdon, Oxon ; Routledge.	☒

Module Code	**ACHA4025**
Title	**Materials and Manufacturing**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To develop the fundamental knowledge and skills required to make informed decisions on material selection and manufacturing methods in engineering design. The module will introduce engineering material science and manufacturing processes; and establish their influence on engineered products.

LEARNING OUTCOMES

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

- describe the classification, structure, characteristics and properties of common engineering materials; and apply basic selection criteria to choose suitable materials for specific engineering applications;

- recognise a range of manufacturing methods and justify a suitable set of manufacturing processes for a given engineered product.

INDICATIVE CONTENT

- The product development cycle.

- Identify and classify different types of engineering materials, including metals, polymers, ceramics, and composites.

- Understand the fundamental properties and characteristics of materials, such as mechanical, thermal, electrical, and chemical properties.

- Interpreting engineering data such as technical data sheets and material property charts.

- Analyse material selection criteria based on application requirements, cost considerations, and environmental sustainability.

- Survey a range of manufacturing processes including: casting, forming, machining, joining, additive manufacturing, and finishing techniques.

- Evaluate the strengths and limitations of each manufacturing method in terms of precision, efficiency, scalability, and material compatibility.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Technical Report	2000 words	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C4: Select and evaluate technical literature and other sources or information to address complex problems.

C5: Design solutions for complex problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.

C7 - Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts.

C12: Use practical, laboratory, and workshop skills to investigate complex problems.

C13: Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

INDICATIVE READING LIST

Module Code	**ACHA4025**	
Module Title	**Materials and Manufacturing**	
Classification	**Reading List entry**	**Electronic***
Essential	Callister, W.D. and Rethwisch, D.G. (2020) *Materials science and engineering : an introduction*. 10th edition. Hoboken, NJ: Wiley.	☒
Essential	Kalpakjian, S., Schmid, S.R. and Sekar, K.S.V. (2023) *Manufacturing engineering and technology*.	☐

	Eighth edition in SI units. Harlow, United Kingdom: Pearson.	
Essential	Ashby, M.F. (2025) *Materials selection in mechanical design*. Sixth edition. Amsterdam: Butterworth-Heinemann.	☒
Further	Pahl, G. *et al.* (2007) *Engineering design : a systematic approach*. 3rd ed. London: Springer.	☒

Module Code	**ACHA4026**
Title	**Mechanics and Dynamics**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To provide students with a fundamental understanding of the principles of mechanics and dynamics as they apply to engineering problems. It will cover the analysis of static and dynamic systems, the principles of force, motion, energy, and momentum, and their applications in solving real-world engineering challenges. Through theoretical lectures and practical problem-solving sessions, students will develop the ability to model and analyse various mechanical systems.

LEARNING OUTCOMES

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

- use the fundamental concepts of forces, moments, equilibrium, kinematics, and kinetics as they apply to engineering systems;

- apply principles of mechanics and dynamics to analyse and solve problems related to static and dynamic systems in engineering.

INDICATIVE CONTENT

- Introduction to Mechanics: Basic concepts of force, vector operations, moments, and couples.

- Statics: Analysis of structures, forces in beams and trusses, centroids, and moments of inertia.

- Structures: Stress, Strain, Young's Modulus, Torsion, Bending, Shear Force and Bending Moment Diagrams, Buckling.

- Dynamics: Kinematics of particles and rigid bodies, Newton's laws of motion, work and energy principles, impulse and momentum.

- Rigid Body Dynamics: Rotation, angular momentum, and the dynamics of rigid bodies in planar motion.

- Vibrations: Basic concepts of vibrations, natural frequencies, and modes of vibration.

- Practical Applications: Application of mechanics and dynamics principles in solving practical engineering problems.

- Problem-Solving Sessions: Workshop sessions focused on solving practical problems and exercises to reinforce theoretical concepts.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Technical Report	2000 words or equivalent	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

INDICATIVE READING LIST

Module Code	**ACHA4026**	
Module Title	**Mechanics and Dynamics**	
Classification	**Reading List entry**	**Electronic***
Essential	Zammit, S.J. (1987) *Motor vehicle engineering science for technicians, level 2*. Harlow: Longman.	☐
Essential	Twigg, P. (1996) *Science for motor vehicle engineers*. Waltham, Mass: Butterworth-Heinemann.	☐
Essential	Bird, J, (2019) *Science for Engineering* Sixth Edition. London. Routledge	☒
Further	Bolton, W. (2021) *Engineering science*. Seventh edition. Abingdon, Oxon ; Routledge.	☒

Module Code	**ACHA4027**
Title	**Motorcycle Technology**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To develop an understanding of motorcycle technology with a focus on the dynamics and performance of motorcycles. The module introduces the fundamental principles of motorcycle systems, and through problem-solving and data interpretation, students' ability to evaluate technical solutions and make informed, evidence-based recommendations.

LEARNING OUTCOMES

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

- describe the key principles of motorcycle dynamics, including suspension setup, kinematics, and geometry, and outline how these influence vehicle behaviour;

- identify and explain fundamental mechanical engineering concepts as they relate to motorcycle systems, using appropriate terminology to support basic analysis and decision-making.

INDICATIVE CONTENT

- Motorcycle Dynamics and Handling:
  - Principles of stability, manoeuvrability, effects of weight distribution, centre of gravity, and wheelbase.

- Motorcycle Kinematics:
  - Motion analysis, effects of motorcycle geometry on performance.

- Suspension Properties and Vehicle Setup:
  - Suspension system types, tuning, and adjustment.

- Geometry Importance:
  - Impact of geometric parameters on dynamics and handling.

- Technical Measurement and Analysis:
  - Techniques for motorcycle data measurement and analysis.

- Motorcycle Modelling and Simulation:
  - Use of computer-aided tools for simulation and optimization.

- Basic Tyre Properties:
  - Influence of tire characteristics on performance, selection criteria.

- Fundamental Motorcycle Design:

- Considerations in design, industry trends, innovations, and sustainability in motorcycle development.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Technical Report	2000 words	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C6: Apply an integrated or systems approach to the solution of complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

C13: Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

C17: Communicate effectively on complex engineering matters with technical and non-technical audiences.

INDICATIVE READING LIST

Module Code	**ACHA4027**	
Module Title	**Motorcycle Technology**	
Classification	**Reading List entry**	**Electronic***
Essential	Bradley, J., (2003) *The Racing Motorcycle: A Technical Guide for Constructors volumes 1 and 2*, Malvern Broadband Leisure Publications,	☐
Essential	Spalding, N. (2019) *MotoGP technology*. Tunbridge Wells: Phoebus Apollo Publishing Limited.	☐
Further	Bradley, J. (2018) *The racing motorcycle. Volume 3, An introduction to chassis set up*. Malvern Broadland Leisure Publications.	☒
Further	Foale, T. (2002) *Motorcycle handling and chassis design : the art and science*. England: Tony Foale.	☐
Further	Cocco, G. (2013) *Motorcycle design and technology : how and why*. Milan: Giorgio Nada.	☐
Further	http://2d-datarecording.com/en/downloads/manuals	☒
Further	https://motochassis.com	☒

Module Code	**ACHA4028**
Title	**Motorsport Technology**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To allow the student to acquire knowledge of a range of motorsport chassis technologies through lectures and practical investigations.

LEARNING OUTCOMES

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

- demonstrate a detailed knowledge and understanding of the underlying principles of vehicle technologies and practices for analysis of chassis systems in a motorsport application;

- demonstrate subject specific practical and cognitive skills applied to a motorsport application problem, obtaining and interpreting data in a laboratory environment and drawing relevant conclusions.

INDICATIVE CONTENT

- Chassis:
  - Chassis requirements and constructions.
  - Advantages and disadvantages of chassis types.

- Tyres:
  - Construction and performance characteristics.
  - Friction and grip (with load and temperature).
  - Slip angles and an introduction to tyre data.

- Suspension Systems:
  - Design parameters and performance characteristics.
  - Suspension types and layouts, including various geometries.
  - Springs and Dampers.
  - Kinematics including instant centres, roll centres and characteristic responses.

- Load transfer:
  - Introduction to basic load transfer under lateral and longitudinal acceleration.
  - Effect of load transfer on vehicle performance.

- Steering and Braking Systems:
  - Steering system requirements and types.
  - Steering geometry including Akerman principles.
  - Drum Brakes.
  - Disc Brakes.
  - ABS principles.

- Aerodynamics:
  - Vehicle Shapes.
  - Pressure.
  - Bernoulli's Principle.
  - Lift and Drag.
  - Effect on cornering performance.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written technical report	2000 Words	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C6: Apply an integrated or systems approach to the solution of complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

C13: Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

C17: Communicate effectively on complex engineering matters with technical and non-technical audiences.

INDICATIVE READING LIST

Module Code	**ACHA4028**	
Module Title	**Motorsport Technology**	
Classification	**Reading List entry**	**Electronic***
Essential	Hillier, V.A.W., Calex UK, editor and Institute of the Motor Industry. (2014) *Hillier's fundamentals of motor vehicle technology. Book 1.* Sixth edition / revised by Calex UK. Oxford: Oxford University Press.	☐
Essential	Schüetz, T. (2016) *Aerodynamics of road vehicles*. Fifth edition. Warrendale: SAE International.	☒
Further	Katz, J. (1995) *Race car aerodynamics : designing for speed*. Cambridge, Mass: Robert Bentley.	☐
Further	Pacejka, H.B. and Besselink, I. (2012) *Tire and vehicle dynamics*. 3rd ed. Amsterdam ; Elsevier/BH.	☒
Further	Rowley, W. (2004) *An introduction to race car engineering*. 3rd ed. Canada. Rowley Race Dynamics.	☐
Further	Smith, C. (2004). *Tune to Win: The Art and Science of Race Car Development and Tuning.* Fallbrook, Calif.: Motorbooks International.	☐
Further	Staniforth, A. (2006) *Competition car suspension*. 4th ed. Sparkford: Haynes.	☐
Further	SAE Mobilus (SAE Journal Papers)	☒

Module Code	**ACHA4029**
Title	**Powertrain Technology**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To introduce students to the core principles, components, and operations of internal combustion engine (ICE), electric and hybrid powertrain systems in automotive applications. Focused on the mechanical and thermodynamic aspects of ICE, it seeks to provide a solid foundation in understanding how energy conversion powers vehicles, with attention to performance, efficiency, and basic emission control strategies.

LEARNING OUTCOMES

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

- identify key components of powertrain systems, including engines, electric motors, transmissions, and drivetrains and describe their functions and basic integration within a vehicle;

- explain fundamental principles of thermodynamics and mechanics as they relate to internal combustion engine performance, including fuel types, combustion processes, and energy conversion.

INDICATIVE CONTENT

- Introduction to Internal Combustion Engines
  - Types of ICE (petrol, diesel), basic operation principles, engine components, and terminology.

- Thermodynamics of ICE
  - Fundamentals of thermodynamics as applied to ICE, including energy conversion, efficiency calculations, and basic heat engines cycles (Otto, Diesel).

- Electric and Hybrid Systems
  - Understanding energy storage in batteries and how energy conversion and efficiencies differ in EV and Hybrid vehicles.

- Engine Components and Systems
  - Detailed study of key engine components (cylinder, piston, valves, crankshaft), fuel system, ignition system, cooling system, and exhaust system.

- Transmission and Drivetrain
  - Basics of transmission systems, including the purpose and types of transmissions (manual, automatic), drivetrain components, and their role in vehicle dynamics.

- Engine Performance Parameters

- Understanding power, torque, efficiency, and how they are influenced by engine design and operating conditions.

- Basics of Emission Control
  - Introduction to the sources of automotive emissions, impact on the environment, and basic strategies and technologies for emission control.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Technical Report	2000 words	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C12: Use practical laboratory and workshop skills to investigate complex problems.

C13: Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

C17: Communicate effectively on complex engineering matters with technical and non-technical audiences.

INDICATIVE READING LIST

Module Code	**ACHA4029**	
Module Title	**Powertrain Technology**	
Classification	**Reading List entry**	**Electronic***
Essential	Stone, R. (2012) *Introduction to internal combustion engines*. 4th ed. Basingstoke: Palgrave Macmillan.	☐
Essential	Hillier, V.A.W., Calex UK, editor and Institute of the Motor Industry. (2014) *Hillier's fundamentals of motor vehicle technology. Book 1.* Sixth edition / revised by Calex UK. Oxford: Oxford University Press.	☐
Essential	Hillier, V.A.W. *et al.* (2006) *Fundamentals of Motor Vehicle Technology. Bk. 2*. Place of publication not identified: Nelson Thornes Limited.	☐
Further	Heywood, J. (2018) *Internal combustion engine fundamentals*. 2nd edition. New York, N.Y: McGraw-Hill Education.	☒
Further	SAE Mobilus (SAE Journal Papers)	☒

Module Code	**ACHA4030**
Title	**Pure Mathematics and Statistics**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To introduce students to pure mathematical and statistical techniques necessary for an understanding of the analytical content encountered in further engineering modules.

LEARNING OUTCOMES

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

- demonstrate an understanding and competency with respect to a range of algebraic and mathematical techniques;
- demonstrate an ability to solve mathematical and statistical problems involving a range of equation forms.

INDICATIVE CONTENT

- Transposition of formula.
- Solution of linear, quadratic and simultaneous equations.
- Trigonometry involving both right-angled and non-right-angled triangles.
- Trigonometric functions and solutions of equations involving them.
- Logarithms.
- Measures of central tendency such as mean, mode and median.
- Measures of dispersion such as range and standard deviation.
- Graphing techniques and data analysis.
- Statistics.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**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%**

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.

INDICATIVE READING LIST

Module Code	**ACHA4030**	
Module Title	**Pure Mathematics and Statistics**	
Classification	**Reading List entry**	**Electronic***
Essential	Smedley, R. and Wiseman, G. (2001) *Introducing pure mathematics*. 2nd ed. Oxford: Oxford University Press.	☐
Essential	Stroud, K.A. and Booth, D.J. (2020) *Engineering mathematics*. Eighth edition. London: Red Globe Press.	☐
Essential	Gaulter, B., Gaulter, M.,(2001) *FurtherPure Mathematics* Oxford. Oxford University Press	☐
Further	Bird, J.O. (2021) *Bird's higher engineering mathematics*. Ninth edition. Abingdon, Oxon ; Routledge, Taylor & Francis Group.	☐
Further	Mathai, A.M. and Haubold, H.J. (2017) *Probability and Statistics : A Course for Physicists and Engineers*. 1st	☒

	ed. Berlin ; De Gruyter,. Available at: https://doi.org/10.1515/9783110562545.	

Module Code	**ACHA4031**
Title	**Vehicle Electronics**
Date	**29/07/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To provide students with a solid understanding of the core principles of vehicle electronic circuits through a combination of theory and practical work. The module covers component selection, the rapidly evolving nature of electronic technologies, and the use of diagnostic test equipment in automotive applications.

LEARNING OUTCOMES

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

- demonstrate transferable skills relevant to employment, including personal responsibility and engagement with continuing professional development (CPD) activities;

- describe key concepts of security and risk in vehicle electronic design and explain their relevance to industry standards;

- interpret and present quantitative data from circuit schematics to support conclusions based on basic electrical theories.

INDICATIVE CONTENT

- Breadboard circuit prototyping
  - Following circuit schematics to assemble circuits.
  - Designing and creating circuits to solve problems.

- Practical electronics skills
  - Develop skills with oscilloscopes, function generators and digital mustimeters.

- Diagnostic electronics skills
  - Interrogate results from tests.
  - Develop logical fault-finding techniques.

- Circuit standards
  - Overview of systems in vehicles.
  - Historical development and future trends.
  - Industry standards.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Laboratory Report	2000 words or equivalent	100%

Assessment Summary

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

Engineering Council AHEP4 Learning Outcomes **assessed** in this module:

C10: Adopt a holistic and proportionate approach to the mitigation of security risks.

C18: Plan and record self-learning and development as the foundation for lifelong learning / CPD.

Engineering Council AHEP4 Learning Outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science, and engineering principles to the solution of complex problems.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.

C6: Apply an integrated or systems approach to the solution of complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

C13: Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

INDICATIVE READING LIST

Module Code	**ACHA4031**	
Module Title	**Vehicle Electronics**	
Classification	**Reading List entry**	**Electronic***
Essential	Husain, I. (2021). *Electric and hybrid vehicles : design fundamentals.* Third edition. Boca Raton. CRC Press.	☐
Essential	Denton, T. and Institute of the Motor Industry. (2018) *Automobile electrical and electronic systems*. 5th edition. Abingdon, Oxon ; Routledge.	☒
Essential	Ehsani, M. *et al.* (2019) *Modern electric, hybrid electric, and fuel cell vehicles*. Third edition, International student edition. Boca Raton: CRC Press, an imprint of Taylor & Francis Group.	☒
Further	Hillier, V.A.W. (2012) *Hillier's fundamentals of automotive electronics. Book 2*. 6th ed. Oxford University Press.	☐

Module Code	ACMA4000
Title	Materials and Introduction to Processing
Date	12/07/2024
Level	4
Credits	20
Pre-Requisites	None

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
*SM3b	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline
EL4	Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate
P2	Knowledge of characteristics of particular materials, equipment, processes or products

*Only applies to Mechanical Engineering, Mechanical and Manufacturing Engineering, Manufacturing Systems Engineering & Energy and Environmental Engineering programmes.

AIM(S)

- To develop a knowledge base and understanding of the structure, properties and basic selection of all classes of materials
- To develop a knowledge and appreciation of the processes used in the manufacture of components with a view to providing basic process selection parameters using a broad range of industrial applications to illustrate this

LEARNING OUTCOMES

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

- an understanding of the structure and properties of metals and polymers
- Knowledge of the applications, advantages and limitations of different manufacturing processes and understanding of engineering materials and manufacturing process selection

INDICATIVE CONTENT

- Materials and the environment: corrosion, UV degradation,
- Polymeric processing (Mould design, process parameters and defects)
- Solidification, metals and alloys, polymers and co-polymerisation, glass transition temperature in polymers
- Primary processing, iron and steelmaking, polymer processing, aluminium processing
- Metallic Casting processes, Sand Casting, Gravity Die Casting, Pressure Die Casting, Investment Casting etc
- Introduction to manufacturing processes: casting, moulding, forming, machining, joining, rapid manufacturing and 3D printing.
- Forming processes. Such as Forging (Smith, Drop, Press, Upset), Rolling, Extrusion, Deep Drawing and sheet metal processing
- Secondary processing - machining and cutting (tool/material wear). Forces and energy dissipation: coatings (electro-plating, thermal spraying, powder coating and cladding)
- Thermal equilibrium diagrams. Ferrous and non-ferrous alloys, Heat treatment, Strengthening Mechanisms, work hardening, structure alignment, precipitation hardening, surface and bulk hardening mechanisms
- Joining - Welding processes, joint design, welding procedures and typical defects

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

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report with presentation	Technical or Laboratory Report 1500 words and Presentation 15 mins	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM3b, EL4, P2

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

AHEP3 Version 3 outcomes to be met in this assessment:
P2

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4000	
Module Title	Materials and Introduction to Manufacturing Technology	
Classification	**Reading List entry**	Electronic*
Essential	Groover, M. P., Principles of Modern Manufacturing - 6th Edition (Wiley, 2017)	☐
Essential	Callister, W. D.; Rethwisch, D. G., Materials Science and Engineering - 9th Edition (Wiley, 2014)	☒
Essential	Bolton, W Engineering Science 6th Edition 2015	☒
Further	Ashby, M. and Johnson, K., (2010) Materials and Design: The Art and Science of Materials Selection in Product Design - 2nd Edition (Butterworth-Heinemann, 2010)	☐
Further	Ashby, M. and Jones, D., Engineering Materials: An Introduction to Properties, Applications and Design - 4th Edition (Butterworth Heinemann, 2011)	☐
Further	Chiles, V., Black, S. and Lissaman, A., Principles of Engineering Manufacture - 3rd Edition (Elsevier, 1996)	☐
Further	Beddoes, J., Principles of Metal Manufacturing Processes (Elsevier Butterworth Heinemann, 1999)	☐
Further	Journal of Manufacturing Processes, the Society of Manufacturing Engineers (SME)	☐

Module Code	**ACMA4002**
Title	**Plant Operations and Performance**
Date	**01/02/2021**
Level	**4**
Credits	**20**
Pre-Requisites	**None**

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
EL4	Understanding of the requirement for engineering activities to promote sustainable development and ability to apply quantitative techniques where appropriate
EL6	Knowledge and understanding of risk issues, including health & safety, environmental and commercial risk, and of risk assessment and risk management techniques
P2	Knowledge of characteristics of particular materials, equipment, processes or products
P5	Knowledge of relevant legal and contractual issues
P6	Understanding of appropriate codes of practice and industry standards

AIM(S)

- To provide the student with the understanding to be able to install, commission and monitor equipment performance

LEARNING OUTCOMES

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

- Understand how to undertake commissioning and installation activities to ensure business and operational needs are fulfilled.
- Monitor equipment performance using a range of techniques and understand performance requirements of the plant.

INDICATIVE CONTENT

- Specifications for equipment including development and criteria for installation and commissioning.
- Installation of equipment including planning the project, provision of utilities, environmental issues, health and safety, ergonomics and resources
- Commissioning – understand what it involves and be able to put a proposal forward for commission plant
- Monitoring equipment in terms of reliability, energy performance and operational factors
- Measuring performance of equipment in terms of productivity, downtime, and energy consumption

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

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	2,000 words	50%

Assessment Component 2

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Poster presentation and marking of poster	20 minutes	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4002**	
Module Title	**Plant Operations and Performance**	
Classification	**Reading List entry**	**Electronic***
Essential	Kilcross, M (2018) Chemical and Process Plant Commissioning Handbook, Butterworth-Heinemann	☐
Essential	Moran, S (2015) An Applied Guide to Process and Plant Design, Elsevier, Oxford	☒
Essential	Harris, D (2016) A Guide to Energy Management in Buildings, 2nd Edition, Routledge, Abingdon	☒
Further	Beggs, C (2009) Energy Management, Supply and Conservation, 2nd Edition, Routledge, Abingdon	☐
Further	Mobley, R. Keith (2014) Maintenance Engineering Handbook 8th Edition, McGraw Hill, New York	☐
Further	Thorpe, D (2014) Energy Management in Industry, Earthscan, Abingdon	☐
Further	Oung, K (2013) Energy Management in Business: The Manager's Guide to Maximising and Sustaining Energy Reduction, Abingdon	☐

Module Code	**ACMA4003**
Title	**Project Design**
Date	**01/02/2021**
Level	**4**
Credits	**20**
Pre-Requisites	**None**

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
EA4b	Knowledge and understanding of management techniques, including project management, that may be used to achieve engineering objectives
D1	Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics
D2	Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards
D5	Plan and manage the design process, including cost drivers, and evaluate outcomes
EL3b	Knowledge and understanding of management techniques, including project management, that may be used to achieve engineering objectives
P6	Understanding of appropriate codes of practice and industry standards
P11b	Understanding of, and the ability to work in, different roles within an engineering team

AIM(S)

- To equip the student with the knowledge necessary to effectively participate in operational/industrial projects

LEARNING OUTCOMES

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

- Demonstrate awareness of project design concepts and principles showing how they can be deployed in industry
- Demonstrate the use of design tools and techniques to define projects and make sound judgements in the context of industrial engineering projects

INDICATIVE CONTENT

- Project phases- initiation, planning, execution, monitoring and control, and closure phases
- Project management- time management, resource planning, construction of network diagrams and Gantt charts, data security, quality control
- Team working and group dynamics – leadership styles, Belbin roles in a team, Tuckman's team building phases, managing people
- System engineering- levels of systems engineering, system boundaries, system design methods, validation and verification
- Research techniques- surveys and questionnaires, on-line databases, private communications, collecting data.

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

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Component 2

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Presentation	15 minutes	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4003	
Module Title	Project Design	
Classification	Reading List entry	Electronic*
Essential	Maylor, H (2010) Project Management, 4th Edition	☐
Essential	Grit, R (2019) Project Management: A Practical Approach 5th Edition, Noordhoff	☐
Essential	Mullins, L (2016) Management and Organisational Behaviour, 11th Edition, Pearson	☐
Further	Leong, M (2019) The Principle of Effective Project Management: The Proven System, Independently Published	☐
Further	Cluster, K (2019) Agile Project Management, Independently Published	☐
Further	Bonnema, G Veenvliet, K and Broenink, J (2015) System Design and Engineering: Facilitating Multidisciplinary Development Project, CRC Press	☐
Further	Journal of Production Economics	☒
Further	Journal of Systems and Software	☒
Further	International Journal of Project Management	☒
Further	Computers & Education	☒
Further	Procedia Manufacturing	☒
Further	Computers in Industry	☒
Further	Learning and Individual Differences	☒
Further	Journal of Engineering and Technology Management	☒
Further	Industrial Marketing Management	☒
Further	Journal of Cleaner Production	☒
Further	www.teamgantt.com	☒
Further	www.mindtools.com	☒
Further	www.managers.org.uk	☒
Further	www.institutelm.com	☒
Further	www.i-l-m.com	☒
Further	www.imeche.org	☒
Further	www.apm.org.uk	☒
Further	www.pmi.org	☒

Module Code	**ACMA4004**
Title	**Quality and Business Improvement**
Date	**01/02/2021**
Level	**4**
Credits	**20**
Pre-Requisites	**None**

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
P1	Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc)
P2	Knowledge of characteristics of particular materials, equipment, processes or products
P7	Awareness of quality issues and their application to continuous improvement

AIM(S)

- To provide the student with the ability to use a range of tools and techniques to improve quality of products and services and business performance.

LEARNING OUTCOMES

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

- Apply a range of tools and techniques that can be used to investigate problems, assess risk, and analyse areas for improvement
- Understand the main elements of the six sigma methodology

INDICATIVE CONTENT

- Main elements of six sigma, DMAIC methodology,
- Lean principles for process improvement
- Failure modes effects analysis- process, systems service FMEAs, benefits and continuous improvements
- Quality Function Deployment analysis
- Kano model for quality
- Seven basic quality tools- Pareto Analysis, cause and effects analysis, check sheets, control charts, flow charts, histograms and scatter diagrams
- Error proofing- applications, use of Poka-Yoke techniques and different levels of error proofing

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

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4004**	
Module Title	**Quality and Business Improvement**	
Classification	**Reading List entry**	**Electronic***
Essential	Dale, B; Van der Wiele, T and Van Iwaarden, J (2016) Managing Quality, Blackwell Publishing	☒
Essential	Jones, E (2017) Quality Management for Organisations Using Lean Six Sigma Techniques, CRC Press, Boca Raton	☐
Essential	Summers, D (2010) Lean Six Sigma Process Improvement Tools and Techniques, Pearson, New Jersey	☐
Further	Besterfield, D (2012) Quality Improvement, 9th Edition, Pearson Education Limited Harlow	☒

Further	Brook, Q (2017) Lean Six Sigma and Minitab The Complete Toolbox Guide for Business Improvement, 5th Edition, Opex Resources Ltd	☐
Further	Gitlow, H; Oppenheim, A; Oppenheim, R and Levine, D (2005) Quality Management, 3rd Edition, McGraw Hill, New York	☐
Further	Altman, H (2017) Six Sigma: Quick Step-by-Step Guide to Improve Quality and Eliminate Defects in any process, Create Space Independent Publishing Platform	☐
Further	Backstrome T., Fundin A. and Johansson P.E., (2019), Innovative Quality Improvements in Operations: Introducing Emergent Quality Management (International Series in Operations Research & Management Science), Springer	☒
Further	George M, Blackwell D. and Rajan D., (2019), Lean Six Sigma in the Age of Artificial Intelligence: Harnessing the Power of the Fourth Industrial Revolution, McGraw-Hill Education	☒

Module Code	ACMA4006
Title	Engineering Mathematics
Date	12/07/2024
Level	4
Credits	20
Pre-Requisites	None

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
SM2b	Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems

AIM(S)

- To introduce the student to the mathematical ideas and techniques necessary for an understanding of the mathematics encountered in further engineering modules

LEARNING OUTCOMES

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

- demonstrate understanding and competency with respect to a range of algebra and functions mathematical techniques which are the basis of the mathematics required in engineering; calculus, types of integrals, manipulation of matrices and complex number theory, cartesian and polar form and manipulation of complex numbers

INDICATIVE CONTENT

- Solution of linear, quadratic and simultaneous equations
- Transposition of formula
- Solution of indicial and logarithmic equations using the laws of logarithms
- Trigonometry, Sine and Cosine rule, solution of trigonometric equations
- Logarithms and their use in solution of indicial and logarithmic equations
- Statistical methods including standard deviation, averages, sample distribution, standard error, sample variance.
- Differential calculus: standard rules; simple partial differentiation
- Integral calculus: definite and indefinite integrals; standard integrals; integration by parts; integration by substitution;
- Complex numbers: algebra and manipulation; Argand diagram; polar form; De Moivres' theorem
- Differentiation: maxima, minima and points of inflection; standard derivatives and the rules of differentiation;
- Matrix algebra: manipulation of matrices, determinants, solution of simultaneous equations using Cramer's method

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

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	1.5 hours	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM2b

Assessment Component 2

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	1.5 hours	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM2b

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4006	
Module Title	Engineering Mathematics	
Classification	**Reading List entry**	**Electronic**
Essential	Smedley, R., Wiseman, G., Introducing Pure Mathematics (Oxford, 2001)	☐
Essential	Stroud, K. A., Engineering Mathematics (Red Globe Press, 2020)	☐
Further	Singh, K., Engineering Mathematics through Applications (Red Globe Press, 2011)	☐
Further	Rouvel, J., Automotive Mathematics (Pearson/Prentice Hall, 2005)	☐
Reference	https://www.khanacademy.org/	☒

Module Code	ACMA4007
Title	Engineering Applications and Study Skills
Date	12/07/2024
Level	4
Credits	20
Pre-Requisites	None

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
SM2b	Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems
EA3b	Ability to apply quantitative and computational methods in order to solve engineering problems and to implement appropriate action
D6	Communicate their work to technical and non-technical audiences
EL5	Awareness of the relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues
P3	Ability to apply relevant practical and laboratory skills
P8	Ability to work with technical uncertainty
G1	Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities
G2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD

AIM(S)

- To introduce the student to workshop and laboratory skills and safety practices through the media of degree pathway specific technology whilst allowing them to critically evaluate and apply theoretical engineering concepts to specific applications and problem-solving exercises.
- Accelerate their learning process and strategies.

LEARNING OUTCOMES

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

- demonstrate knowledge and understanding of specific engineering concepts and how their theoretical characteristics are used in discipline specific engineering applications;
- apply practical engineering skills and demonstrate know-how of practices, skills, safety and standards with respect to laboratory and workshops, and key transferable skills in terms of written and oral presentation, personal development, reflective abilities and proficiency in appropriate engineering software
- Demonstrate key transferable skills in the creation of a personal development plan, manage their own learning; avoid plagiarism and create independent work; master referencing conventions; communicate information, ideas, problem and solutions to both specialist and non-specialist audiences; apply a range of key transferable study and communication skills to produce assignment work.

INDICATIVE CONTENT

- Understanding the learning process and identifying skills (e.g. self-evaluation, skills needed for higher education, transferable skills, action plans for personal development).
- Organising study (e.g. time management, organising space, organising resources)
- Structuring study and sourcing information - effective note taking, using the library and the internet, referencing convention. Revision and examination techniques.

- Communicating and presenting information (e.g. presentation techniques, styles, the appropriate use of graphs, charts, measures of central tendency)
- Developing an appropriate writing style (e.g. planning and structuring essays and reports, linking ideas together, using facts, opinions or arguments, analytical thinking, etc.)
- Fundamentals of Statistics and Probability.
- Fundamentals of computing language.
- Develop proficiency of appropriate general and engineering specific software.
- Implementation of Matlab to solve statistics practice problems.
- Familiarity with basic electronic and mechanical components, laboratory and workshop equipment and their real-world applications and behaviour.
- Health & Safety procedures and legislations, personal protective equipment and safe working practice.
- Workshop / machine-shop practical exercises

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

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Series of short exercises, reports and presentations	1,600 words total	40%

AHEP3 Version 3 outcomes to be met in this assessment:
D6, EL5, G1, G2

Assessment Component 2

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report & Logbook documenting engineering applications covered.	2,400 words	60%

AHEP3 Version 3 outcomes to be met in this assessment:
SM2b, EA3b, P3, P8

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4007**	
Module Title	**Engineering Applications and Study Skills**	
Classification	**Reading List entry**	**Electronic***
Essential	Bosch Automotive Handbook (Bentley, 2011)	☐
Essential	Cottrell, S., The Study Skills Handbook (Red Glob Press, 2019)	☒
Essential	Van Emden, J., Writing for Engineers (Red Globe Press, 2017)	☒
Essential	Bird, J., Mechanical Engineering Principles (Routledge, 2019)	☐
Essential	Shigley, J., Mechanical Engineering Design - 10th Edition (McGraw Hill, 2014)	☐
Further	Bolton, W., Mechanical Science, Wiley-Blackwell (2006)	☐
Further	Hannah, J. and Hillier, M. J., Mechanical Engineering Science (Prentice Hall, 1999)	☐
Further	Sizemore, J., MATLAB for dummies (John Wiley & Sons, 2015)	☒
Further	Health and Safety Executive www.hse.gov.uk	☒

Module Code	ACMA4008
Title	Engineering Design
Date	12/07/2024
Level	4
Credits	20
Pre-Requisites	None

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
*SM3b	Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline
D1	Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics
D2	Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards
D5	Plan and manage the design process, including cost drivers, and evaluate outcomes
P3	Ability to apply relevant practical and laboratory skills

***** Only applies to Materials Science programme

AIM(S)

- To introduce students to both 2D and 3D Computer Aided Design, Drafting and Solid Modelling and a familiarity with the engineering design process and to give an understanding of the theory and application of design methodologies and processes.
- To develop a knowledge base and understanding of the structure, properties and basic selection of classes of materials and appreciation of the processes used in the manufacture of components with a view to providing basic process selection parameters

LEARNING OUTCOMES

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

- Show knowledge and understanding of design methodologies and processes (problem definition/decision making/communication etc.) Including key transferable skills in problem formulation and decision making, communication and self-management skills
- Demonstrate skills in communicating the design, material and manufacturing of products through the preparation and interpretation of Engineering Drawings to BS8888 through the medium of 2D and 3D CAD tools. Including cognitive skills to allow choice of material and manufacturing processes to meet specific design criteria.

INDICATIVE CONTENT

- Methodologies for the generation of design solutions to conceptual and adaptive design problems, to include creativity, innovation, evaluation, optimisation, design isolation, manufacture, reliability, sustainability, safety and cost implications.
- Engineering Graphics – basic sketching and drawing skills in the creation and interpretation of engineering drawings. British Standard 8888 (or equivalent standard).
- Computer Aided Drawing – introduction to the use of Solidworks (or equivalent software) for the creation of 3D solid models, assemblies and 2D engineering drawings.

- Methodologies for the generation of design solutions to conceptual and adaptive design problems. To include; creativity, innovation, evaluation, optimisation, design isolation, manufacture, reliability, sustainability, safety and cost implications.
- Material properties and material selection using CES material selection software.
- Introduction to primary and secondary manufacturing processes.
- Tolerancing principles, limit and fit calculations, geometric dimensioning and tolerancing theory and applications

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

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Practical Assessment	2 Hour Assessment	50%

AHEP3 Version 3 outcomes to be met in this assessment:
P3

Assessment Component 2

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Technical Report	2000-word report	50%

AHEP3 Version 3 outcomes to be met in this assessment:
D1, D2, D5, P3

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4008	
Module Title	Engineering Design	
Classification	**Reading List entry**	**Electronic***
Essential	Pugh S - Total Design: Integrated Methods for Successful Product Engineering, (Prentice Hall, 1990)	☐
Essential	Madsen, D., Engineering Drawing and Design (Cengage Delmar Learning, 2016)	☒
Essential	Pahl, G. et al - Engineering Design: A Systematic Approach, (Springer, 2006)	☐
Further	Willis, J., SolidWorks 2020: A Power Guide for Beginners and Intermediate User, (CADArtifex, 2020)	☒
Further	Ullman DG - The Mechanical Design Process, 6th Edition, (David Ullman LLC, 2017)	☒
Further	Ashby, M., Materials Selection in Mechanical Design, 5th Edition, (Butterworth-Heinemann, 2016)	☒
Further	Walker, S., Sustainable by Design: Explorations in Theory and Practice, (Routledge, 2006)	☐
Further	Budynas, R., Shigley's Mechanical Engineering Design (McGraw-Hill Education, 2014)	☐
Further	Science Direct (https://www.sciencedirect.com/)	☒

Module Code	**ACMA4015**
Title	**Business Planning**
Date	**07/08/2023**
Level	**4**
Credits	**10**
Pre-Requisites	**None**

AIM(S)

- To facilitate students' understanding of business planning and project management.

LEARNING OUTCOMES

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

- assess the internal and external business environment using suitable tools and techniques;
- understand the stages of a project and its components;
- use appropriate project planning and management tools.

INDICATIVE CONTENT

- Business Analysis in contemporary logistics systems.
- Business environment.
- Business planning.
- External environment.
- PEST Analysis.
- Linear versus Circular Business Planning.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Business Planning Exercise presented as an Essay	1,500 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4015	
Module Title	Business Planning	
Classification	Reading List entry	Electronic*
Essential	Coyle, J. J. et al (2016) *The Management of Business Logistics: A Supply Chain Perspective* 6th Ed, Mason Ohio: Thompson	☐
Essential	Daniels, J., Radebaugh, L., and Sullivan, D. (2018) *International Business Global Edition* 16th Ed, London: Pearson	☐
Essential	Winter, H. (2019) *The Business Analysis Handbook: Techniques and Questions to Deliver Better Business Outcomes* London: Kogan Page	☐
Further	Bak, O. (2018) *E-Business and Supply Chain Integration - Strategies and Case Studies from Industry* London: Kogan Page	☐
Further	Finch, B. (2022) *How to Write a Business Plan - Win Backing and Support for Your Ideas and Ventures* London: Kogan Page	☐
Further	Kerzner, H. (2009) *Project Management - A Systems Approach to Planning, Scheduling, and Controlling* 10th Ed, Chichester: Wiley	☒
Further	Project Management Institute (2013) *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide) Pennsylvania: Project Management Institute	☒

Module Code	ACMA4016
Title	Data Analytics Principles
Date	07/08/2023
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To develop the knowledge and skills required to perform basic data analysis.
- To introduce students to data analytics techniques, tools and systems applied to logistics and supply chains.

LEARNING OUTCOMES

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

- understand the fundamental concepts and principles of data analysis, management systems and will be developing practical skills in using data analysis tools and systems in logistics and supply chains.

INDICATIVE CONTENT

- Data, and databases and management systems.
- The role of data in logistics and supply chains.
- Database, warehousing and analysis techniques.
- Data mining systems applied to logistics databases.
- Data analysis tools and systems.
- Logistics data management.
- Data Analytics in logistics and supply chains.
- The future of supply chain analytics.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Coursework including written report and data analysis	1,500 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4016**	
Module Title	**Data Analytics Principles**	
Classification	**Reading List entry**	**Electronic***
Essential	Marr, B. (2015) *Big Data: Using SMART Big Data Analytics and Metrics to Make Better Decisions and Improve Performance* Chichester: Wiley	☐
Essential	Tipi, N. (2021) *Supply Chain Analytics and Modelling: Quantitative Tools and Applications* London: Kogan Page	☐
Essential	Bag, D. (2016) *Business Analytics* 1st Ed, Abingdon: Taylor & Francis	☐
Further	Gupta, D. (2018) *Applied Analytics Through Case Studies using SAS and R: Implementing Predictive Models and Machine Learning Techniques* Berkeley CA: Apress doi:10.1007/978-1-4842-3525-6	☐
Further	Loth, A. (2019) *Visual Analytics with Tableau* Chichester: Wiley	☒
Further	Witten, I. H., Elbe, F., Hall, M. A., and Pal, C. J. (2016) *Data Mining: Practical Machine Learning Tools and Techniques* Cambridge MA: Morgan Kaufmann	☒
Further	Robertson, P. (2020) *Supply Chain Analytics* 1st Ed, Abingdon: Taylor & Francis	☐

Module Code	ACMA4017
Title	Finance Management
Date	07/08/2023
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To develop an appreciation and understanding of the significance of finance management within a company.
- To apply the theories and methods for managing finance to specific problems in logistics and supply chains.

LEARNING OUTCOMES

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

- demonstrate an understanding of finance management related to the logistics industries and supply chain management;
- evaluate the application of theories and methods of supply chain finance.

INDICATIVE CONTENT

- Costing Managing Budgets and Financial Statements.
- Managing Sustainable Finance.
- Inter-departmental relationships.
- Supply Chain finance and Credit Insurance requirements for suppliers.
- Cost of capital.
- Working capital management including influence from moving / improving payment terms and stock levels.
- Risk and hedging.
- NPV and investment criteria.
- Crypto currencies.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Presentation	15 minutes	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4017**	
Module Title	**Finance Management**	
Classification	**Reading List entry**	**Electronic***
Essential	Camerinelli, E. (2009) *Measuring the Value of Supply Chain Linking Financial Performance and Supply Chain Decisions* Farnham: Gower	☒
Essential	Tsai, S-B., Shen, C-H., Song, H. and Niu, B. (2019) *Green Finance for Sustainable Global Growth* Hershey PA: IGI Global	☐
Essential	McLaney, E. J. (2011) *Business Finance: Theory and Practice*, 9th Ed, Harlow: Financial Times Prentice Hall	☒
Further	Weetman, P. (2016) *Financial Accounting: An Introduction* 7th Ed, London: Pearson	☒

Module Code	ACMA4018
Title	Introduction to Procurement
Date	07/08/2023
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To develop an appreciation and understanding of the application of procurement and purchasing.

LEARNING OUTCOMES

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

- describe and explain procurement and purchasing concepts and definitions and the different types of procurement;
- explain and understand outsourcing, managing and selecting suppliers.

INDICATIVE CONTENT

- Procurement and purchasing definitions, concepts and principles.
- Procurement as a strategic activity.
- Types of procurement.
- Procurement process.
- Outsourcing.
- Supplier selection.
- Procurement and markets.
- The Kraljik Matrix.
- The difference between public and private sector procurement.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)
☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Online exam	2 hours	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4018**	
Module Title	**Introduction to Procurement**	
Classification	**Reading List entry**	**Electronic***
Essential	Bailey, P. et al (2008) *Procurement, Principles and Management* London: FT Prentice Hall	☐
Essential	Mena, C. van Hoek, R. and Christopher, M. *(2021) Leading Procurement Strategy - Driving Value Through the Supply Chain* London: Kogan Page	☐
Essential	Lysons, K. and Farrington, B. (2020) *Purchasing and Supply Chain Management* 10th Ed, London: Pearson	☐
Further	Sabri, E. H. (Ed) (2015) *Optimization of Supply Chain Management in Contemporary Organizations* Hershey PA: Business Science Reference	☒
Further	*Journal of Purchasing and Supply Management* (2003-2022) Pergamon	☒
Further	Murphy, P. R. and Wood, D. (2008) *Contemporary Logistics* 9th Ed, London: Pearson Prentice Hall	☐

Module Code	**ACMA4019**
Title	**Lean Thinking**
Date	**07/08/2023**
Level	**4**
Credits	**10**
Pre-Requisites	**None**

AIM(S)

- To provide the students with the ability to apply lean thinking tools and systems in order to improve the quality of products, processes or services.

LEARNING OUTCOMES

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

- identify, adapt and use a range of tools and techniques to investigate problems, assess risk, and analyse areas for improvement;

- evaluate the techniques and practices used in lean management to implement and maintain sustainable logistic operations.

INDICATIVE CONTENT

- Main elements of Six Sigma, and DMAIC methodology.

- The Five principles of Lean Thinking :
  - Defining Value.
  - Mapping the Value Stream.
  - Creating Flow.
  - Using a Pull System.
  - Pursuing Perfection.

- The Eight Wastes of Lean Manufacturing, including Muda, Mura and Muri.

- A3 Thinking as part of the problem-solving process.

- Lean Supply Chain management and practices.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Problem-solving exercise	1,500 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4019	
Module Title	Lean Thinking	
Classification	Reading List entry	Electronic*
Essential	Rother, M. and Shook, J. (2009) *Learning to See.* Cambridge, MA: Lean Enterprise Institute,	☐
Essential	Smalley, A. and Sobek, D. (2008) *Understanding A3 Thinking* London: CRC Press	☐
Essential	Bicheno, J. and Bicheno, J. (2016) *The New Lean Toolbox* 5th Ed, Buckingham: PICSIE Books	☐
Further	Roos, D., Womack, J. and Jones, D. (2014) *The Machine That Changed The World* London: Simon & Schuster	☐
Further	Baudin, M. (2004) *Lean Logistics: The Nuts and Bolts of Delivering Materials and Goods* New York NY: Productivity Press	☐
Further	Hajdul, M. and Mindur, L. *(2015). Lean and Reliable Digital Supply Chains – A Case Study.* LogForum *1(11), 15-27*	☒
Further	Leite, H. R. and Vieira, G. E. (2015) *Lean Philosophy and its Applications in the Service Industry: A Review of the Current Knowledge* pdf 25(3), 529-541	☒
Further	Schneider, J. (2017) *Understanding Design Thinking, Lean and Agile* 1st Ed Sebastopol: O'Reilly Media	☐

Module Code	ACMA4020
Title	Organisation Management
Date	07/08/2023
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To introduce the students to the theory and practice of organisation management as applied to logistics and supply chain management.
- To develop leadership skills for maintaining the competitiveness of the supply chains and logistics companies.

LEARNING OUTCOMES

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

- describe applied knowledge and understanding of the theories of organisation management;
- acquire knowledge of leadership theories and develop leadership skills in Supply Chain Management or Logistics Operations.

INDICATIVE CONTENT

- Project management.
- People management.
- Planning the workforce.
- Leadership.
- Productive working relationships.
- Leadership in Supply Chain Management or Logistics Organisations.

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
Essay	1,500 words	50%

Assessment Component 2
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Presentation	15 minutes	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4020**	
Module Title	**Organisation Management**	
Classification	**Reading List entry**	**Electronic***
Essential	Mullins, L. J. (2016) *Management and Organisational Behaviour* Harlow: Pearson Education Limited	☐
Essential	Mullins, L. J. and Christy, G. (2013) *Management and Organisational Behaviour* 10th Ed, Harlow: Pearson Education Limited	☒
Essential	Mullins, L. J. and McLean, J. E. (2019) *Organisational Behaviour in the Workplace* 12th Ed, Harlow: Pearson Education Limited	☐
Essential	Northouse, P.G. (2022). *Leadership: Theory and Practice* 9th Ed, Los Angeles: SAGE	☒
Further	Evans, J. R. and Lindsay, W. M. (2019) *Managing for Quality and Performance Excellence* 10th Ed, Andover: South-Western Cengage Learning	☐
Further	Sabri, E. H. (Ed) (2015) *Optimization of Supply Chain Management in Contemporary Organizations* Hershey PA: Business Science Reference	☐
Further	Beardwell, J. and Claydon, T. (eds) (2007) *Human Resource Management: A Contemporary Approach* Harlow: Pearson Education Limited	☐
Further	Cole, G. A. and Kelly, P. (2001) *Management Theory and Practice* 7th (Revised) Ed, Andover: South-Western Cengage Learning	☐

Module Code	**ACMA4021**
Title	**Study and Research Skills**
Date	**07/08/2023**
Level	**4**
Credits	**10**
Pre-Requisites	**None**

AIM(S)

- To provide the students with the essential skills to study, undertake research, and communicate for effective learning.

LEARNING OUTCOMES

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

- identify, adapt and use suitable methods that can support learning through a reflective, active, positive approach to learning, and take responsibility for self-learning;

- evaluate the research and development approaches used in logistics and supply chains.

INDICATIVE CONTENT

- Study Skills: Understanding the learning process and identifying the appropriate skills, such as self-evaluation, skills needed for higher education, transferable skills, and action plans for personal development. Organising study, including effective time management and the organising of space and resources. Effective note-taking, use of the library and the internet, and implementation of referencing standards.

- Research Skills: Identifying and evaluating the academic literature. Critical and creative thinking, and reviewing of existing literature. Understanding the fundamentals of research methods.

- Presentation Skills: Communicating and presenting information (presentation techniques, styles, the appropriate use of graphs, charts, measures of central tendency). Developing the academic writing style (planning and structuring reports, linking ideas together, using facts, opinions or arguments, analytical thinking, etc.).

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Portfolio	2 elements (equivalent of 1,500 words)	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4021**	
Module Title	**Study and Research Skills**	
Classification	**Reading List entry**	**Electronic***
Essential	Cottrell, S. (2010) *Skills for Success: The Personal Development Planning Handbook* 2nd Ed, Basingstoke: Palgrave Macmillan	☒
Essential	Cottrell, S. (2019) *The Study Skills Handbook* 5th Ed, London: Macmillan International Higher Education/Red Globe Press, an imprint of Springer Nature Limited	☐
Essential	Hopkins, D. and Reid, T. (2018) *The Academic Skills Handbook: Your Guide to Success in Writing, Thinking and Communicating at University* Los Angeles: SAGE	☐
Further	Sharp, J. A., Howard, K., and Peters, J. (2017) *The Management of a Student Research Project* Open University Press / London: Routledge / Gower	☐
Further	Open Learn (2022) *Skills for Study* Available at : https://www.open.edu/openlearn/skills-for-study	☒
Further	Smale, B. and Fowlie, J. (2015) *How to Succeed at University: An Essential Guide to Academic Skills and Personal Development* Los Angeles: SAGE	☐

Further	Cottrell, S. (2017) *Critical Thinking Skills: Effective Analysis, Argument, and Reflection* 3rd Ed, Basingstoke: Palgrave Macmillan	☐
Further	Pears, R. and Shields, G. J. (2019) *Cite Them Right: the Essential Referencing Guide.* 11th Ed, London: Macmillan International Higher Education	☒
Further	Well-being of Future Generations (Wales) Act 2015 (Online). Available at http://www.legislation.gov.uk/anaw/2015/2/contents/enacted	☐

Module Code	**ACMA4022**
Title	**Supply Chain Informatics**
Date	**07/08/2023**
Level	**4**
Credits	**10**
Pre-Requisites	**None**

AIM(S)

- To introduce students to supply chain information systems and recognise that the effective and innovative management of information can sustain competitive advantage.

- To develop students' understanding of the application of information technologies systems.

LEARNING OUTCOMES

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

- demonstrate a sound understanding of the application of information technology and systems (i.e. SAP-ERP) in logistics and supply chain management.

INDICATIVE CONTENT

- Information systems in supply chain management and logistics.

- The benefits and challenges of applying information technology in logistics.

- Information systems for product planning, materials management, inventory, transportation and distribution.

- Current information systems (e.g. enterprise systems such as ERP, CRM and SCM, e-Business, e-Marketing, e-HRM, e-Procurement, e-Learning, e-government, mobile commerce).

- Enterprise Resource Planning Systems Implementation and SAP-ERP.

- Analyse complex information in the supply chain.

- Knowledge management in logistics.

- Decision making systems.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	1,500 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4022**	
Module Title	**Supply Chain Informatics**	
Classification	**Reading List entry**	**Electronic***
Essential	Chaffey, D. (2015) *Digital Business and E-Commerce Management* 6th Ed, Harlow: Pearson	☒
Essential	Wang, Y. and Pettit, S. (2021) *E-Logistics: Managing Digital Supply Chains for Competitive Advantage* London: Kogan Page	☐
Essential	Pagano, A. and Liotine, M. (2020) *Technology in Supply Chain Management and Logistics : Current Practice and Future Applications* Amsterdam: Elsevier	☐
Further	Murphy, P. R. and Wood, D. (2008) *Contemporary Logistics* 9th Ed, London: Pearson Prentice Hall	☐
Further	Mangan, J. (2016) *Global Logistics and Supply Chain Management* 3rd Ed, Chichester: Wiley	☐
Further	Information Resources Management Association (2013) *Enterprise Resource Planning Concepts, Methodologies, Tools and Applications* Hershey PA: Business Science Reference	☐
Further	Ferran, C. and Salim, R. (2008) *Enterprise Resource Planning for Global Economies - Managerial Issues and Challenges* New York: IGI Global	☒

Module Code	**ACMA4023**
Title	**Sustainability**
Date	**07/08/2023**
Level	**4**
Credits	**10**
Pre-Requisites	**None**

AIM(S)

- To provide students with the knowledge and ability to assess sustainability and environmental impact considerations in logistics and supply chains.
- To enable students to understand the benefits of circular versus linear economy.

LEARNING OUTCOMES

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

- describe the requirements needed to evaluate sustainability in logistics and supply chain management;
- understand circular economy concepts and principles.

INDICATIVE CONTENT

- Environmental, social norms and standards for logistics companies and supply chain sustainability evaluation.
- The triple bottom line.
- Corporate social responsibility.
- Circular economy principles.
- Linear versus circular economies.
- The supply chain transformation from linear to circular.
- Innovation in SCM.
- Environmental Impact of logistics operations and reducing packaging.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Sustainability Assessment Exercise presented as an Essay	1,500 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4023**	
Module Title	**Sustainability**	
Classification	**Reading List entry**	**Electronic***
Essential	Kovacic, Z., Strand, R. and Völker, T. (2020) *The Circular Economy in Europe: Critical Perspectives on Policies and Imaginaries* 1st Ed, London: Routledge https://doi.org/10.4324/9780429061028	☒
Essential	Weenk, E. and Henzen, R. (2021). *Mastering the Circular Economy - A Practical Approach to the Circular Business Model Transformation* London: Kogan	☐
Essential	Weetman, C. (2020) *A Circular Economy Handbook - How to Build a More Resilient, Competitive and Sustainable Business* London: Kogan	☒
Further	Kramberger, T., Potočan, V. and Ipavec, V. M. (2016) *Sustainable Logistics and Strategic Transportation Planning* Hershey PA: IGI Global	☒
Further	Heyzer, J. and Render, B. (2014) *Operations Management: Sustainability and Supply Chain Management* Harlow: Pearson.	☒
Further	Gupta, H. (2020) *Barriers and Overcoming Strategies to Supply Chain Sustainability Innovation* Elsevier, Amsterdam	☐

Further	Well-being of Future Generations (Wales) Act 2015 (online). Available at www.legislation.gov.uk/anaw/2015/2/contents/enacted	☒

Module Code	**ACMA4024**
Title	**Warehousing and Inventory Operations**
Date	**07/08/2023**
Level	**4**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To provide students with fundamental knowledge and skills in the development and management of warehouses.
- To understand efficient inventory management and optimisation strategies.

LEARNING OUTCOMES

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

- describe a range of issues that need to be considered as part of warehousing operations;
- explain the role of inventory in businesses and which factors need to be considered when managing inventory.

INDICATIVE CONTENT

- Role of the warehouse.
- Warehouse layouts.
- Inventory control and management.
- Stock control and accountancy.
- Order management.
- Materials handling.
- Customer service.
- Control supplies at storage locations.
- Packaging systems design and management.

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
Case Study Report	1,500 words	50%

Assessment Component 2
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Presentation	15 minutes	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4024**	
Module Title	**Warehousing and Inventory Operations**	
Classification	**Reading List entry**	**Electronic***
Essential	Richards, G. (2021), *Warehouse Management: A Complete Guide to Improving and Minimising Costs in the Modern Warehouse* 4th Ed, London: Kogan Page	☐
Essential	Mangan, J. (2016). *Global Logistics and Supply Chain Management* 3rd Ed, Chichester: Wiley	☐
Essential	Martin, H. (2018) *Warehousing and Transportation Logistics Systems, Planning, Application and Cost Effectiveness* London: Kogan Page	☐
Further	Murphy, P. R. and Wood, D. (2008) *Contemporary Logistics* 9th Ed London: Pearson Prentice Hall	☐
Further	Relph, G. and Milner, C. (2019) *The Inventory Toolkit - Business Systems Solutions* London: Kogan Page	☐

Module Code	ACMA4028
Title	Engineering Science
Date	12/07/2024
Level	4
Credits	20
Pre-Requisites	None

Engineering Council AHEP3 Learning Outcomes Assessed in this Module	
SM1b	Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of relevant historical, current and future developments and technologies
EA1b	Understanding of engineering principles and the ability to apply them to analyse key engineering processes
P1	Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc)
P3	Ability to apply relevant practical and laboratory skills

AIM(S)

- To provide a basic understanding of the principles and applications associated with general aspects of mechanical engineering science

LEARNING OUTCOMES

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

- Demonstrate a detailed knowledge and understanding of key relevant engineering principles in structures and dynamics analysis, and an understanding of modelling and solving numerical problems of both.
- Present an ability to apply appropriate key transferable skills and theoretical and practical methods to the analysis and solution of structures and dynamics engineering problems including decision making, interpreting experimental results.
- Show cognitive skills with respect to modelling and simplifying real problems, and applying mathematical methods of analysis.

INDICATIVE CONTENT

- Dynamics
- Friction
- Linear and Angular motion – inertia, radius of gyration etc
- Newton's Laws
- SHM
- Work / energy / momentum / power
- Static and dynamic: A calculative and analytical considerations of the bending equation, $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$ and torsion equation, $\frac{T}{J} = \frac{\tau}{r} = \frac{G\theta}{l}$, moments, uniform linear and rotary motion, simple energy systems and mechanical oscillations.

- Analysis of thermal heat transfer through conduction, $Q = \frac{-kA(T_2 - T_1)}{x}$, convection, $Q = hA(T_2 - T_1)$ and radiation, $Q = 56.7\varepsilon A\left[\left(\frac{T_2}{1000}\right)^4 - \left(\frac{T_1}{1000}\right)^4\right]$.

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

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Report	2000 words	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM1b, EA1b, P1, P3

Assessment Component 2

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	1.5 hours	50%

AHEP3 Version 3 outcomes to be met in this assessment:
SM1b, EA1b, P1

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4028	
Module Title	Engineering Science	
Classification	**Reading List entry**	**Electronic***
Essential	Zammit, S.J, Motor Vehicle Engineering Science for Technicians (Longman Technical Series, 1987)	☐
Essential	Twigg, P, Science for Motor Vehicle Engineers (Butterworth Heinemann, 1995)	☐
Further	Bird, J, Science and Mathematics for Engineering (Routledge, 2019)	☒
Further	Bolton, W, Engineering Science (Routledge, 2015)	☒

Module Code	**ACMA4029**
Title	**Data Analysis and Simulation**
Date	**06/08/2025**
Level	**4**
Credits	**20**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To provide students with foundational knowledge and skills in coding and statistics necessary for data analysis and simulation techniques.

LEARNING OUTCOMES

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

- demonstrate knowledge of the key programming concepts;
- apply statistical methods to analyse and interpret data effectively.

INDICATIVE CONTENT

- Introduction to programming languages such as Python, R, or MATLAB.
- Basic concepts of statistics including:
  - descriptive statistics;
  - probability distributions;
  - hypothesis testing.
- Data visualisation techniques.

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
Programme Code	2000 words or equivalent	50%

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

C4: Select and evaluate technical literature and other sources or information to address complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4029	
Module Title	Data Analysis and Simulation	
Classification	Reading List entry	Electronic*
Essential	Moore, H. (2019) *MATLAB® for engineers*. Fifth edition. New York: Pearson.	☒
Essential	McKinney, W.(2022) *Python for Data Analysis*, 3rd Edition. Delaware. O'Reilly Media. Open Access. Python for Data Analysis, 3E	☒
Essential	Wickham, H.,(2023) *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data.* 2nd Edition. Delaware. O'Reilly Media, Open Access. R for Data Science (2e)	☒
Further	Urdan, T., C., (2022) *Statistics in Plain English*, 5th Edition. Oxford. Routledge,	☐
Further	Dobrow, R., P.(2016) *Introduction to Stochastic Processes with R.* New Jersey. Wiley	☐
Further	Spiegelhalter, D.J. (2019) *The art of statistics learning from data*. UK: Pelican.	☒

Module Code	**ACMA4031**
Title	**Electrical Principles**
Date	**06/08/2025**
Level	**4**
Credits	**20**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To understand the fundamental operation of common electrical components and circuits.

LEARNING OUTCOMES

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

- analyse specified circuits and networks using appropriate analysis tools;
- define electrical / electronic measurements, record and analyse data and produce a report.

INDICATIVE CONTENT

- Ohm's Law.
- Series/parallel connections for R, L and C.
- KVL and KCL.
- Potential and Current divider networks.
- Voltage and Current sources.
- AC fundamentals.
- Sinusoidal properties.
- Resistance, Reactance and Impedance.
- Complex notation.
- Single phase AC circuits.
- Maximum Power Transfer.
- Tuned Circuits.
- Electromagnetism, Electromagnetic Induction, Faraday's, Lens' Laws etc.
- Principles of motors and generators.

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	2000 words	50%

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

C4: Select and evaluate technical literature and other sources or information to address complex problems.

C12: Use practical laboratory and workshop skills to investigate complex problems.

Assessment Component 2
(Tick one)

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C3: Select and apply appropriate computational and analytical techniques to model complex problems.

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4031**	
Module Title	**Electrical Principles**	
Classification	**Reading List entry**	**Electronic***
Essential	Bird, J.O. (2022) *Bird's electrical circuit theory and technology*. Seventh edition. London: Routledge.	☒
Essential	Floyd, T.L. and Buchla, D.M. (2013) *DC/AC fundamentals : a systems approach*. Upper Saddle River, N.J: Pearson.	☐
Further	Sinclair, I.R. and Dunton, J. (2007) *Practical electronics handbook*. 6th ed. Amsterdam ; Newnes.	☐
Further	Warnes, L.A.A. (2003) *Electronic and electrical engineering : principles and practice*. 3rd ed. Basingstoke: Palgrave Macmillan.	☒

Module Code	**ACMA4032**
Title	**Engineering Mathematics 1**
Date	**06/08/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To introduce students to pure mathematical techniques necessary for an understanding of the analytical content encountered in further engineering modules.

LEARNING OUTCOMES

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

- present an understanding and competency with respect to a range of algebraic and mathematical techniques;
- present an ability to solve mathematical problems involving a range of equation forms.

INDICATIVE CONTENT

- Transposition of formula.
- Solution of linear, quadratic and simultaneous equations.
- Trigonometry involving both right-angled and non-right-angled triangles.
- Trigonometric functions and solutions of equations involving them.
- Logarithms.
- An introduction to matrix algebra and manipulation.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**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%**

Engineering Council AHEP4 Learning outcomes **developed** in this module:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

INDICATIVE READING LIST

Module Code	**ACMA4032**	
Module Title	**Engineering Mathematics 1**	
Classification	**Reading List entry**	**Electronic***
Essential	Smedley, R. and Wiseman, G. (2001) *Introducing pure mathematics*. 2nd ed. Oxford: Oxford University Press.	☐
Essential	Stroud, K.A. and Booth, D.J. (2020) *Engineering mathematics*. Eighth edition. London: Red Globe Press.	☐
Essential	Gaulter, B., Gaulter, M., (2001) *Further Pure Mathematics* Oxford. Oxford University Press	☐

Module Code	**ACMA4033**
Title	**Engineering Science 1 and Laboratory Skills**
Date	**06/08/2025**
Level	**4**
Credits	**20**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To introduce fundamental engineering science principles.
- To develop practical laboratory skills relevant to mechanical engineering.

LEARNING OUTCOMES

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

- identify and describe basic principles of engineering science;
- present proficiency in using laboratory equipment and techniques.

INDICATIVE CONTENT

- Fundamentals of mechanics:
  - Vectors and Scalars;
  - Statics;
  - Newton's Laws of Motion;
  - Work, Energy, and Power;
  - Conservation Laws;
  - Fluid Mechanics Basics;
  - Simple Harmonic Motion;
  - Mechanics of materials.
- Laboratory sessions covering basic experimental methods in mechanical engineering, including safety protocols, security measures, and secure communication protocols.
- Measurement errors and uncertainties.
- Data analysis and presentation techniques with consideration for security implications.

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	50%

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Laboratory Report	2000 words	50%

Engineering Council AHEP4 Learning Outcomes **developed** in this assessment:

C1: Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.

C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science, and engineering principles.

C12: Use practical laboratory and workshop skills to investigate complex problems.

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4033**	
Module Title	**Engineering Science 1 and Laboratory Skills**	
Classification	**Reading List entry**	**Electronic***
Essential	Bird, J.O. (2019) *Science and mathematics for engineering*. 6th edition. London: Routledge. Available at: https://doi.org/10.1201/9780429261701.	☒
Essential	Bird, J.O. and Ross, C.T.F. (2020) *Mechanical engineering principles*. Fourth edition. Abingdon, Oxon: Routledge.	☒
Essential	Kirkup, L., (2019) *Experimental Methods for Science and Engineering Students: An Introduction to the Analysis and Presentation of Data.* 2nd Edition. Cambridge. Cambridge University Press	☐
Further	Tooley, M., (2020) *Engineering Science: For Foundation Degree and Higher National* 2nd Edition. Oxford. Routledge,	☐
Further	Leng, L., G., (2024) *Understanding Data Encryption: A Practical Guide to Secure Computing*, Independently published	☐
Further	Taylor, J., R., (1997) *Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements*, 2nd Edition. Herndon. University Science Books, U.S.,	☐

Module Code	**ACMA4035**
Title	**Laboratory Skills for Materials 1**
Date	**06/08/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To develop an understanding of working with various materials in a laboratory environment and gain practical experience in the testing and analysis of materials and their properties.

LEARNING OUTCOMES

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

- recognise safe working in a laboratory setting by themselves and with others;
- define and perform a suitable test for a material and relate its mechanical properties to its microstructure.

INDICATIVE CONTENT

- Safety in the lab, MSDS and proper PPE usage.
- Metallographic preparation.
- Mounting, polishing, etching.
- Tension and compression testing of metals.
- Hardness testing.
- Optical microscopy of metals.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Laboratory Report	2000 Words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4035**	
Module Title	**Laboratory Skills for Materials 1**	
Classification	**Reading List entry**	**Electronic***
Essential	Callister, W.D. and Rethwisch, D.G. (2020) *Materials science and engineering : an introduction*. 10th edition. Hoboken, NJ: Wiley.	☐
Essential	Jones, D.R.H. and Ashby, M.F. (2019) *Engineering materials 1 : an introduction to properties, applications and design.* Fifth edition / David R.H. Jones, Michael F. Ashby. Oxford: Butterworth-Heinemann.	☐
Essential	Ashby, M.F. and Jones, D.R.H. (2013) *Engineering materials 2 : an introduction to microstructures, processing, and design*. 4th ed. Oxford [Oxfordshire] ; Butterworth-Heinemann.	☐
Further	Schrader, G.F. *et al.* (2000) *Manufacturing processes & materials*. Fourth edition. Dearborn, Mich: Society of Manufacturing Engineers.	☐
Further	Creese, R.C. (1999) *Introduction to manufacturing processes and materials*. New York: Marcel Dekker.	☐
Further	White, M.A. (2019) *Physical properties of materials*. Third edition. Boca Raton, FL: CRC Press, Taylor & Francis Group.	☐

Module Code	**ACMA4036**
Title	**Mechanical Properties of Materials 1**
Date	**06/08/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To develop an understanding of the mechanical properties of various materials, covering the influence of microstructure, temperature, environment, and deformation rate on material response.

LEARNING OUTCOMES

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

- describe the differences between elasticity and plasticity and their relationship to crystallography and slip systems;
- recognise phase diagrams, formation of microstructures through heat treatment and the influence on mechanical properties of materials.

INDICATIVE CONTENT

- Fundamentals of elastic and plastic deformation, the stress-strain curve.
- Crystal structures, points, planes, analysis.
- Dislocations in crystalline materials, edge, screw, mixed dislocations.
- Atomic diffusion and phase diagrams.
- Mechanical testing of metals and ceramics.
- Static fracture in materials.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**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	**ACMA4036**	
Module Title	**Mechanical Properties of Materials 1**	
Classification	**Reading List entry**	**Electronic***
Essential	Callister, W.D. and Rethwisch, D.G. (2020) *Materials science and engineering : an introduction*. 10th edition. Hoboken, NJ: Wiley.	☐
Essential	Jones, D.R.H. and Ashby, M.F. (2019) *Engineering materials 1 : an introduction to properties, applications and design.* Fifth edition / David R.H. Jones, Michael F. Ashby. Oxford: Butterworth-Heinemann.	☐
Essential	Ashby, M.F. and Jones, D.R.H. (2013) *Engineering materials 2 : an introduction to microstructures, processing, and design*. 4th ed. Oxford [Oxfordshire] ; Butterworth-Heinemann.	☐
Further	Ashby, M.F. and Johnson, K. (2014) *Materials and design : the art and science of material selection in product design*. Third edition. Oxford: Butterworth-Heinemann.	☐
Further	Schrader, G.F. *et al.* (2000) *Manufacturing processes & materials*. Fourth edition. Dearborn, Mich: Society of Manufacturing Engineers.	☐
Further	Creese, R.C. (1999) *Introduction to manufacturing processes and materials*. New York: Marcel Dekker.	☐
Further	White, M.A. (2019) *Physical properties of materials*. Third edition. Boca Raton, FL: CRC Press, Taylor & Francis Group.	☐

Module Code	**ACMA4037**
Title	**Plant Operations and Performance**
Date	**06/08/2025**
Level	**4**
Credits	**20**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To provide students with foundational knowledge and understanding of industrial plant operations and performance, focusing on safe, efficient, and reliable practices that support effective engineering management.

LEARNING OUTCOMES

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

- describe the structure and function of industrial plant systems and apply standard operational procedures to support safe and efficient performance;
- explain basic methods for monitoring and improving plant performance, including the role of maintenance, reliability, and operational decision-making.

INDICATIVE CONTENT

- Introduction to Plant Operations:
  - Role of plant operations in engineering and industrial management;
  - Overview of plant systems and process flows.
- Plant Components and Functions:
  - Mechanical, electrical, and process equipment;
  - Integration of systems in production environments.
- Operational Procedures:
  - Standard operating procedures (SOPs);
  - Start-up, shutdown, and emergency protocols;
  - Communication and shift handovers.
- Health, Safety, and Environmental Considerations:
  - Introduction to risk assessment and hazard control;
  - Safety regulations and compliance;
  - Environmental impact and sustainability in operations.

- Performance Monitoring and Metrics:
  - Key performance indicators (KPIs): uptime, downtime, throughput, efficiency;
  - Introduction to basic data collection and interpretation;
  - Visual inspections and instrumentation.
- Maintenance and Reliability:
  - Preventive and corrective maintenance;
  - Basic reliability concepts (e.g., MTBF, availability);
  - Maintenance as a performance enabler.
- Operational Decision-Making:
  - Introduction to operational planning and resource allocation;
  - Impact of operational decisions on performance and cost;
  - Communication and coordination in plant environments.
- Introduction to Continuous Improvement:
  - Basic concepts of lean operations and process optimisation;
  - Identifying inefficiencies and performance bottlenecks.

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	50%

Assessment Component 2
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Poster presentation and marking of poster	20 minutes	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4037**	
Module Title	**Plant Operations and Performance**	
Classification	**Reading List entry**	**Electronic***
Essential	Slack, N. and Brandon-Jones, A. (2019) *Operations management*. 9th ed. Harlow: Pearson.	☒
Essential	Bradley, E. (2022). *Reliability Engineering: A Life Cycle Approach*. 2nd Edition. Boca Raton. CRC Press, Taylor & Francis Group.	☐
Essential	Kelly, A. (2006). *Plant Maintenance Management Set*. Oxford. Butterworth-Heinemann	☐
Further	Ries, J. (2022). *Lean Six Sigma: 3 Books in 1: The Complete Guide to Implementing Six Sigma Methodology for Continuous Manufacturing Process Improvement (Lean Methodology)*. Independently published	☐
Further	McWhorter, B. (2017). *Introduction to Lean Manufacturing: The Road to Continuous Improvement*. CreateSpace Independent Publishing Platform	☐

Module Code	**ACMA4038**
Title	**Quality and Business Improvement**
Date	**06/08/2025**
Level	**4**
Credits	**20**
Pre-Requisites	**None**
DBS Check	**May be required** ☐ **Not required** ☒

AIM(S)

- To equip students with the knowledge and skills necessary to apply various tools and techniques to improve the quality of products, services, and overall business performance.

LEARNING OUTCOMES

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

- select and apply appropriate tools and techniques to investigate problems, assess risks, and analyse potential areas for improvement;

- identify and describe the core elements of the Six Sigma methodology, including its applications in quality management and process improvement.

INDICATIVE CONTENT

- Fundamentals of the Six Sigma methodology: Define, Measure, Analyse, Improve, Control.

- Basic quality tools: check sheets, histograms, Pareto analysis, cause & effect analysis, scatter diagrams, flow charts, control charts.

- Lean principles: 9 wastes, kaizen, stability, standard work, heijunka, respect for people, Just-In-Time (JIT), jidoka, value to the customer.

- Lean tools & strategies: 5S, Plan-Do-Check-Act (PDCA), Kanban, pull systems, value stream mapping, poka-yoke, single-minute exchange of die (SMED).

- Statistical methods for quality improvement: statistical process control, analysis of variation, design of experiments, machine & process capability, regression analysis, evolutionary operation, analysis of means, multivariate analysis.

- The impact of digitalisation on quality improvement: smart automation, Internet of Things (IoT), big data analytics and AI for monitoring and enhancing quality.

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	2000 words	50%

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4038**	
Module Title	**Quality and Business Improvement**	
Classification	**Reading List entry**	**Electronic***
Essential	Pyzdek, T. and Keller, P.A. (2019) *The six sigma handbook*. Fifth edition. New York: McGraw-Hill Education.	☒
Essential	Bicheno, J. and Holweg, M. (2023) *The lean toolbox : a sourcebook for process improvement*. Sixth edition. Buckingham: PICSIE Books.	☒
Essential	Ryan, T.P., 2011. *Statistical methods for quality improvement*. John Wiley & Sons.	☒
Further	Wilson, L. (2015) *How to implement lean manufacturing*. Second edition. New York: McGraw-Hill.	☒
Further	Tetteh, E., & Chapman, H. (2018). *Lean six sigma for optimal system performance in manufacturing and service organizations : emerging research and opportunities*. Business Science Reference.	☒

Module Code	ACMA4038	
Module Title	Quality and Business Improvement	
Classification	Reading List entry	Electronic*
Further	Nicholas, J.M. (2018) *Lean production for competitive advantage : a comprehensive guide to lean methods and management practices*. Second edition. Boca Raton, [Florida] ; CRC Press.	☒
Further	Pažek, K. (ed.) (2021) *Lean manufacturing*. London, England: IntechOpen.	☒
Further	*Expanding the Horizons of Manufacturing: Towards Wide Integration, Smart Systems and Tools*. (2022). MDPI - Multidisciplinary Digital Publishing Institute.	☒
Further	*Lean Six Sigma in the Age of Artificial Intelligence: Harnessing the Power of the Fourth Industrial Revolution* (2019) Assembly (Carol Stream, Ill.). BNP Media, pp. 4-.	☒
Further	International journal of lean six sigma	☒
Further	International Journal of Quality & Reliability Management	☒

Module Code	**ACMA4039**
Title	**Study Skills**
Date	**06/08/2025**
Level	**4**
Credits	**10**
Pre-Requisites	**None**
DBS Check	**May be required ☐ Not required ☒**

AIM(S)

- To explore fundamental academic study skills essential for success in Higher Education.
- To develop independence as a learner and the ability to create a personal development plan.

LEARNING OUTCOMES

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

- identify the value of the current skills in connection to the academic work and use personal development planning to enhance them;
- recognise academic writing standards, such as the usage of Harvard referencing and supporting documentation, and apply peer and self-evaluation feedback, as well as identify and build independent learning skills;
- identify the ethical concerns of academic research and gain knowledge of critical thinking and analysis in scholarly work.

INDICATIVE CONTENT

- Skills identification (e.g. self-evaluation, skills needed for higher education, transferable skills, action plans for personal development).
- Study Organisation and Management Exploration of strategies for effective time management, workspace arrangement, and resource organisation to support academic success.
- Information Structuring and Research Techniques Examination of methods for effective note-taking, library and internet research, referencing conventions, and approaches to revision and examination preparation.
- Communication and Data Presentation Study of presentation methods, visual communication tools such as graphs and charts, and statistical measures used to convey information clearly and accurately.
- Academic Writing and Critical Thinking Analysis of writing techniques including essay and report planning, logical structuring, argument development, and the integration of analytical thinking in academic contexts.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	24	24%
Independent learning	76	76%
Placement learning	0	0%
TOTAL	**100**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	1400 words total	70%

Engineering Council AHEP4 Learning Outcomes **assessed** in this assessment:

C10: Adopt a holistic and proportionate approach to the mitigation of security risks.

C18: Plan and record self-learning and development as the foundation for lifelong learning / CPD.

Assessment Component 2
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Video Presentation	5 minutes	30%

Engineering Council AHEP4 Learning Outcomes **assessed** in this assessment:

C10: Adopt a holistic and proportionate approach to the mitigation of security risks.

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACMA4039**	
Module Title	**Study Skills**	
Classification	**Reading List entry**	**Electronic***
Essential	Cottrell, S. (2024) *The study skills handbook*. Sixth edition. London: Bloomsbury Academic.	☒

Module Code	ACMA4039	
Module Title	Study Skills	
Classification	Reading List entry	Electronic*
Essential	Van Emden, J. and Becker, L.M. (2018) *Writing for engineers*. Fourth edition. London: Palgrave.	☒
Further	Bird, J.O. and Ross, C.T.F. (2020) *Mechanical engineering principles*. Fourth edition. Abingdon, Oxon: Routledge.	☐