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

MODULE DIRECTORY

LEVEL 7

ENGINEERING

WALES INSTITUTE OF SCIENCE & ART

2021-2022

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INTRODUCTION

This Module Directory includes all the modules for Level 7 within Engineering in the academic year 2021-2022.

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	**ACEA7001**
Title	**Advanced Motorcycle Performance**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To introduce the student to the advanced processes governing the dynamic behaviour of a motorcycle, its suspension, tyres and rider interaction while in motion.

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

- demonstrate a critical understanding of the physics governing the kinematic and dynamic behaviour of a motorcycle and rider interaction while in steady state, quasi-static and dynamic motion

- display cognitive skills in the use of advanced data acquisition techniques to acquire dynamic data with which to validate and develop a range of motorcycle simulation models.

INDICATIVE CONTENT

- Determination the wheel loads of a motorcycle under static and dynamic conditions

- The performance of a motorcycle accelerating against non-linear resistive loads

- The effect of transmission ratios on inertia for given engine and motorcycle application

- The determination of the longitudinal weight transfer of an accelerating motorcycle

- To analyse the effect of aerodynamic forces on the behaviour of the motorcycle

- Fitting, calibrating and testing data acquisition systems

- Analysing real dynamic data from controlled tests and full track activities

- Motorcycle manoeuvrability and directional stability

- Motorcycle vibration modes

- Motorcycle attitude and trim

- Roll motion and steering

- Modelling of motorcycle tyres

- One, two and four degree of freedom suspension models

- Detailed analysis, processing and interpretation of real dynamics 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 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Individual Presentation	12 minutes followed by questions	30%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	4200 words	70%

Assessment Summary

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

READING LIST

Module Code	**ACEA7001**	
Module Title	**Advanced Motorcycle Performance**	
Classification	**Reading List entry**	**Electronic ***
Essential	Cossalter, V., Motorcycle Dynamics, 2nd English Edition (Lulu, 2006)	☐
Essential	Blundell, M. and Harty, D., The Multibody Systems Approach to Vehicle Dynamics (Butterworth Heinemann, 2004)	☐
Essential	Phoebus Apollo Publishing Limited (15 Nov. 2017)	☐
Further	Foale, T., Motorcycle Handling and Chassis Design (Tony Foale, 2002)	☐
Further	**Websites** www.sciencedirect.com http://www.tjprc.org/journals/international-journal-of-automobile-engineering-research-and-development223 http://www.academia.edu/Documents/in/Automobile_Engineering https://www.scimagojr.com/journalrank.php?category=2203 https://journals.sagepub.com/home/pid	☒
Further	SAE Journals	☒
Further	IMechE Journal	☒

Module Code	**ACEA7002**
Title	**Advanced Motorsport Dynamics**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To introduce the student to the advanced processes governing the dynamic behaviour of a vehicle, its suspension, tyres and driver interaction while in motion.

LEARNING OUTCOMES

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

- demonstrate knowledge and a critical understanding of the processes governing the dynamic behaviour of a high performance vehicle, its suspension, tyres and driver interaction while in motion

- display cognitive skills to use advanced data acquisition interpretation techniques to acquire dynamic data with which to validate complex vehicle models

INDICATIVE CONTENT

- Determination the wheel loads of a vehicle under static and dynamic conditions

- The performance of a vehicle accelerating against non-linear resistive loads

- The effect of transmission ratios on inertia for given engine and vehicle application

- The determination of the longitudinal and lateral weight transfer of an accelerating vehicle

- To analyse the effect of aerodynamic forces on the behaviour of the vehicle

- To analyse the effect of longitudinal drive forces and stability control

- Fitting, calibrating and testing data acquisition systems

- Analysing real dynamic data from controlled tests and full track activities

- Developing basic vehicle dynamics simulation model

- Utilising a driver in the loop simulator to assess handling of a vehicle.

- Modelling of tyres

- One, two and four degree of freedom suspension models

- Detailed analysis, processing and interpretation of real dynamics 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 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Individual Presentation	12 minutes followed by questions	30%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	4200 words	70%

Assessment Summary

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

READING LIST

Module Code	**ACEA7002**	
Module Title	**Advanced Motorsport Dynamics**	
Classification	**Reading List entry**	**Electronic ***
Essential	Milliken, W., & Milliken, Douglas L. (1995). Race car vehicle dynamics. Warrendale, Pa.: Society of Automotive Engineers.	☐
Essential	Blundell, M. and Harty, D., The Multibody Systems Approach to Vehicle Dynamics (Butterworth Heinemann, 2014)	☐
Essential	Schüetz, T. (2016). Aerodynamics of road vehicles (Fifth ed.).	☐
Further	Gillespie, T. (1992). Fundamentals of vehicle dynamics. Warrendale, Pa.: Society of Automotive Engineers.	☐
Further	Segers, J. (2014). Analysis techniques for racecar data acquisition (2nd Edition). Warrendale, PA.: SAE International.	☐
Further	Rowley, W. (2004). An introduction to race car engineering (3rd ed.). Canada: Rowley Race Dynamics.	☐
Further	Katz, J. (2006). Race car aerodynamics: Designing for speed (Rev. 2nd ed.). Cambridge, Mass.: Bentley.	☐
Further	Pacejka, H. (2012). Tyre and vehicle dynamics (3rd ed.). Amsterdam; London: Butterworth-Heinemann.	☒
Further	**Websites** www.sciencedirect.com http://www.tjprc.org/journals/international-journal-of-automobile-engineering-research-and-development223 http://www.academia.edu/Documents/in/Automobile_Engineering https://www.scimagojr.com/journalrank.php?category=2203 https://journals.sagepub.com/home/pid	☒
Further	SAE Journals	☒
Further	IMechE Journal	☒

Module Code	**ACEA7003**
Title	**Advanced Vehicle Dynamic Behaviour**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To introduce the student to the advanced processes governing the dynamic behaviour of a vehicle, its suspension, tyres and driver interaction while in motion.

LEARNING OUTCOMES

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

- demonstrate a depth of knowledge and critical comprehension of the dynamic behaviour of a road-based vehicle with particular focus on noise, vibration and harshness (NVH).

- display cognitive skills to use advanced metrology methods and interpretation techniques to acquire dynamic data with the aim to allow an analysis of vehicle vibration modes and dynamic vehicle response.

INDICATIVE CONTENT

- Determination the wheel loads of a vehicle under static and dynamic conditions

- The performance of a vehicle accelerating against non-linear resistive loads

- The effect of transmission ratios on inertia for given engine and vehicle application

- The determination of the longitudinal and lateral weight transfer of an accelerating vehicle

- To analyse the effect of aerodynamic forces on the behaviour of the vehicle

- To analyse the effect of longitudinal drive forces and stability control

- Fitting, calibrating and testing data acquisition systems

- Analysing real dynamic data from controlled tests and full track activities

- Developing basic vehicle dynamics simulation model

- Utilising a driver in the loop simulator to assess handling of a vehicle.

- Modelling of tyres

- One, two and four degree of freedom suspension models

- Detailed analysis, processing and interpretation of real dynamics 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 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Individual Presentation	12 minutes followed by questions	30%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	4200 words	70%

Assessment Summary

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

READING LIST

Module Code	**ACEA7003**	
Module Title	**Advanced Vehicle Dynamic Behaviour**	
Classification	**Reading List entry**	**Electronic ***
Essential	Milliken, W., & Milliken, Douglas L. (1995). Race car vehicle dynamics. Warrendale, Pa.: Society of Automotive Engineers.	☐
Essential	Blundell, M. and Harty, D., The Multibody Systems Approach to Vehicle Dynamics (Butterworth Heinemann, 2004)	☐
Essential	Schüetz, T. (2016). Aerodynamics of road vehicles (Fifth ed.).	☐
Further	Gillespie, T. (1992). Fundamentals of vehicle dynamics. Warrendale, Pa.: Society of Automotive Engineers.	☐
Further	Segers, J. (2008). Analysis techniques for racecar data acquisition. Warrendale, PA.: SAE International.	☐
Further	Rowley, W. (2004). An introduction to race car engineering (3rd ed.). Canada?]: Rowley Race Dynamics.	☐
Further	Katz, J. (2006). Race car aerodynamics: Designing for speed (Rev. 2nd ed.). Cambridge, Mass.: Bentley.	☐
Further	Pacejka, H. (2012). Tyre and vehicle dynamics (3rd ed.). Amsterdam; London: Butterworth-Heinemann.	☐
Further	**Websites** www.sciencedirect.com http://www.tjprc.org/journals/international-journal-of-automobile-engineering-research-and-development223 http://www.academia.edu/Documents/in/Automobile_Engineering https://www.scimagojr.com/journalrank.php?category=2203 https://journals.sagepub.com/home/pid	☒
Further	SAE Journals	☒
Further	IMechE Journal	☒

Module Code	**ACEA7004**
Title	**Design for Manufacture**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To provide a comprehensive understanding of the implications of sustainable manufacturing factors for component and assembly design.
- To provide the skills, tools and techniques to enable product or system designs to be analysed and optimised with regard to manufacturability and assembly.

LEARNING OUTCOMES

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

- Analyse a range of manufacturing-related considerations and apply these in the generation of appropriate manufacturing/design solutions.
- Analyse the requirements for other factors relevant for design (e.g. recycling and re-use, reliability, maintainability, recyclability, sustainability) and specify appropriate design features.

INDICATIVE CONTENT

- Design for Six Sigma and Design for Lean Manufacture - design implications of major processes: machining, casting, forming, polymer moulding, sheet materials and extrusion. Redesign of existing products for alternative materials and processes.
- Design for 'X' - recycling, reliability, maintainability, sustainability
- Value stream mapping for product design and development activities.
- Computer Aided Manufacturing principles and techniques, Computer Aided Design for manufacture applications, manufacturing/production simulation and optimisation applications.
- Design for manual and automated assembly.
- Tolerance Design. Mechanical tolerance stack-up & analysis (for assemblies). Geometric Dimensioning & Tolerancing.
- Quality of Design Techniques – Failure Mode and Effects Analysis (design and process), Quality Function Deployment.
- Inventive problem solving techniques in the context of Design. TRIZ, SCAMPER,

- Poke Yoke Error-proofing. Families of components. Value analysis and value engineering. Economics of process selection. Integration of Design and Manufacture.

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
Assignment	6,000 words equivalent (including Appropriate Manufacturing / Design Documentation e.g. solid model files or machine code.	100%

Assessment Summary

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

READING LIST

Module Code	**ACEA7004**	
Module Title	**Design for Manufacture**	
Classification	**Reading List entry**	**Electronic***
Essential	Anderson, D M. et al (2014) *Design for Manufacturability: How to Use Concurrent Engineering to Rapidly Develop Low-Cost, High-Quality Products for Lean Production*, New York, Productivity Press.	☒
Essential	Boothroyd, G. et al (2014) *Product Design for Manufacture & Assembly (Manufacturing, Engineering & Materials Processing), 3rd Edition,* London: CRC Press	☒
Further	Locher D. A (2008) *Value Stream Mapping for Lean Development – A How-To Guide for Streamlining Time to Market*, Oxford: Routledge	☒
Further	Gothelf J. et al (2016) *Lean UX - Designing Great Products with Agile Teams, 2nd Edition*, California: O'Reilly Media	☒
Further	Gothelf J. (2017) *Lean vs. Agile vs. Design Thinking: What you Really Need to Know to Build High-Performing Digital Product Teams*, Sense & Respond Press	☐
Further	Yang, K. et al (2009) *Design for Six Sigma: A Roadmap for Product Development, 2nd Edition*, McGraw-Hill Education	☐
Further	Boothroyd, G. (2005) Assembly Automation and Product Design, 2nd Edition, London: CRC Press	☒
Further	Brissaud, D. et al (2006) *Innovation in Lifecycle Engineering & Sustainable Development,* Berlin: Springer	☒

Module Code	**ACEA7005**
Title	**Engine Performance and Emissions**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- this module aim is to provide students with “calibration engineer” technical skills. The module will provide students with real, state-of-the-art engine test cell data including cylinder pressure, fuel flow, Lambda, emissions, inlet and exhaust temperatures and pressures
- students will be provided with the ability to analyse the data and build up real combustion models specific to the subject engine

LEARNING OUTCOMES

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

- demonstrate cognitive skills in the interpretation and evaluation of full data set of measurements provided in a modern engine test facility
- apply mathematical modelling techniques for the development of a 2-zone combustion model from first principles.

INDICATIVE CONTENT

- fuel chemistry calculations to determine mixture and exhaust gas composition
- molecular weight analysis of burned and unburned zones to determine gas constants per kg
- specific heat analysis using non-dissociated and dissociated burned gas models
- building up model in Excel or Matlab
- determine polytropic coefficients in compression and expansion
- determine suitable polytropic coefficients to use during combustion
- investigation of Woschni heat loss model
- determination of burned and unburned temperatures in 2-zone model
- determination of detonation risk of unburned zone
- determination of exhaust gas temperatures from model and correlation with measured data
- determination of oxygen content in burned zone using dissociation constants
- determination of thermal Nox production using Zeldovich mechanism
- correlation between Nox production and measured 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 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Individual Presentation	12 Minutes	30%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	4,200 words without appendices	70%

Assessment Summary

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

READING LIST

Module Code	**ACEA7005**	
Module Title	**Engine Performance and Emissions**	
Classification	**Reading List entry**	**Electronic***
Essential	Heywood, J., Internal Combustion Engine Fundamentals (McGraw Hill, 2002)	☐
Essential	Blair, Gordon P., Design and Simulation of Four-Stroke Engines (SAE International, 1998)	☐
Essential	Warnatz, J., Maas, V. and Dibble, R. W., Combustion - 4th Edition (Springer, 2006)	☐
Further	Heizer, H., Advanced Engine Technology (Butterworth Heinemann, 1995)	☐
Further	Lumley, J., Engines – An Introduction (Cambridge, 1999)	☐
Further	SAE Journals	☒
Further	IMechE Journal	☒

Module Code	ACEA7006
Title	Engineering Management Leadership
Date	12/07/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To develop a critical understanding of key management issues within the engineering environment and to be able to critically appraise key operational areas such as; leadership, finance, inventory management, logistics and performance measurement.

LEARNING OUTCOMES

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

- Critically analyse the need for leadership, good financial practices, change management and ethics in an engineering environment

- To evaluate the important role played by inventory management and logistics in optimising operational performance

INDICATIVE CONTENT

- Leadership including models of leadership, empowerment of employees, understanding cultural and organisation roadblocks, SWOT and PESTLE analysis

- Team management: roles and responsibilities, team formation and group dynamics, motivational techniques, approaches to communication and team working

- Change management- need for change, managing change, how to deal with resistance, reasons for change management failures

- Inventory management and logistics- reasons for inventory management, logistics role and purpose, logistics issues externally and internally

- Business and financial measures such as – KPI's development and applications, performance measurement, costing, investment analysis, profitability, critical-to-cost and Schedule and balanced scorecard

- Ethical issues- corporate social responsibility, moral values, consumer protection organisation and legal measures, organisational culture and cultural issues in trading, environmental impact of operations

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	3,000 words	50%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	3,000 words	50%

Assessment Summary

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

READING LIST

Module Code	**ACEA7006**	
Module Title	**Engineering Management Leadership**	
Classification	**Reading List entry**	**Electronic***
Essential	Muller, M (2011) Essentials of Inventory Management, 2nd Edition, Amaeon, New York	☐
Essential	Paton, R and McCalman, C (2010) *Change Management A Guide to Effective Implementation, 3rd Edition*, Sage, London	☐
Essential	Rudd, J (2019) A Practical Guide to Logistics: An Introduction to Transport, Warehousing, Trade and Distribution, Kogan Page, London	☐
Further	Christopher, M (2016) Logistics and Supply Chain Management, 5th Edition, Pearson, London	☐
Further	Cameron, E and Green, M (2012) *Making Sense of Change Management: A Complete Guide to Models Tools and Techniques of Organisational Change, 3rd Edition*, Kogan Page, London	☐
Further	Hayes, J (2014) *The Theory and Practice of Change Management, 4th Edition* Palgrave McMillan, New York	☐
Further	Mullins, L (2013) *Management and Organisational Behaviour, 10th Edition*, Pearson, London	☐
Further	Northouse, P (2014) *Leadership: Theory and Practice, 8th Edition*, Sage, London	☐
Further	Parameter, D (2015) Key Performance Indicators: Developing, Implementing, and using Winning KPIs, 3rd Edition, John Wiley, New Jersey	☐
Further	Fraedrich, J and Ferrell, O (2016) Business Ethics: Ethical Decision Making & Cases 11th Edition, South-Western College Publishing, Boston	☐
Further	Wild, T (2017) Best Practice in Inventory Management, 3rd Edition, Routledge, Adbington	☐
Further	Feenstra, R and Taylor, A (2017) International Trade, 4th Edition, Worth Publishing	☐
Further	Reuvid, I and Sherlock, J (2011) International Trade: An Essential Guide to the Principles and Practice of Export, 3rd Edition, Kogan Page, LOndon	☐
Further	Attrill, P and McLaney, E (2017) Accounting and Finance for Non-Specialists, 10th Edition, Pearson, London	☐
Further	Robinson, S and Dowson, P (2012) Business Ethics in Practice, Kogan Page, London	☐
Further	**Journals** European Management Journal Journal of Business Research The Leadership Quarterly Computer and Industry Engineering European Journal of Operational Research International Journal of Production Economics Transport Research Part E: Logistics and Transportation Review	☒

	Production and Inventory Management Journal Journal of Industrial Engineering International Journal of Logistics Management European Transport Research Review International Journal of Shipping and Transport Logistics Journal of Organisational Change Management International Journal of Engineering Business Management	
Further	**Websites** www.-l-m.com www.dalecarnegie.co.uk www.managers.org www.ciltuk.org www.fta.co.uk www.rha.uk.net www.apics.org www.cipd.co.uk	☒

Module Code	**ACEA7007**
Title	**Hybrid Powertrain and Control**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- This module is designed to allow the student to critically analyse the function and application of electrical and electronic systems used in modern electric, fuel cell and hybrid vehicles.

LEARNING OUTCOMES

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

- demonstrate knowledge and critical understanding of various electrical and electronic systems used in modern electric and hybrid vehicles

- display cognitive skills with regards to the principles behind the powertrain design, function and control within advanced vehicles.

INDICATIVE CONTENT

- vehicle tractive requirements
- characteristics of internal combustion engines
- electrical principles and electromagnetism
- alternative hybrid systems
- the physics of modern electronic sensors
- motors, generators and control systems
- energy recovery systems
- reversible energy storage
- the hydrogen fuel cell
- hardware calibration and testing
- control design and implementation

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
Individual Presentation	12 Minutes	30%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Written Report	4,200 words without appendices	70%

Assessment Summary

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

READING LIST

Module Code	ACEA7007	
Module Title	Hybrid Powertrain and Control	
Classification	Reading List entry	Electronic *
Essential	Eshani, M, Gao, Y. Longo, S. Ebrahimi, K : Modern Electric, Hybrid Electric, and Fuel Cell Vehicles 3rd edition (CRC Press, 2018)	☒
Essential	Rahn, C. Wang, C-Y : Battery Systems Engineering (Wiley, 2013)	☐
Further	Miller, M : Propulsion Systems for Hybrid Vehicles 2nd edition. (IET 2010)	☐
Further	Hoboken, N : Environmentally Conscious Transportation (Wiley 2008)	☐
Further	Larminie, J. Lowry, J : Electric Vehicle Technology Explained. 2nd edition (Wiley 2012)	☐
Further	Hu, H. Smaling, R. Baseley, S : Advanced Hybrid Powertrains for Commercial Vehicles (SAE 2012)	☐
Further	Ham, K-H : AC Motor Control and Electrical Vehicle Applications (CRC Press 2018)	☐
Further	Emadi, A. : Advanced Electric Drive Vehicles (CRC Press 2017)	☐
Further	Dincer, I. Hamut, H. Javani, N. : Thermal Management of Electric Vehicle Battery Systems (Wiley 2017)	☐
Further	Jaing, J. Zhang, C. : Fundamentals and Applications of Lithium-ion Batteries in Electric Drive Vehicles (Wiley 2015)	☐
Further	**Websites** https://www.electrichybridvehicle technology.com https://www.electricautosprt.com https://onlinelibrary.wiley.com/journal/25666223 https://batteryuniversity.com/ https://www.shell.co.uk/make-the-future/cleaner-mobility/the-great-travel-hack/usa/fuels-and-vehicles.html?gclid=EAIaIQobChMInPrrya-b4gIVhbTtCh08bAK6EAAYAiAAEgI2l_D_BwE&gclsrc=aw.ds https://www.carbonbrief.org/ http://www.ieahev.org/	☒

Module Code	**ACEA7008**
Title	**Lean and Agile Systems**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To develop an in-depth, critical understanding of the principles of lean and agile systems and their application in the operational environment.

LEARNING OUTCOMES

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

- Demonstrate a critical and systematic understanding of the principles and practice of lean and agile thinking in the analysis and design of lean and agile operations

- Analyse lean and agile systems using appropriate analytical and simulation techniques to assess opportunities for improvement and develop appropriate solutions problems

INDICATIVE CONTENT

- Concepts of lean six sigma such as; value adding/non value adding, value stream mapping 5S

- Concept of agility in operations and performance improvement

- Operations strategy- performance objectives, top-down and bottom-up perspective, market requirements and capabilities of operations

- Facilities layout for lean and agile operations- analytical techniques, queuing theory, line balancing, discrete event time, changeover reduction and set up time, cycle time reduction

- Scheduling- push and pull systems, demand planning and forecasting, just-in-time, materials requirement planning, capacity planning

- Asset Management, maintenance planning, maintenance strategies such reliability centred maintenance, condition-based monitoring and total productive maintenance

- Materials handling and automation, storage operations and automated guided vehicles

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
Assignment	3,000 words	50%

Assessment Summary

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

READING LIST

Module Code	**ACEA7008**	
Module Title	**Lean and Agile Systems**	
Classification	**Reading List entry**	**Electronic***
Essential	Womack, J P & Jones, D (2003) *Lean Thinking,* Free Press, New York	☐
Essential	Womack, J P & Jones D (2007) *The Machine That Changed the World,* Simon & Schuster, New York	☐
Essential	Bicheno, J & Holweg, M (2008) *The Lean Toolbox*, Picsie Books, Johannesburg	☐
Further	Johnston, R. Clark, G & Shulver, M (2012) Service Operations Management, 4th Edition, Pearson, Harlow	☐
Further	Slack, N and Brandon-Jones, A (2016) Operations Management, 8th Edition, Pearson, Harlow	☐
Further	Wilson, L (2009) *How to Implement Lean Manufacturing,* McGraw-Hill, New York	☐
Further	Gunasekaran, G (2001) *Agile Manufacturi*ng, Pergammon, Oxford	☐
Further	George, ML (2002) *Lean Six Sigma: Combining Six Sigma Quality with Lean Production Speeds,* McGraw-Hill, New York	☐
Further	Bicheno, J (2000) *Cause and Effect Lean: Lean Operations, Six Sigma and Supply Chain,* Picsie Books, Johannesburg	☐
Further	Hines, P, et al (2008) *Staying Lean,* Lean Enterprise Research Centre, Cardiff	☐
Further	Nash, M A & Poling, S.R (2008) *Mapping the Total Value Stream,* Productivity Press, Florida	☐
Further	**Journals** International Journal of Operations and Production Management International Journal of Production Research Journal of Physical Distribution and Materials Management European Journal of Operational Research Journal of Operations Management Journal of Manufacturing Systems International Journal of Production Economics Journal of Purchasing Supply Management	☒
Further	**Websites** www.leanproduction.com www.asme.org www.lean.org www.leanmanufacturingtools.org www.asq,org/quality-resources/lean www.mckinsey.com www.manufacturing institute.co.uk www.leansix sigmainstitute.org	☒

Module Code	**ACEA7009**
Title	**Management of Engineering Projects**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To be able to critically evaluate the dynamics of projects and project management while demonstrating an understanding of a range of key project management tools and techniques

LEARNING OUTCOMES

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

- Critically analyse project life cycle(s), the structure and organisation of projects, project planning, governance and the project environment.

- Critically evaluate project risk, risk management, resource management and apply a range of techniques that can be used to support successful project management

INDICATIVE CONTENT

- Structure of projects and organisations: - different types of organisational structure, roles and responsibilities of the project manager, project sponsor and responsibility

- Project environment: - use of PESTLE, SWOT analysis, characteristics of and issues of programme management, environmental and health and safety legislation, project management versus portfolio management.

- Project life cycle: - life cycle phases, project review, handover extended life cycle, principles of governance and procedures to support it, benefits of structured methodologies.

- Project risk management: - risk management process, risk mitigation strategies, issues and escalation management

- Project planning and communication: - negotiation planning for, negotiation tactics and negotiation strategies, role of communication and barriers to it in projects, conflict management, estimating, earned value management, use of investment analysis techniques, project management plans, ownership and reporting

- Scope, Schedule and resource management: - project scheduling, cost management, and budget control, types of resource, resource levelling, work breakdown structure, configuration management and information 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
Report	3,000 words	50%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Report	3,000 words	50%

Assessment Summary

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

READING LIST

Module Code	ACEA7009	
Module Title	**Management of Engineering Projects**	
Classification	**Reading List entry**	**Electronic***
Essential	Association of Project Managers (APM) (2012) *'Project Management Body of Knowledge - 5th Edition*' APM, Bucks	☐
Essential	Burke, R (2013) Project Management: Planning and Control Techniques, 5th Edition, John Wiley & Sons, Chichester	☐
Essential	Smith, N (2007) Engineering Project Management, 3rd Edition, Wiley Blackwell, London	☐
Further	Turner, J (2019) Agile Project Management: The Ultimate Beginner's Guide to Learn Agile Project Management Step by Step, Independently published	☐
Further	Jung, S and Krebs, P (2019) The Essentials of Contract Negotiation, Springer, New York	☐
Further	Carroll, J and Morris, D (2015) Agile Project Management in Easy Steps, 2nd Edition, Easy Steps Limited, Leamington Spa	☐
Further	Maylor, H (2010) Project Management, 4th Edition, Pearson, Harlow	☐
Further	Wysocki., R (2019) Effective Project Management: Traditional, Agile, Extreme, Hybrid, 8th Edition, John Wiley and Son, London	☐
Further	Averous, J (2014) Practical Cost Control Handbook for Project Managers, Fourth Revolution Publishing, Singapore	☐
Further	Raydugin, Y (2013) Project Risk Management: Essential Methods for Project Teams and Decision Makers, John Wiley and Son, New Jersey	☐
Further	Taylor, S and Woodhams, C (2016) Human Resources Management: People and Organisations, 2nd Edition, CIPD-Kogan Page, London	☐
Further	Gates, S (2015) The Negotiating Book: Your Definitive Guide to Successful Negotiation, 2nd Edition, Capstone, Chichester	☐
Further	Arden, D (2015) Win Win: How to get a Winning Result from Persuasive Negotiations, Pearson, Harlow	☐
Further	Wyatt, N (2012) The Financial Times Essential Guide to Budgeting and Forecasting: How to Deliver Accurate Number, Financial Times Publishing, London	☐
Further	Westland, J (2007) The Project Management Life Cycle: A Complete Step-by-Step Methodology for Initiating, Planning, Executing and Closing the	☐
Further	Wilson, R (2014) A Comprehensive Guide to Project Management Schedule and Control, Pearson, New Jersey	☐

Further	**Journals** International Journal of Project Management Project Management Journal International Journal of Managing Projects in Business International Journal of Project Organisation and Management European Project Management Journal Journal of Management in Engineering	☒
Further	**Websites** www.apm.org.uk www.pmi.org www.ipma.world	☒

Module Code	**ACEA7010**
Title	**Mechanisms of Materials Failure**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To develop an advanced conceptual understanding of materials failure mechanisms and an ability to apply those concepts in the analyse and evaluation of various mechanisms of materials failure, their causes and effects.

LEARNING OUTCOMES

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

- Critically examine the causes, effects and mechanisms of fracture, fatigue and creep and apply appropriate analytical techniques to model and predict behaviour.

- Critically examine the causes, effects and mechanisms of environmental degradation of materials and apply appropriate scientific models to analyse behaviour.

INDICATIVE CONTENT

- Review of stress and strain – three-dimensional stress systems, hydrostatic stress, deviatoric stress, constitutive equations.
- Fracture mechanics – ductile and brittle failure, analysis of fractographs, effect of temperature, chemistry and microstructure. Design against fracture. Fracture toughness, stress concentration and stress intensity factor. Critical crack size and Griffith's equation. Applications of linear elastic fracture mechanics.
- Fatigue – three stages of fatigue. S-N and S-N-P curves. Factor affecting fatigue. Effect of mean stress (Goodman, Gerber, Soderberg). Cummulative damage (Miner-Palmgren). Strain based approaches. Crack growth and stress intensity threshold. Service life (Paris-Erdogan). Variable loadings - segments and blocks. Reservoir method of cycle counting. Lifetime estimation.
- Creep – effects of temperature, micromechanisms of creep. Deformation mechanisms. Tertiary creep and rupture. Damage processes. Design against creep. Larson-Miller parameter. Creep resistant materials.
- Environmental failure of materials – The role of protective films on metal surfaces; Pourbaix diagrams and polarisation curves; effect of pH, aggressive ions and corrosion inhibitors; galvanic, pitting and bacterial corrosion; stress-corrosion cracking, hydrogen embrittlement and liquid-metal embrittlement; designing against corrosion. Chemical and thermal degradation of polymers and the effects of degradation on polymer properties, including environmental stress cracking. Case studies

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
Coursework	3,000 words	50%

Assessment Summary

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

READING LIST

Module Code	**ACEA7010**	
Module Title	**Mechanisms of Material Failures**	
Classification	**Reading List entry**	**Electronic***
Essential	Open University Course Team. (2009) *Practical Fracture Mechanics and Fatigue,* The Open University, Milton Keynes	☐
Essential	Open University Course Team (2007) *Failure Modes and Structural Modelling,* The Open University, Milton Keynes	☐
Essential	Roberge, P.R. (2008) *Corrosion Engineering: Principles and Practice*, McGraw-Hill, New York	☐
Further	Ahmad, Z. (2006) *Principles of Corrosion Engineering and Corrosion Control*, Butterworth Heinemann, Oxford	☐
Further	Altenbach, H. et al (1998) *Modeling of Material Damage and Failure of Structures: Theory and Applications*, Springer, Berlin	☐
Further	Bathias, C. & Pineau, A. (2011) *Fatigue of Materials and Structures*, Wiley-Blackwell, London	☐
Further	Betten, J.(2008) *Creep Mechanics*, Springer, Berlin	☐
Further	Janssen, M. et al (2004) *Fracture Mechanics*, Taylor & Francis, Abingdon	☐
Further	Kundu, T. (2008) *Fundamentals of Fracture Mechanics*, CRC Press	☐
Further	Kutz, M. (2012) *Handbook of Environmental Degradation*, William Andrews, Oxford	☐
Further	Lemaitre, J. & Desmorat, R. (2010) *Engineering Damage Mechanics:Ductile, Creep, Fatigue and Brittle Fractures*, Springer, Berlin	☐
Further	Suresh, S. (1998) *Fatigue of Materials*, Cambridge University Press, Cambridge	☐
Further	Schive, J. (2008) *Fatigue of Structure & Materials*, Springer, Berlin	☐
Further	Schweitzer, P.A. (2010) *Fundamentals of Metallic Corrosion*, CRC Press	☐
Further	Tawancy, H.M. et al (2004) *Practical Engineering Failure Analysis*, Dekker, New York	☐
Further	**Journals** Journal of Strain Analysis International Journal of Fatigue International Journal of Fracture Materials and Corrosion Journal of Failure Analysis and Prevention	☒
Further	**Websites** ASM Failure Analysis Centre http://products.asminternational.org/faco/index.jsp	☒

Module Code	ACEA7011
Title	Procurement and Supply Chain Management
Date	12/07/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To develop a comprehensive understanding of procurement in commercial operations.
- To critically analyse the roles and issues connected with successful supply chain operations.

LEARNING OUTCOME

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

- critically evaluate the management and key functions of the procurement department; such as sourcing, supplier assessment and development, and performance management ;
- analyse the function of key supply chains, evaluate risks and vulnerability in supply chains and take measures to develop more resilient supply chains;

INDICATIVE CONTENT

- Supply chain management issues that relate to what supply chains are, supply chain vulnerability, fragility and resilience.
- Management of purchasing function and strategies to manage the function such as centralisation.
- Cost versus price argument and use of total acquisition costs.
- Consideration of environmental, sustainability issues and health & safety implications of procurement.
- Different types of purchases to include; capital buying, buying services, outsourcing, commodity buying, international procurement and buying for resale.
- Sourcing strategies to include; single, dual and multiple sourcing, global versus local sourcing.
- Supplier Selection processes to include; supplier appraisal, supplier assessment, measuring supplier performance and development.
- The strategic role of the supplier including partnerships, strategic alliances, management of relationships and to assess and develop supplier relationships.
- The measurement of supply chain performance and how to assess the performance of procurement operations.
- Consideration of ethical policies, circular economy, sustainable procurement and measures to prevent fraud, corruption and bribery.
- The role of technology in supply chains and procurement; e-procurement, e-auctions

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
Coursework	6,000 word assignment	100%

Assessment Summary

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

READING LIST

Module Code	ACEA7011	
Module Title	**Procurement and Supply Chain Management**	
Classification	**Reading List entry**	**Electronic***
Essential	Crandall R, Crandall, W and Chen, C (2010) Principles of Supply Chain Management, CRC Press	☒
Essential	Managan, J, Lalwani, C, Butcher, T and Javadpour, R (2012) Global Logistics and Supply Chain Management, 2nd Edition, Wiley	☐
Further	Christopher, M (2011) Logistics and Supply Chain Management, 4th Edition, Pearson	☐
Further	Gattorna, J (2009) Dynamic Supply Chain Alignment, Gower	☐
Further	Harrison, A and Van Hoek, R (2010) Logistics Management and Strategy: Competing Through the Supply Chain, 2nd Edition, Wile	☐
Further	Handfield, R and McCormack, K (2008) Supply Chain Risk Management Minimising Disruptions in Global Sourcing, Auerbach Publications	☐
Further	Lui, J (2012) Supply Chain Management and Transport Logistics, Routledge	☐
Further	Rushton, A Croucher P and Baker, P (2014) The Handbook of Logistics and Distribution Understanding the Supply Chain, 5th Edition, Kogan Page	☐
Further	**Journals** European Journal of Operations Research International Journal of Production Economics International Journal of Logistics Management Journal of Supply Chain Management Journal of Operations Management Journal of Operations and Supply Chain Management Journal of Purchasing and Supply Management	☒
Further	**Websites** www.supplymanagement.com www.cips.org www.ciltuk.org www.ism.ws www.ifpsm.org www.apics.org	☒

Module Code	**ACEA7012**
Title	**Quality Management in an Operational Environment**
Date	**12/07/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To enable students to critically evaluate problems and apply a range of analytical and statistical techniques that can be used to improve operational performance while developing a culture of continuous improvement.

LEARNING OUTCOMES

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

- To select and apply an appropriate range of tools and techniques that will help to improve operational performance while understanding their limitations

- Analyse, apply and evaluate the use of a range of improvement methodologies (Six Sigma) and statistical techniques in developing a culture of continuous improvement while considering ethical, environmental and legal issues

INDICATIVE CONTENT

- Consideration of the financial impact of poor quality and the ethical concerns associated with poor quality performance

- Use of statistical process control techniques, Gage R & R studies, capability studies and performance measurement techniques

- Strategies and methodologies to improve quality including their application in operational environments, six sigma, 8D and business excellence

- Application of advanced quality planning techniques- quality function deployment (QFD), Taguchi methods, benchmarking

- Reliability engineering concepts- systems reliability, redundancy systems, mean between failure, mean to repair overall equipment/systems effectiveness

- Use of the seven new quality tools such as matrix diagrams, interrelationship diagrams, tree diagrams, process decision programme charts (PDPC) and activity network diagrams

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
Report	3,000 words	50%

Assessment Summary

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

READING LIST

Module Code	**ACEA7012**	
Module Title	**Quality Management in an Operational Environment**	
Classification	**Reading List entry**	**Electronic***
Essential	Dale, B., Bamford, D and Van der Wiele, T (2016) *Managing Quality*: An Essential Guide and Resource Gateway, Wiley, Chichester	☐
Essential	Oakland, J. (2012) *Statistical Process Control, 3rd Edition*, Elsevier, Amsterdam,	☐
Essential	Keller, P. (2011) *Six Sigma De Mystified*, McGraw Hill, New York	☐
Essential	Pyzdek, T. and Keller, P. (2009) *The Six Sigma Handbook, 3rd Edition*, McGraw Hill, New York	☐
Essential	Ficalora, J and Cohen, L. (2012) *Quality Function Deployment and Six Sigma: A QFD Handbook*, Pearson, London	☐
Essential	Sartor, M and Orzes, G (2019) Quality Management: Tools, Methods and Standards, Emerald Publishing, London	☐
Further	Evans and Lindsay (2010) *The Management and Control of Quality, 8th Edition* South Western Publishing, Stamford, CT	☐
Further	Voehi, F., Harrington, H., Mignosa, C and Charron, R (2013) The Lean Six Sigma Black Belt Handbook: Tools and Methods for Process Acceleration, Productivity Press, Boca Raton	☐
Further	Setter, C (2018) Six Sigma: A Complete Step-by-Step Guide: A Complete Training & Reference Guide for White Belts, Yellow Belts, Green Belts and Black Belts, Harmony Living	☐
Further	Keleman, M. (2005) *Managing Quality, 2nd Edition*, Sage, London	☐
Further	Akao, J. (2004) *Quality Function Deployment: Integration Customer Requirements into Product Design*, Productivity Press, Florida	☐
Further	Anthony, J. (2004) *Design of Experiments for Engineers and Scientists*, Butterworth Heinemann, Oxford	☐
Further	O'Connor, P. And Kleyner, A (2012) *Practical Reliability Engineering, 5th Edition*, Wiley, New Jersey	☐
Further	**Journals** Benchmarking: An International Journal Food Control International Journal of Production Economics International Journal of Quality and Reliability Management International Journal of Quality Science Journal of Operations Management Measuring Business Excellence Process Engineer Quality World	☒

	Quality Progress Reliability Engineering and System Safety The TQM Journal The TQM Magazine Total Quality Management	
Further	**Websites** www.thecqi.org www.asq.org www.isixsigma.com www.bqf.org.uk www.emeraldinsight.com www.isspro.co.uk	☒

Module Code	ACEA7013
Title	Structural Integrity and Material Evaluation
Date	12/07/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)
To enable the student to develop an understanding and appreciation for the structural reliability and the safe design of engineered structures.

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

- demonstrate an in depth understanding of the scientific concepts underpinning structural integrity methods
- evaluate and compare structural integrity assessment methods using relevant statistical models

INDICATIVE CONTENT

- History and development of Structural Integrity Assessment
- the role of NDT within Structural Integrity Assessment
- theory of Structural Integrity Assessment Methods – NDT Methods, Vibration and Stress Analysis, Acoustic Emission Monitoring, Infrared Methods
- Risk Based Inspection
- consequences of structural integrity failure
- Probability of Detection (POD) statistics

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
Research/Lab Report	3,000 words	50%

Assessment Component 2 ***(Tick one)***

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

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Summary

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

READING LIST

Module Code	**ACEA7013**	
Module Title	**Structural Integrity and Material Evaluation**	
Classification	**Reading List entry**	**Electronic***
Essential	Slater, J. C., Vibration Testing, with Modal Testing and Health Monitoring (John Wiley, 2013)	☐
Essential	Müller, G., Handbook of Engineering Acoustics (Springer, 2012)	☐
Essential	Alten, F., Fundamentals of Structural Integrity (Wiley, 2003)	☐
Essential	Mix, P. E., Introduction to Non-Destructive Testing: A Training Guide (John Wiley, 2004)	☐
Further	Journals International Journal of Materials and Structural Integrity; Journal of Sound and Vibration; Journal of Materials Processing Technology; NDT&E International; Infrared Physics and Technology	☐
Further	Websites www.ndt.net; www.ndt-ed.org; Science Direct	☒

Module Code	**ACFA7003**
Title	**Masters Project**
Date	**11/04/2019**
Level	**7**
Credits	**60**
Pre-Requisites	**None**

AIM(S)

- To allow the student to advance their knowledge and understanding by undertaking and managing a significant project of their own choice, related to the major themes of their MSc programme.

LEARNING OUTCOMES

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

- critically identify and develop an advanced research topic
- review appropriate literature by contextualising and integrating the study into the continuing development of knowledge and understanding of chosen research topic
- critically formulate a series of research objectives and devise strategies to support these
- demonstrate and display advanced critical, analytic and creative thinking
- demonstrate advanced professional skills to present information both orally and in a written form

INDICATIVE CONTENT

The Masters Project is an essential part of the degree; it is the culmination of the Masters programme. As such, it has been designed and conceived as an integral part of the programme. Preparation for the Masters Project begins early in the programme, and students acquire analytical and other research skills throughout part 1. This underpins and enhances the student's ability to undertake research.

- Formulation and rationale for suitable post-graduate research objectives
- Application of an appropriate methodology for the investigation.
- Collation and communication - recording and organising information, analysis of results, communicating the results, referencing, plagiarism.
- Critical review of appropriate literature within a conceptual/theoretical framework.
- Determination of research results.
- Critical appraisal of the results/solutions of the investigation.
- Project planning - project time scale control
- Oral/visual critique and presentation of the results of the investigation.

- Written and verbal critique of the research
- Intellectual property - copyright, trademarks, patents.
- Social and cultural context, and ethical issues
- Intellectual property - copyright, trademarks, patents.
- Social and cultural context, and ethical issues

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	15	2.5%
Independent learning	585	97.5%
Placement learning	0	0%
TOTAL	**600**	**100%**

ASSESSMENT

Assessment Component 1

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

Mode of assessment	Volume	Weighting
Masters Project	15,000 words equivalent Students will produce a research portfolio of work appropriate to the nature of their project. This will vary slightly according to the nature of the project undertaken. Portfolio elements may include a selection of the following, to be agreed with the external examiner: • Written Report (all students) • Exhibition Board (all students) • Presentation slides • Hardware and/or software implementation	80%

Assessment Component 2

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

Mode of assessment	Volume	Weighting
Viva voce	15 mins (before questions)	20%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	80%
Practical	20%
TOTAL	**100%**

INDICATIVE READING LIST

Module Code	**ACFA7003**	
Module Title	**Masters Project**	
Classification	**Reading List entry**	**Electronic***
Essential	McCormac, C. and Davis, J. (2015) *Research Project Success: The Essential Guide for Science and Engineering Students*, Cambridge: Royal Society of Chemistry	☒
Essential	Greenfield, T. (2016) *Research Methods for Postgraduates,* London: Arnold	☒
Essential	Cottrell, S. (2011) *Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition,* London: Palgrave Macmillan	☒
Essential	Cottrell, S. Dissertations and Project Reports: A Step by Step Guide (Palgrave Study Skills, 2014)	☒
Essential	O'Leary, Z. (2013) *Doing Your Research Project (2nd Edition)*, SAGE Publications Ltd	☒
Further	O'Leary, Z. (2015) The Essential Guide to *Doing Your Research Project,* Newcastle upon Tyne: Sage	☒
Further	Kranzler, J. H. (2017) *Statistics for the Terrified,* Upper Saddle River: Prentice Hall	☒
Further	Dawson, C. W. (2009) *Projects in Computing and Information Systems: a Student's Guide, 2nd Edition,* Boston: Addison-Wesley	☒
Further	Dipankar, D. (2019) Engineering Research Methodology: A Practical Insight for Researchers. Springer	☐
Further	Fellows, R. and Liu, A. *Research Methods for Construction (*Blackwell Oxford, 2015)	☐
Further	Few, S. (2012) *Show Me the Numbers*, Burlingame: Analytics Press	☒
Further	Hughes, B. and Cotterell, M. (2009) *5th Software Project Management*, New York: McGraw-Hill	☐
Further	Phillips, J. (2010) *IT Project Management: On Track from Start to Finish*, New York: McGraw-Hill	☐
Further	Gregoire, T.G. & Valentine, H.T. (2008) *Sampling strategies for natural resources and the environment*. Chapman, London	☐
Further	Baase, S. (2012) *A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 4th Edition,* Boston: Pearson	☐
Further	Collis, J. and Hussey, R. (2009) Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, London: Palgrave Macmillan	☐

Further	Cottrell, S. (2011) Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition, London: Palgrave Macmillan	☐
Further	Davies, M. B. (2007) Doing a Successful Research Project, London: Palgrave Macmillan	☐
Further	Dawson, C. W. (2009) Projects in Computing and Information Systems: a Student's Guide, 2nd Edition, Boston: Addison-Wesley	☐
Further	Hewson, C. , Vogel, C. & Laurent, D. (2015) Internet research methods. Sage: London.	☐
Further	Few, S. (2012) Show Me the Numbers: Designing Tables and Graphs to Enlighten, Burlingame: Analytics Press	☐
Further	Quinn, M. J. (2010) Ethics for the Information Age: International Edition - 4th Edition, Boston: Pearson	☐
Further	Yin, R. K. (2008) Case Study Research: Design and Methods, 4th Edition, Newcastle upon Tyne: Sage	☐
Further	Spence, R. (2014) *Information Visualization: an Introduction,* Boston: Addison-Wesley	☐
Further	Thiel, D.V. (2014) Research methods for engineers. Cambridge UP	☒
Further	Wheater, C.P. & Cook, P.A. (2015) Using statistics to understand the environment Routledge	☐
Further	**Journals** ACM Transactions on Information Systems Behaviour and Information Technology Communications on the ACM International Journal of Electronic Commerce Journal of Strategic Information Systems Journal of Systems Management	☒
Further	**Websites** http://www.acm.org http://www.bized.co.uk http://www.managers.org.uk http://www.cbronline.com http://www.eevl.ac.uk http://juno.emeraldinsight.com http://www.ft.chadwyck.co.uk http://www.itwales.com http://www3.gartner.com http://www.silicon.com http://www.mckinseyquarterly.com http://www.zdnetweek.co.uk http://projectmanagement.ittoolbox.com/ http://www.ics.ltsn.ac.uk/resources/projman/index.html http://www.niwotridge.com/ Resources/PM-SWEResources/PMResources.htm http://www.tickit.org/international.htm http://www.bcs.org/ http://www.uml.org/ http://www.omg.org/	☒

Module Code	**ACFA7004**
Title	**Research Methods and Professional Development**
Date	**11/04/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- The aim of this module is for students to develop a problem solving approach to research to facilitate their production of a valid and reliable postgraduate dissertation.

LEARNING OUTCOMES

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

- Generate a project proposal that meets a given domain research requirements.

- Identify and visualise a complex research problem within a specific research domain, outline the investigative approach and comprehensively consider appropriate methods and solutions.

- Critically appraise the research process and its outcomes.

INDICATIVE CONTENT

- Core lectures on the principles of postgraduate research :
    - Research principles and approaches (e.g. the research process, purpose, sources of data including primary/secondary research, quantitative/qualitative data, objective/hypothesis formation, reliability, validity)
    - Research methodologies - historical, descriptive, correlational, comparative, experimental
    - Field data - survey design, questionnaires, sampling, statistical techniques, interviews, case studies, observation
    - Developing a proposal - research statement, research outline and design research schedule
    - Project planning - project time scale control
    - Intellectual property - copyright, trademarks, patents
    - Social and cultural context, and ethical considerations

- Writing up and publishing

- Domain specific research methods:
    - Research for engineering
    - Project planning for computing
    - Advanced Quantitative research methods
    - Advanced Qualitative research methods

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
Research Proposal	4,000 words	70%

Assessment Component 2

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

Mode of assessment	Volume	Weighting
Presentation	10 mins (plus questions)	30%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	**ACFA7004**	
Module Title	**Research Methods and Professional Development**	
Classification	**Reading List entry**	**Electronic***
Essential	Cottrell, S. (2011) Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition, London: Palgrave Macmillan	☒
Essential	Cottrell, S. (2014) Dissertations and Project Reports: A Step by Step Guide, Palgrave Study Skills	☒
Essential	O'Leary, Z. (2013) Doing Your Research Project (2nd Edition), SAGE Publications Ltd	☒
Further	Dawson, C. W. (2009) Projects in Computing and Information Systems: a Student's Guide, 2nd Edition, Boston: Addison-Wesley	☒
Further	Dipankar, D. (2019) Engineering Research Methodology: A Practical Insight for Researchers. Springer	☐

Further	Fellows, R. and Liu, A. (2015) Research Methods for Construction, Oxford: Blackwell	
Further	Few, S. (2012) Show Me the Numbers, Burlingame: Analytics Press	☐
Further	Gregoire, T.G. & Valentine, H.T. (2008) Sampling strategies for natural resources and the environment. London : Chapman	☐
Further	Hart, C. (1998) Doing a Literature Review, Sage	☒
Further	Hewson, C., Vogel, C. & Laurent, D. (2015) Internet research methods. London: Sage	☐
Further	Kranzler, J. H. (2011) Statistics for the Terrified, 5th Edition, Upper Saddle River: Prentice Hall	☐
Further	Leedy. P. D. and Ormrod, J. E. (2012) Practical Research Planning and Design, 10th Edition, Boston: Pearson Education	☒
Further	Maylor, H. (2010) Project Management, Boston: Pearson Education	☐
Further	Oppenheim, A. (1992) Questionnaire Design, Interviewing and Attitude Measurement, London: Continuum	☒
Further	Spence, R. (2014) Information Visualization: an Introduction, Boston: Addison-Wesley	
Further	Thiel, D.V. (2014) Research Methods for Engineers. Cambridge UP	☒
Further	Wheater, C.P. & Cook, P.A. (2015) Using Statistics to Understand the Environment, Routledge	☒