

MODULE DIRECTORY

LEVEL 7

ACADEMIC DISCIPLINE OF ENGINEERING

WALES INSTITUTE OF SCIENCE AND ART

2024-2025

CONTENTS PAGE

Page No

INTRODUCTION.....	1
MODULES	2

INTRODUCTION

This Module Directory includes all the modules for Level 7 within the Academic Discipline of Engineering (WISA) in the academic year 2024-2025.

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, 2 nd 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.tiprc.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 (2 nd 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) <i>Design for Manufacturability: How to Use Concurrent Engineering to Rapidly Develop Low-Cost, High-Quality Products for Lean Production</i> , New York, Productivity Press.	☒
Essential	Boothroyd, G. et al (2014) <i>Product Design for Manufacture & Assembly (Manufacturing, Engineering & Materials Processing)</i> , 3 rd Edition, London: CRC Press	☒
Further	Locher D. A (2008) <i>Value Stream Mapping for Lean Development – A How-To Guide for Streamlining Time to Market</i> , Oxford: Routledge	☒
Further	Gothelf J. et al (2016) <i>Lean UX - Designing Great Products with Agile Teams</i> , 2 nd Edition, California: O'Reilly Media	☒
Further	Gothelf J. (2017) <i>Lean vs. Agile vs. Design Thinking: What you Really Need to Know to Build High-Performing Digital Product Teams</i> , Sense & Respond Press	☐
Further	Yang, K. et al (2009) <i>Design for Six Sigma: A Roadmap for Product Development</i> , 2 nd Edition, McGraw-Hill Education	☐
Further	Boothroyd, G. (2005) <i>Assembly Automation and Product Design</i> , 2 nd Edition, London: CRC Press	☒
Further	Brissaud, D. et al (2006) <i>Innovation in Lifecycle Engineering & Sustainable Development</i> , 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 - 4 th 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, 2 nd Edition, Amaeon, New York	☐
Essential	Paton, R and McCalman, C (2010) <i>Change Management A Guide to Effective Implementation</i> , 3 rd 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, 5 th Edition, Pearson, London	☐
Further	Cameron, E and Green, M (2012) <i>Making Sense of Change Management: A Complete Guide to Models Tools and Techniques of Organisational Change</i> , 3 rd Edition, Kogan Page, London	☐
Further	Hayes, J (2014) <i>The Theory and Practice of Change Management</i> , 4 th Edition Palgrave McMillan, New York	☐
Further	Mullins, L (2013) <i>Management and Organisational Behaviour</i> , 10 th Edition, Pearson, London	☐
Further	Northouse, P (2014) <i>Leadership: Theory and Practice</i> , 8 th Edition, Sage, London	☐
Further	Parameter, D (2015) Key Performance Indicators: Developing, Implementing, and using Winning KPIs, 3 rd Edition, John Wiley, New Jersey	☐
Further	Fraedrich, J and Ferrell, O (2016) Business Ethics: Ethical Decision Making & Cases 11 th Edition, South-Western College Publishing, Boston	☐
Further	Wild, T (2017) Best Practice in Inventory Management, 3 rd Edition, Routledge, Adbington	☐
Further	Feenstra, R and Taylor, A (2017) International Trade, 4 th Edition, Worth Publishing	☐
Further	Reuvid, I and Sherlock, J (2011) International Trade: An Essential Guide to the Principles and Practice of Export, 3 rd Edition, Kogan Page, LONDON	☐
Further	Attrill, P and McLaney, E (2017) Accounting and Finance for Non-Specialists, 10 th 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	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) <i>Lean Thinking</i> , Free Press, New York	☐
Essential	Womack, J P & Jones D (2007) <i>The Machine That Changed the World</i> , Simon & Schuster, New York	☐
Essential	Bicheno, J & Holweg, M (2008) <i>The Lean Toolbox</i> , Picsie Books, Johannesburg	☐
Further	Johnston, R. Clark, G & Shulver, M (2012) <i>Service Operations Management</i> , 4 th Edition, Pearson, Harlow	☐
Further	Slack, N and Brandon-Jones, A (2016) <i>Operations Management</i> , 8 th Edition, Pearson, Harlow	☐
Further	Wilson, L (2009) <i>How to Implement Lean Manufacturing</i> , McGraw-Hill, New York	☐
Further	Gunasekaran, G (2001) <i>Agile Manufacturing</i> , Pergammon, Oxford	☐
Further	George, ML (2002) <i>Lean Six Sigma: Combining Six Sigma Quality with Lean Production Speeds</i> , McGraw-Hill, New York	☐
Further	Bicheno, J (2000) <i>Cause and Effect Lean: Lean Operations, Six Sigma and Supply Chain</i> , Picsie Books, Johannesburg	☐
Further	Hines, P, et al (2008) <i>Staying Lean</i> , Lean Enterprise Research Centre, Cardiff	☐
Further	Nash, M A & Poling, S.R (2008) <i>Mapping the Total Value Stream</i> , 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.manufacturinginstitute.co.uk www.leansixsigma.institute.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) <i>'Project Management Body of Knowledge - 5th Edition'</i> APM, Bucks	☐
Essential	Burke, R (2013) <i>Project Management: Planning and Control Techniques</i> , 5 th Edition, John Wiley & Sons, Chichester	☐
Essential	Smith, N (2007) <i>Engineering Project Management</i> , 3 rd Edition, Wiley Blackwell, London	☐
Further	Turner, J (2019) <i>Agile Project Management: The Ultimate Beginner's Guide to Learn Agile Project Management Step by Step</i> , Independently published	☐
Further	Jung, S and Krebs, P (2019) <i>The Essentials of Contract Negotiation</i> , Springer, New York	☐
Further	Carroll, J and Morris, D (2015) <i>Agile Project Management in Easy Steps</i> , 2 nd Edition, Easy Steps Limited, Leamington Spa	☐
Further	Maylor, H (2010) <i>Project Management</i> , 4 th Edition, Pearson, Harlow	☐
Further	Wysocki., R (2019) <i>Effective Project Management: Traditional, Agile, Extreme, Hybrid</i> , 8 th Edition, John Wiley and Son, London	☐
Further	Averous, J (2014) <i>Practical Cost Control Handbook for Project Managers</i> , Fourth Revolution Publishing, Singapore	☐
Further	Raydugin, Y (2013) <i>Project Risk Management: Essential Methods for Project Teams and Decision Makers</i> , John Wiley and Son, New Jersey	☐
Further	Taylor, S and Woodhams, C (2016) <i>Human Resources Management: People and Organisations</i> , 2 nd Edition, CIPD-Kogan Page, London	☐
Further	Gates, S (2015) <i>The Negotiating Book: Your Definitive Guide to Successful Negotiation</i> , 2 nd Edition, Capstone, Chichester	☐
Further	Arden, D (2015) <i>Win Win: How to get a Winning Result from Persuasive Negotiations</i> , Pearson, Harlow	☐
Further	Wyatt, N (2012) <i>The Financial Times Essential Guide to Budgeting and Forecasting: How to Deliver Accurate Number</i> , Financial Times Publishing, London	☐
Further	Westland, J (2007) <i>The Project Management Life Cycle: A Complete Step-by-Step Methodology for Initiating, Planning, Executing and Closing the</i>	☐
Further	Wilson, R (2014) <i>A Comprehensive Guide to Project Management Schedule and Control</i> , 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). Cumulative 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) <i>Practical Fracture Mechanics and Fatigue</i> , The Open University, Milton Keynes	☐
Essential	Open University Course Team (2007) <i>Failure Modes and Structural Modelling</i> , The Open University, Milton Keynes	☐
Essential	Roberge, P.R. (2008) <i>Corrosion Engineering: Principles and Practice</i> , McGraw-Hill, New York	☐
Further	Ahmad, Z. (2006) <i>Principles of Corrosion Engineering and Corrosion Control</i> , Butterworth Heinemann, Oxford	☐
Further	Altenbach, H. et al (1998) <i>Modeling of Material Damage and Failure of Structures: Theory and Applications</i> , Springer, Berlin	☐
Further	Bathias, C. & Pineau, A. (2011) <i>Fatigue of Materials and Structures</i> , Wiley-Blackwell, London	☐
Further	Betten, J.(2008) <i>Creep Mechanics</i> , Springer, Berlin	☐
Further	Janssen, M. et al (2004) <i>Fracture Mechanics</i> , Taylor & Francis, Abingdon	☐
Further	Kundu, T. (2008) <i>Fundamentals of Fracture Mechanics</i> , CRC Press	☐
Further	Kutz, M. (2012) <i>Handbook of Environmental Degradation</i> , William Andrews, Oxford	☐
Further	Lemaitre, J. & Desmorat, R. (2010) <i>Engineering Damage Mechanics:Ductile, Creep, Fatigue and Brittle Fractures</i> , Springer, Berlin	☐
Further	Suresh, S. (1998) <i>Fatigue of Materials</i> , Cambridge University Press, Cambridge	☐
Further	Schive, J. (2008) <i>Fatigue of Structure & Materials</i> , Springer, Berlin	☐
Further	Schweitzer, P.A. (2010) <i>Fundamentals of Metallic Corrosion</i> , CRC Press	☐
Further	Tawancy, H.M. et al (2004) <i>Practical Engineering Failure Analysis</i> , 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, 2 nd Edition, Wiley	☐
Further	Christopher, M (2011) Logistics and Supply Chain Management, 4 th 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, 2 nd 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, 5 th 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) <i>Managing Quality: An Essential Guide and Resource Gateway</i> , Wiley, Chichester	☐
Essential	Oakland, J. (2012) <i>Statistical Process Control, 3rd Edition</i> , Elsevier, Amsterdam,	☐
Essential	Keller, P. (2011) <i>Six Sigma De Mystified</i> , McGraw Hill, New York	☐
Essential	Pyzdek, T. and Keller, P. (2009) <i>The Six Sigma Handbook, 3rd Edition</i> , McGraw Hill, New York	☐
Essential	Ficalora, J and Cohen, L. (2012) <i>Quality Function Deployment and Six Sigma: A QFD Handbook</i> , Pearson, London	☐
Essential	Sartor, M and Orzes, G (2019) <i>Quality Management: Tools, Methods and Standards</i> , Emerald Publishing, London	☐
Further	Evans and Lindsay (2010) <i>The Management and Control of Quality, 8th Edition</i> South Western Publishing, Stamford, CT	☐
Further	Voehi, F., Harrington, H., Mignosa, C and Charron, R (2013) <i>The Lean Six Sigma Black Belt Handbook: Tools and Methods for Process Acceleration</i> , Productivity Press, Boca Raton	☐
Further	Setter, C (2018) <i>Six Sigma: A Complete Step-by-Step Guide: A Complete Training & Reference Guide for White Belts, Yellow Belts, Green Belts and Black Belts</i> , Harmony Living	☐
Further	Keleman, M. (2005) <i>Managing Quality, 2nd Edition</i> , Sage, London	☐
Further	Akao, J. (2004) <i>Quality Function Deployment: Integration Customer Requirements into Product Design</i> , Productivity Press, Florida	☐
Further	Anthony, J. (2004) <i>Design of Experiments for Engineers and Scientists</i> , Butterworth Heinemann, Oxford	☐
Further	O'Connor, P. And Kleyner, A (2012) <i>Practical Reliability Engineering, 5th Edition</i> , 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	ACEB7007
Title	Hybrid Powertrain and Control
Date	27/02/2023
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

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

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Component 2

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

Mode of assessment	Volume	Weighting
Written Report	3,000 words without appendices	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACEB7007	
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 2 nd edition. (IET 2010)	☐
Further	Hoboken, N : Environmentally Conscious Transportation (Wiley 2008)	☐
Further	Larminie, J. Lowry, J : Electric Vehicle Technology Explained. 2 nd 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.electrcautosprt.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?qclid=EAlalQobChMlnPrrya-b4glVhbTtCh08bAK6EAAYAiAAEql2l D BwE&qclsrc=aw.ds https://www.carbonbrief.org/ http://www.ieahev.org/	☒

Module Code	ACEB7013
Title	Structural Integrity and Material Evaluation
Date	25/08/2023
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

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Lab-based assessment	3,000 words or equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACEB7013	
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
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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
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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) <i>Research Project Success: The Essential Guide for Science and Engineering Students</i> , Cambridge: Royal Society of Chemistry	☒
Essential	Greenfield, T. (2016) <i>Research Methods for Postgraduates</i> , London: Arnold	☒
Essential	Cottrell, S. (2011) <i>Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition</i> , London: Palgrave Macmillan	☒
Essential	Cottrell, S. <i>Dissertations and Project Reports: A Step by Step Guide</i> (Palgrave Study Skills, 2014)	☒
Essential	O'Leary, Z. (2013) <i>Doing Your Research Project (2nd Edition)</i> , SAGE Publications Ltd	☒
Further	O'Leary, Z. (2015) <i>The Essential Guide to Doing Your Research Project</i> , Newcastle upon Tyne: Sage	☒
Further	Kranzler, J. H. (2017) <i>Statistics for the Terrified</i> , Upper Saddle River: Prentice Hall	☒
Further	Dawson, C. W. (2009) <i>Projects in Computing and Information Systems: a Student's Guide, 2nd Edition</i> , Boston: Addison-Wesley	☒
Further	Dipankar, D. (2019) <i>Engineering Research Methodology: A Practical Insight for Researchers</i> . Springer	☐
Further	Fellows, R. and Liu, A. <i>Research Methods for Construction</i> (Blackwell Oxford, 2015)	☐
Further	Few, S. (2012) <i>Show Me the Numbers</i> , Burlingame: Analytics Press	☒
Further	Hughes, B. and Cotterell, M. (2009) <i>5th Software Project Management</i> , New York: McGraw-Hill	☐
Further	Phillips, J. (2010) <i>IT Project Management: On Track from Start to Finish</i> , New York: McGraw-Hill	☐
Further	Gregoire, T.G. & Valentine, H.T. (2008) <i>Sampling strategies for natural resources and the environment</i> . Chapman, London	☐
Further	Baase, S. (2012) <i>A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 4th Edition</i> , Boston: Pearson	☐
Further	Collis, J. and Hussey, R. (2009) <i>Business Research: a Practical Guide for Undergraduate and Postgraduate Students</i> , 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) <i>Information Visualization: an Introduction</i> , 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, 2 nd 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 (2 nd Edition), SAGE Publications Ltd	☒
Further	Dawson, C. W. (2009) Projects in Computing and Information Systems: a Student's Guide, 2 nd 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, 5 th Edition, Upper Saddle River: Prentice Hall	☐
Further	Leedy. P. D. and Ormrod, J. E. (2012) Practical Research Planning and Design, 10 th 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	☒

Module Code	ACPA7001
Title	Design for Industry 4.0
Date	24/05/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To provide a comprehensive understanding of the implications and challenges of sustainable manufacturing factors for Industry 4.0 applications.

LEARNING OUTCOMES

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

- Critically appraise the broad range of manufacturing-related considerations of a product and synthesize design solutions with appropriate consideration of new and emerging Industry 4.0 manufacturing technologies.
- Analyse the requirements for other factors relevant for capturing full value from new and emerging Industry 4.0 technologies (e.g. design for automated assembly, design for automated dis-assembly, design for recycling and re-use, reliability, maintainability, recyclability, sustainability) and specify appropriate design features.

INDICATIVE CONTENT

- Design for Industry 4.0 Manufacturing strategies (such as additive manufacturing and implications of new and advanced materials) and how these maturing technologies can be exploited through design.
- Design processes and methodologies, including Design for Automated Assembly / Dis-assembly.
- Quality of Design Techniques - Failure Mode and Effects Analysis (design and process), Quality Function Deployment.
- Fool-proofing. Families of components. Value analysis/engineering. Economics of process selection. Integration of Design and Manufacture.
- Design for recycling, reliability, maintainability, sustainability to develop innovative products and services, systems, components to fulfil new requirements.

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
Seminar Presentation (individual)	20 Minutes	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Reflective Essay	3,000 words	50%

Assessment Summary

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

READING LIST

Module Code	ACPA7001	
Module Title	Design for Industry 4.0	
Classification	Reading List entry	Electronic*
Essential	Brissaud, D et al (2006) <i>Innovation in Lifecycle Engineering & Sustainable Development</i> , Springer, Berlin	☒
Essential	Boothroyd, G (2005) <i>Assembly Automation & Product Design</i> , CRC Press, Florida	☒
Further	Hon, H (2004) <i>Design & Manufacture for Sustainable Development</i> , Professional Engineering Publishing, London	☐
Further	Mascitelli, R (2004) <i>The Lean Design Guidebook</i> , Technology Perspectives,	☐
Further	Journals	☒

	The International Journal of Advanced Manufacturing Technology Procedia Manufacturing International Journal on Interactive Design and Manufacturing International Journal of Operations & Production Management	
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Module Code	ACPA7002
Title	Financial Management and Planning
Date	24/05/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with an understanding of financial management and planning to support the general management process and an informed appreciation of how specialist financial management and planning can contribute to the attainment of business objectives and strategies.

LEARNING OUTCOMES

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

- Critically analyse financial and accounting concepts and apply them to prepare detailed business justification for innovation and manufacturing project investment.
- Comprehensively understand financial statement analysis to interpret complex data and prepare reports analysing corporate financial statements.
- Systematically review and analyse the main theories of corporate finance and be able to apply them to investment problems and financing decisions.

INDICATIVE CONTENT

- Financial principles and metrics.
- Overview of costing methods such as activity-based costing, throughput accounting and management accounting.
- Sources of finance and organisational relationships with financial markets.
- Financial statements.
- The financial position of businesses using ratio analysis.
- Analysis of financial data.
- Project appraisal and management accounting principles.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Presentation and Questions	20 minutes	50%

Assessment Summary

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

READING LIST

Module Code	ACPA7002	
Module Title	Financial Management and Planning	
Classification	Reading List entry	Electronic*
Essential	Edward Fields (2011) <i>The Essentials of Finance and Accounting for Non-Financial Managers</i> , 2 nd Edition, American Management Association.	☒
Essential	Martin Fridson and Fernando Alvarez (2011) <i>Financial Statement Analysis: A Practitioner's Guide</i> , 4 th Edition, Wiley 2011	☒
Further	Torleif Halkjelsvik and Magne Jorgensen (2018) <i>Time Predictions: Understanding and Avoiding Unrealism in Project Planning and Everyday Life</i> , Springer.	☒
Further	Financial Innovation	☒
Further	Journal of the Knowledge Economy	☒
Further	European Financial Management	☒

Further	Industrial Marketing Management	☒
Further	Journal of Business Research	☒
Further	International Journal of Project Management	☒

Module Code	ACPA7004
Title	Introduction to Industry 4.0
Date	24/05/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To enable the students to develop an understanding of the principles of the core areas, necessary to analyse and solve challenges in an Industry 4.0 driven manufacturing environment.

LEARNING OUTCOMES

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

- Demonstrate a systematic and comprehensive understanding of the principles, practice and current challenges of Industry 4.0 technologies.
- Critically evaluate existing manufacturing systems at an operational level, applying engineering analysis methods to solve complex problems and identify opportunities for new and emerging Industry 4.0 technology enablers to deliver sustainable economic and societal benefit.

INDICATIVE CONTENT

- Historical context of the 4th Industrial Revolution, including drivers, enablers, compelling forces and challenges for Industry 4.0
- Lean thinking manufacturing strategies, continuous improvement utilising tools such as Value Stream Mapping (VSM) whilst ensuring resilient supply chains through discrete event simulation using appropriate software.
- Theory of Constraints, Lean and Agile Manufacturing strategies
- Robotics and Automation, including low-cost automation.
- Control systems, including an overview of PLCs
- Appreciation of Programme languages, such as Python, C and Java and their use for Internet of Things, Industrial Internet of Things, Internet of Services applications.
- Smart manufacturing, smart devices, smart logistics.
- Circular economy and its influence on the manufacturing strategy.
- Role of data, information, cloud-based computing and cybersecurity.
- Enabling manufacturing strategies to deliver efficient operations in an Industry 4.0 world including the role of the 'Digital Twin' in the Factory of the Future.

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	1,500 words	25%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	4,500 Words	75%

Assessment Summary

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

READING LIST

Module Code	ACPA7004	
Module Title	Introduction to Industry 4.0	
Classification	Reading List entry	Electronic*
Essential	Gilchrist, A. (2016). <i>Industry 4.0 The Industrial Internet of Things</i> . New York: Apress.	☒
Essential	Schwab, K. (2016). <i>The Fourth Industrial Revolution</i> . Geneva: World Economic Forum.	☐
Essential	Goldratt, E. M., & Cox, J. (2014) <i>The Goal: A process of ongoing improvement</i> . Great Barrington, MA: North River Press.	☐
Further	Nash, M A & Poling, S.R. (2008) <i>Mapping the Total Value Stream</i> . Florida: Productivity Press.	☒
Further	Womack, J P & Jones, D T (2007) <i>Lean Solutions; How Companies and Customers can create value and wealth together</i> . London: Simon & Schuster	☐
Further	Womack, J P & Jones, D T (2007) <i>The Machine that changed the World</i> . London: Simon & Schuster	☐

Further	Journals Journal of Manufacturing Systems CIRP Journal of Manufacturing Science and Technology The International Journal of Advanced Manufacturing Technology Procedia Manufacturing International Journal of Operations & Production Management International Journal of Machine Tools and Manufacture	☒
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Module Code	ACPA7005
Title	Introduction to Innovation Management
Date	24/05/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To review innovation best practice within an industrial context and understand the factors which both influence and contribute to the successful management of innovation.
- To evaluate innovation management concepts and apply this understanding to the analysis of real-world innovation exemplars.

LEARNING OUTCOMES

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

- Critically evaluate the uncertainties and technical/business risks inherent within any innovation-based activities.
- Demonstrate a systematic understanding of the key elements that contribute to successful innovation management processes.
- Synthesise a detailed view of how individual, team and corporate behaviour can both facilitate or stifle innovation, in relation to best-practice procedures.

INDICATIVE CONTENT

- Innovation, uncertainty and risk
- Individual, collective and corporate innovation
- Pre-conditions for innovation – corporate culture and innovation
- Innovation and business strategy
- Leadership styles and change management
- Theory of innovation management (including business model canvas)
- Scenario planning
- Strategies and implementation plans

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
Group seminar presentation	15 mins per person	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

READING LIST

Module Code	ACPA7005	
Module Title	Introduction to Innovation Management	
Classification	Reading List entry	Electronic*
Essential	Paul Trott (2012), <i>Innovation Management and New Product Development</i> , 5 th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), <i>Managing Innovation: Integrating Technological, Market and Organizational Change</i> , 5 th edition Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	Peter Drucker (2012) <i>Innovation and Entrepreneurship</i> , Taylor and Francis.	☒

Further	OECD/Eurostat (2018), <i>Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation</i> , 4th edition, Paris/Eurostat, Luxembourg.	☒
Further	Malcolm Goodman and Sandra Dingli (2013) <i>Creativity and Strategic Innovation Management</i> , New York: Routledge.	☒
Further	Mark Dodgson, David Gann and Nelson Phillips (2015), <i>The Oxford Handbook of Innovation Management</i> , Oxford University Press.	☐
Further	Journal of Product Innovation Management	☒
Further	Research Technology Management	☒
Further	European Journal of Innovation Management	☒
Further	Asia-Pacific Journal of Management Research and Innovation	☒
Further	Journal of Open Innovation	☒

Module Code	ACPA7006
Title	Management of New Product Development
Date	24/05/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To evaluate the primary elements of the new product development process.
- To develop the knowledge, skills and expertise necessary to plan, implement and manage a successful product development process.

LEARNING OUTCOMES

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

- Systematically document and evaluate a detailed plan for an appropriate new product development process for a given product scenario.
- Make critical judgements on alternative approaches to new product development based on technological, strategic and financial / business considerations.
- Comprehensively understand the challenges inherent in incremental and disruptive new product development practices.

INDICATIVE CONTENT

- Knowledge acquisition and evaluation
- Business opportunity appraisal
- Product design specifications
- Distributive new product development
- Concept generation
- Prototyping and evaluation
- Technical and market testing
- Market introduction

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	4,500 words	75%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Individual presentation	10 mins	25%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	75%
Practical	25%
TOTAL	100%

READING LIST

Module Code	ACPA7006	
Module Title	Management of New Product Development	
Classification	Reading List entry	Electronic*
Essential	Paul Trott (2012), <i>Innovation Management and New Product Development</i> , 5 th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), <i>Managing Innovation: Integrating Technological, Market and Organizational Change</i> , 5 th edition, Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	Robert Cooper and Scott Edgett (2005) <i>Lean, Rapid and Profitable New Product Development</i> , Product Development Institute.	☐
Further	Peter Drucker (2012) <i>Innovation and Entrepreneurship</i> , Taylor and Francis.	☒

Further	Malcolm Goodman and Sandra Dingli (2013) <i>Creativity and Strategic Innovation Management</i> , New York: Routledge.	☒
Further	Journal of Product Innovation Management	☒
Further	Journal of Engineering and Technology Management	☒
Further	Technovation	☒
Further	Journal of Product and Brand Management	☒
Further	Production and Operations Management	☒