



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

MODULE DIRECTORY

LEVEL 3/4

COMPUTING

WALES INSTITUTE OF SCIENCE & ART

2021-2022

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INTRODUCTION

This Module Directory includes all the modules for Level 3~4 within Computing 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	ACHA3000
Title	Introduction to Mathematics and Science
Date	14/05/2020
Level	3
Credits	20
Pre-Requisites	None

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	1 hour	50%

Assessment Component 2

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	1 hour	50%

Assessment Summary

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

INDICATIVE READING LIST

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

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

MODULE CODE: ACCA4017
TITLE: Software Development
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I310

AIM(S)

To introduce students to software constructs and to the development of software using a high level programming language. Simple design concepts and good programming practice will be adopted.

LEARNING OUTCOMES

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

1. Understand the syntax and semantics of a high-level programming language and develop programs using good programming practices.
2. Select and deploy basic software constructs using simple algorithms in the development of solutions to programming problems

INDICATIVE CONTENT

- The software life cycle – analysis, design, implementation and maintenance
- Algorithm design – flow charts and pseudo-code
- The programming environment – editor, compiler, debugger
- High level language programming syntax and semantics e.g. C, C++, C#, etc.
- Data types, variables, operators, control structures, data structures, functions
- Software testing and debugging
- Documentation including user guides, technical guides, etc.
- Introduction to problem solving techniques for well-defined problems e.g. interpreting natural language problem definitions, variable identification techniques, divide and conquer, etc.

LEARNING AND TEACHING STRATEGY

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
Essay	2800 words	70%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
In-class practical	2 hours	30%

Assessment Summary

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

READING LIST

Module Code	ACCA4017	
Module Title	Programming I	
Classification	Reading List entry	Electronic*
Essential	Davenport, K. & Vine, M. (2014) <i>C Programming for the Absolute Beginner</i> ,, Cengage Learning PTR	☒
Further	McGrath, M. (2012) <i>C Programming In Easy Steps 4th Edition</i> , In Easy Steps Limited	☐
Further	Greene, J. (2013) <i>Head First C#</i> , O'Reilly Media	☐

MODULE CODE: ACCA4018
TITLE: Internet Technology & Security
DATED: 22/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: I120

AIM(S)

- To provide the student with an understanding of the underlying concepts and principles necessary for the implementation of web technologies including the analysis of the security of an Internet/intranet system with regard to internal and external threats

LEARNING OUTCOMES

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

1. Demonstrate an understanding of the standards, concepts, principles and practice required in the implementation of websites and to select and deploy web languages to implement websites.
2. Demonstrate systematic understanding of security policies and measures to mitigate internal and external attacks and threats in a network.

INDICATIVE CONTENT

- Web fundamentals, including web architecture, browsers, web-enabled devices and compatibility issues.
- Web design concepts: information architecture, design principles, page layouts and grids, schematic design tools.
- Core technologies and standards for building web pages e.g. HTML and XHTML for structural layout and CSS for visual design and style.
- Web content: text, graphics, audio, animations, video, etc., hypertext and hypermedia, web forms.
- Web Accessibility: guidelines, standards, tools and techniques for designing accessible websites.
- Website evaluation e.g. standards validation, performance assessment and evaluation tools.
- Network security and principles.
- Developing a comprehensive network and self-defending networks.
- Security policy, standards, guidelines and procedures.
- Authentication, Authorisation, and Accounting.
- Firewall technologies.
- Fundamentals of cryptography.
- Intrusion detection system and intrusion prevention system.
- Web and database attacks – attacking web servers, category of risk, vulnerabilities of Web Servers and applications, permissions, SQL injections, attacking tools.
- Database Vulnerabilities – locating databases on the network, database server password cracking, locating vulnerabilities in databases.
- HTML – Vulnerabilities, analysing suspicious sites, MS04-040 threats.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Tutorial	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
Essay	2000 words + implementation	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2000 words	50%

Assessment Summary

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

READING LIST

Module Code	ACCA4018	
Module Title	Internet Technology & Security	
Classification	Reading List entry	Electronic*
Essential	Web Design with HTML, CSS, JavaScript and jQuery Set, Wiley (2014) By Jon Duckett	☐
Essential	Stallings, W (2014) Cryptography and network security, principles and practice, Pearson Education Ltd. 2016	☐
Further	Don't Make Me Think Revisited, Pearson (2014) By Steve Krug	☒
Further	Lambert, M., 2016. <i>Learning Bootstrap 4</i> 2nd ed., Packt Publishing.	☒
Further	Kyrmin, J., 2015. <i>Bootstrap in 24 Hours, Sams Teach Yourself</i> 1st ed., Sams Publishing.	☒
Further	Megosinarso, R., 2014. <i>Step By Step Bootstrap 3: A Quick Guide to Responsive Web Development Using</i>	☒

	<i>Bootstrap 3</i> 1st ed., CreateSpace Independent Publishing Platform.	
Further	H.Carr, C. Snyder, B. Bailey (2010) The Management of Network Security, Technology, Design and Management Control, Pearson Education Ltd.	☐
Further	M. Gregg, (2017) Certified Ethical Hacker (CEH) Cert Guide, Pearson Education Ltd.	☒
Further	Ciampa, M (2013) Security+ Guide to Network security fundamentals, Cengage Learning	☒
Further	D. Kim, M. Solomon, (2016) Fundamentals of Information System Security, Jones and Bartlett Learning	☐
Further	J. Michael Stewart (2013) Network Security, firewalls, and VPNs, Jones and Bartlett Learning,	☐
Further	M. Whitman, H. Mattord (2017) Principles of Information Security, Cengage Learning	☐

Module Code	ACCA4019
Title	Analysing and Solving Problems
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with the ability to develop generic solutions to problems using abstract thinking skills

LEARNING OUTCOMES

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

- Evaluate a problem and formulate requirements and constraints.
- Analyse a problem and produce a logical solution

INDICATIVE CONTENT

- Deconstructing Technical Language and Identifying Problems
- Problem solving approaches and techniques
- Interpreting natural language problems
- Subdividing problems
- Constraining problems
- Determining generic and specific solutions.
- Abstract thinking skills
- Critical Thinking Skills
- Reapplying solutions across different contexts
- Rules, heuristics and algorithms
- Logic and rhetoric
- Logical fallacies
- Boolean algebra
- Statistics and analysing results

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
Practical – for example, a Moodle-based quiz or a task such as flowcharting a problem	1 hour	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written assessment	1500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4019	
Module Title	Analysing and Solving Problems	
Classification	Reading List entry	Electronic*
Essential	Curzon P and McCowan P (2017) Power Of Computational Thinking, The: Games, Magic And Puzzles To Help You Become A Computational Thinker, World Scientific	☒
Essential	Levitin, A and Levitin, M (2011) Algorithmic Puzzles, Oxford University Press.	☐
Further	Michalewicz, M and Michalewicz Z (2010), Puzzle-based Learning; An introduction to critical thinking, mathematics and problem solving, Hybrid Publishers.	☐

Further	Fraser, Jen and Anthony, P (2014) Everyone's a Genius: Simple Tips to Boost Your Brilliance Now, Ideation Training Pty Ltd	☐
Further	Gardner, M (1978) aha! Insight, Scientific American.	☐
Further	McInerny, D Q (2005) Being Logical, Random House	☐
Further	Watanabe, K (2009) Problem Solving 101: A Simple Book for Smart People	☐

Module Code	ACCA4020
Title	Introduction to Computer Programming
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to understand and apply programming constructs, languages and tools.

LEARNING OUTCOMES

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

- Demonstrate an understanding of the syntax, semantics and software constructs of programming language.
- Deploy a programming language in developing a program given a well-defined scenario or problem.

INDICATIVE CONTENT

- Programming/scripting languages e.g. C, Python, Perl, etc.
- Declaring variables, local and global variables, arrays, constants.
- Branch constructs: if, else, switch, Boolean AND/OR/NOT
- Loop constructs: while, for loops
- Functions: Arguments and return values
- Design and documentation of code e.g. flow diagrams
- Using a code editor, fundamental debugging techniques

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written report (with associated coding)	3000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4020	
Module Title	Introduction to Computer Programming	
Classification	Reading List entry	Electronic*
Essential	McGrath, M (2018) C Programming In Easy Steps 5 th Edition	☒
Essential	Novikov, D (2019) <i>Python for Beginners: The Ultimate Beginners Guide to Python Programming With Step by Step Guidance and Hands-On Examples.</i>	☒
Further	Romano, F. (2018) <i>Learn Python Programming: The no-nonsense, beginner's guide to programming, data science, and web development with Python 3.7, 2nd Edition</i> , Packt Publishing	☒
Further	McGrath, M (2018) <i>Python in Easy Steps, 2nd Edition</i> , In Easy Steps Limited	☒

Module Code	ACCA4021
Title	Introduction to Computer Systems
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a fundamental understanding of the key components and characteristics of computer systems.

LEARNING OUTCOMES

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

- Understand computer hardware, operating systems and computer networking principles.
- To install and manage a networked computer and a range of software applications.

INDICATIVE CONTENT

- Operating systems. Processes, services and applications. User management. OS commands.
- Computer networks, network cards, Ethernet cable, etc. RJ45 sockets, jacks and wiring, 4-port Ethernet switches.
- File systems e.g. files, folders, file name extensions, etc.
- Components of PC, processors, memory, motherboard, motherboard interfaces, e.g. PCI, PCI Express, and AGP.
- Security, personal firewalls, anti-virus software and software patches.
- Installing and configuring applications, windows registry, user rights, etc.
- The role of a network administrator
- Internet access, Broadband Routers, Internet Service Providers, DHCP, etc.
- Disposing of computer equipment, environmental, privacy and security implications

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	1 hour	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Assessment	1500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4021	
Module Title	Introduction to Computer Systems	
Classification	Reading List entry	Electronic*
Essential	Bott, E, Stinson, T (2018) Windows 10 Inside Out, Microsoft Press	☒
Essential	Stallings, W (2012) Computer Organization and Architecture: Designing for Performance, Pearson Education	☐
Further	Patterson, D A (2016) Computer Organization and Design: The Hardware/Software Interface (The Morgan Kaufmann Series in Computer Architecture and Design), Morgan Kaufmann Publishers	☒
Further	Tanenbaum, A S, Bot, H, (2014) Modern Operating Systems, 4 th Edition, Prentice Hall	☐
Further	Tanenbaum, A (2013) Computer Networks, Prentice Hall	☐

Module Code	ACCA4022
Title	Computer Architecture and Operating Systems
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide the student with a fundamental grounding in the key concepts behind typical computer architectures, hardware, networks and operating systems.

LEARNING OUTCOMES

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

- Determine the essential characteristics and concepts behind computer systems and components, number systems, data capacities and transfer speeds, in the context of typical PC hardware and networking environments.
- Demonstrate an understanding of general Operating System concepts.

INDICATIVE CONTENT

- Fundamentals of number systems. Binary, Dec and Hex notation, representation and conversion.
- Computer systems: major components and peripherals.
- Storage devices. Optical, HDD, SSD, RAID configurations etc.
- Nomenclature and specification of typical data capacities and transfer speeds
- Processor characteristics: RISC, CISC, multi-core etc.
- Computer architecture: system block diagram, CPU, memory, input/output unit, system clock, data bus, address bus, control bus, Harvard vs Von-Neumann etc.
- Memory Organisation: Main RAM, cache, virtual memory etc
- Input/output including polled, interrupts and direct memory access.
- Networking hardware and introduction to networking principles.
- OS fundamentals
- Privileges and permissions
- File system structures, navigation, viewing and editing files and scripts

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
Assignment	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4022	
Module Title	Computer Architecture and Operating Systems	
Classification	Reading List entry	Electronic*
Essential	W Stallings, Computer Organization and Architecture (10th Ed), Pearson, 2016	☐
Essential	I Englander, The architecture of Computer Hardware, Systems Software & Networking – An Information Technology Approach, John Wiley & sons, 2014	☐
Essential	E Siever, Linux in a nutshell, O'Reilly 2009	☒
Further	https://www.tomshardware.com/uk	☒
Further	https://www.anandtech.com/	☒
Further	J O'Gorman, Operating systems with Linux, Palgrave 2001	☐
Further	S Mueller, Upgrading and repairing PCs, Que 2015	☐

Module Code	ACCA4023
Title	Introduction to Web and Database Concepts
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with an understanding of the underlying concepts and principles needed to design and implement relational databases and build and render web pages.

LEARNING OUTCOMES

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

- Demonstrate a systematic understanding and application of the fundamental concepts, technologies, and standards required for building and rendering web pages.
- Demonstrate a systematic understanding of the underlying concepts of data and databases, and the methodology of database design. Apply appropriate systems investigation and analysis techniques to design and implement relational database solutions.

INDICATIVE CONTENT

- Data, Databases and Database Management Systems (DBMS).
- Conceptual, logical and physical database design. Database design and entity analysis techniques.
- Entity-relationship models: entities, relationships, attributes and integrity constraints.
- Relational database implementation using DBMS software and Structured Query Language (SQL).
- Core technologies for building and rendering web pages i.e. HTML, CSS.
- Web content, including text, graphics, media content, hypertext and hypermedia, web forms, etc.
- Fundamental standards and principles of web design and applications i.e. interface and layout design principles, mobile web and device-independent web practices, web accessibility, etc.
- Web evaluation techniques and tools e.g. standards validation, browser evaluation tools, accessibility evaluation, and performance assessment.

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
Portfolio	2 - 3 elements	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	2 - 3 elements	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4023	
Module Title	Introduction to Web and Database Concepts	
Classification	Reading List entry	Electronic*
Essential	Connolly, T., Begg, C., 2015, <i>Database Systems: A Practical Approach to Design, Implementation and Management</i> , 6th Edition, Addison Wesley	☒
Essential	Viescas, J. L., 2018, <i>SQL Queries for Mere Mortals: A Hands-On Guide to Data Manipulation in SQL</i> , 4 th Edition, Addison-Wesley Professional	☒
Essential	Robbins, J., 2018, <i>Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics</i> , O'Reilly Media	☒
Further	Duckett, J., 2014, <i>Web Design with HTML, CSS, JavaScript and jQuery Set</i> , Wiley	☒
Further	Coronel, C. & Morris, S., 2018, <i>Database Systems: Design, Implementation, & Management</i> , 13 th Edition, Cengage Learning	☒

Module Code	ACCA4024
Title	Networks and Cyber Security Essentials
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide the students with an understanding of the key concepts and fundamentals of data communications, computer networks and security of data and devices in a network.

LEARNING OUTCOMES

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

- Develop fundamental understanding of network basics in terms of architecture, devices, application and protocols.
- Demonstrate systematic understanding of security policies and measures to mitigate internal and external attacks and threats in a network.

INDICATIVE CONTENT

- Fundamentals of networks, circuit and packet switching
- Communication on a network
- Client server model
- OSI and TCP/IP Models
- Types of Networks – LAN, WAN, MAN, SAN, etc
- Physical and logical addressing
- Wireless networks and standards
- Cyber Security – attacks, access control, encryption, cryptography
- Importance of data security
- System security – firewalls, threats, intruders and malicious software

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
Portfolio	2000 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
in-class test	1 hrs	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4024	
Module Title	Networks and Cyber Security Essentials	
Classification	Reading List entry	Electronic*
Essential	William Stallings (2014) Data and Computer Communications, 10th Edition, Pearson	☒
Essential	www.netacad.com Username and password required	☒
Essential	William Stallings (2017) Network Security Essentials: Applications and Standards, 6th Edition, Pearson	☒
Further	J. S. Beasley & P. Nilkaew (2018) Networking Essentials: A CompTIA Network+ N10-007 Textbook, 5th Edition, Pearson IT Certification	☒
Further	IEEE/ACM, IEEE/ACM Transactions on Networking	☒
Further	IEEE, IEEE Network Magazine	☒
Further	Science Direct	☒
Further	Scopus	☒

Module Code	ACCA4025
Title	Learning in the Digital Era
Date	25/06/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To develop student's skills for independent study and life-long learning, which will form the foundations for successful completion of their degree programme and support future employment opportunities.

LEARNING OUTCOMES

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

- Demonstrate the foundational skills required to be a resilient and healthy independent learner.
- Practise the principles of learning agility
- Use suitable technology to support and enhance their learning experience within the discipline area

INDICATIVE CONTENT

- Time management, reading, writing, referencing and plagiarism, searching for and evaluating sources of information, working online.
- Critical thinking: issues concerning knowledge, belief, and doubt.
- Critical writing: synthesis, paraphrasing and creating an informed argument, avoiding plagiarism.
- Reflection and self-reflection.
- Identity and sense of place; including values, culture and intercultural awareness, heritage, diversity and inclusion and, multilingualism.
- Skills for a range of assessment modes, including blogs, vlogs, video, presentations, performances, posters, exams and written coursework.
- Skills and attitudes which underpin resilience, health, wellbeing and learning agility; the role of spirit, mind, emotions and body.
- Physical literacy: Consideration of the role of physical activity to the support of physical, mental health, well-being and resilience.
- Digital literacy: using appropriate technology; staying safe online, cyber security, digital identity.
- Team working.

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
E-portfolio	Equivalent to 2,000 words	50%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Video and Supporting Materials	Individual 3 minute video which incorporates supporting materials	50%

Assessment Summary

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

INDICATIVE READING LIST

This will be guided by the student's subject area.

Module Code	ACCA4025	
Module Title	Learning in the Digital Era	
Classification	Reading List entry	Electronic*
Essential	Cottrell, S (2019) <i>The Study Skills Handbook</i> . 5th edn. London: Macmillan International Higher Education.	☒
Essential	Pears, R. and Shields, G.J. (2019) <i>Cite Them Right: the essential referencing guide</i> . 11th edn. London: Macmillan International Higher Education.	☒
Essential	Library Info Skills Sessions	☒

Further	Hopkins, D. and Reid, T., 2018. <i>The Academic Skills Handbook: Your Guide to Success in Writing, Thinking and Communicating at University</i> . London: Sage	☐
Further	Osmond, A., 2016. <i>Academic Writing and Grammar for Students</i> 2 nd edn. London: SAGE.	☐

Module Code	ACCA4026
Title	Software Solutions for Business
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To give students a theoretical and a practical understanding and knowledge of various software and applications used within businesses.

LEARNING OUTCOMES

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

- Knowledge and skills to use software packages and applications to support day-to-day business operations.
- Ability to create, present and communicate information in a structured and managed way at their workplace.

INDICATIVE CONTENT

- Essential software for businesses operation
- Office software packages
- Documentation – create, format, tables, pictures, mail merge,
- Spreadsheets and macros
- Emails and other communication tools
- PowerPoint Presentations
- Databases and concepts
- Online collaboration tools - SharePoint, Skype for Business, MS Teams.
- Working with pdf
- Privacy, Ethics and legal aspects for computing

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
Portfolio	4000 words equivalent Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Presentation slides • Software/hardware implementation • Demonstration of work	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4026	
Module Title	Software Solutions for Business	
Classification	Reading List entry	Electronic*
Essential	J. T. Campbell, S. M. Freund, M. Frydenberg, M. Z. Last, P. J. Pratt, S. L. Sebok, M. E. Vermaat (2017) Shelly Cashman Series Discovering Computers & Microsoft Office 365 & Office 2016: A Fundamental Combined Approach, 1st Edition	☒
Essential	P. Carey, K. T. Pinard, A. Shaffer, M. Shellman, S. Vodnik (2020) New Perspectives Microsoft Office 365 & Office 2019 Introductory, 1st Edition	☒
Further	S Baase & T. M. Henry (2018) Gift of Fire, A: Social, Legal, and Ethical Issues for Computing Technology, 5th Edition, Pearson	☒

Module Code	ACCA4028
Title	Computer Systems Fundamentals
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To provide students with an essential understanding of the key components and characteristics of computer systems.

LEARNING OUTCOMES

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

- Demonstrate a knowledge of the underlying concepts and principles of computer hardware, operating systems and cyber security.

INDICATIVE CONTENT

- Components of PC, processors, memory, motherboard, motherboard interfaces, e.g. PCI, PCI Express, and AGP.
- Operating systems. Processes, services and applications. User management. OS commands.
- Computer networks, network cards, Ethernet cable, etc. RJ45 sockets, jacks and wiring, 4-port Ethernet switches.
- File systems e.g. files, folders, file name extensions, etc.
- Installing and configuring applications, windows registry, user rights, etc.
- Internet access, Broadband Routers, Internet Service Providers, DHCP, etc.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Hardware implementation - Demonstration of work	2,000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4028	
Module Title	Computer Systems Fundamentals	
Classification	Reading List entry	Electronic*
Essential	Stallings, W (2016) Computer Organization and Architecture: Designing for Performance, 10 th Ed. Pearson Education	☒
Essential	www.netacad.net username and password required	☒
Further	Bott, E & Stinson, T (2019) Windows 10 Inside Out, 3 rd Ed, Microsoft Press	☒
Further	Tanenbaum, A S, Bot, H, (2014) Modern Operating Systems, 4th Edition, Prentice Hall,	☐

Module Code	ACCA4029
Title	Cyber Security Essentials
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- Students will learn how to protect their personal privacy and business information

LEARNING OUTCOMES

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

- Demonstrate essential skills and an understanding of trends, threats and countermeasures for safer online and communication at workplace.

INDICATIVE CONTENT

- Basics of information security
- Cyber Security – the need, attacks, concepts and techniques.
- Data protection and Privacy.
- Security, personal firewalls, anti-virus software and software patches.
- Most common threats, attacks and vulnerabilities
- Securing devices, information and users
- Disposing of computer equipment, environmental, privacy and security implications
- Basics of VPN

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Online assessment	1 hour	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4029	
Module Title	Cyber Security Essentials	
Classification	Reading List entry	Electronic*
Essential	www.netacad.net username and password required	☒
Further	William Stallings (2017) Network Security Essentials: Applications and Standards, 6th Edition, Pearson	☒
Further	C J Brooks, C Grow, P Craig and D Short (2018) Cybersecurity Essentials, John Wiley & Sons, Inc	☒

Module Code	ACCA4030
Title	Digital Technologies
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To provide students with knowledge and practical skills in a range of industry standard digital technologies to support effective and efficient work-flow.

LEARNING OUTCOMES

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

- Demonstrate essential knowledge and skills to use software packages and applications to support day-to-day business operations.

INDICATIVE CONTENT

- Working with personal computers, tablets and mobile devices
- Operating system: Windows, Mac, OS, Android, Linux, etc
- Internet and web technologies
- software packages and installations
- Office software products
- Emails and other communication tools
- Online collaboration tools - SharePoint, Skype for Business, MS Teams.
- Remote working and VPN
- Data storage, security and compliance
- Latest trends

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Software implementation - Demonstration of work	2,000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4030	
Module Title	Digital Technologies	
Classification	Reading List entry	Electronic*
Essential	J. T. Campbell, S. M. Freund, M. Frydenberg, M. Z. Last, P. J. Pratt, S. L. Sebok, M. E. Vermaat (2017) Shelly Cashman Series Discovering Computers & Microsoft Office 365 & Office 2016: A Fundamental Combined Approach, 1st Edition	☒
Further	P. Carey, K. T. Pinard, A. Shaffer, M. Shellman, S. Vodnik (2020) New Perspectives Microsoft Office 365 & Office 2019 Introductory, 1st Edition	☒

Module Code	ACCA4031
Title	Software and Apps for Business
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To give students both a theoretical and a practical understanding and knowledge of various software and applications used within Businesses.

LEARNING OUTCOMES

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

- Demonstrate knowledge and skills to use software packages and applications to support day-to-day business operations.

INDICATIVE CONTENT

- Essential software for businesses operation
- Office software packages
- Documentation – create, format, tables, pictures, mail merge,
- Spreadsheets & Macros
- Emails and other communication tools
- PowerPoint Presentations
- Online collaboration tools - SharePoint, Skype for Business, MS Teams.
- Working with pdf
- Database concepts

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Presentation slides • Software/hardware implementation • Demonstration of work	2,000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA4031	
Module Title	Software and Apps for Business	
Classification	Reading List entry	Electronic*
Essential	J. T. Campbell, S. M. Freund, M. Frydenberg, M. Z. Last, P. J. Pratt, S. L. Sebok, M. E. Vermaat (2017) Shelly Cashman Series Discovering Computers & Microsoft Office 365 & Office 2016: A Fundamental Combined Approach, 1st Edition	☒
Essential	P. Carey, K. T. Pinard, A. Shaffer, M. Shellman, S. Vodnik (2020) New Perspectives Microsoft Office 365 & Office 2019 Introductory, 1st Edition	☒
Further	S Baase & T. M. Henry (2018) Gift of Fire, A: Social, Legal, and Ethical Issues for Computing Technology, 5th Edition, Pearson	☒

Module Code	ACCB4002
Title	Data Analysis and Visualisation
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To develop the knowledge and skills required to perform basic statistical analysis of experimental data.
- To introduce students to a wide variety of techniques used to display different types of data effectively. The student will learn to design data presentations for both static and interactive displays, both individual and team scenarios.

LEARNING OUTCOMES

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

- Select and apply appropriate statistical methods for the analysis of well-defined problems.
- Demonstrate an ability to present nominal, ordinal, categorical and network data in forms that enable the easy understanding of the data
- Demonstrate an ability to rearrange data in order to extract hidden information
- Apply colour, position, size, shape and icons to encode information creatively and effectively to solve well-defined problems in information visualisation.

INDICATIVE CONTENT

- Frequency distributions, descriptive statistics, the normal curve, percentiles and standard scores, hypothesis development, confidence limits
- Correlation coefficients, the t test, chi-square test
- Software for statistical analysis and data visualisation
- Different types of data; nominal, ordinal, categorical, network data; univariate, bivariate, trivariate, hypervariate data
- Appropriate display methods for differing data types; graphs, tables, icons.
- Histograms, boxplots, scatterplots, barcharts, parallel coordinate plots, maps
- Rearranging data to extract meaning from it; introducing distortion to provide clarity
- Identifying problems with visualisations

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB4002	
Module Title	Data Analysis and Visualisation	
Classification	Reading List entry	Electronic*
Essential	Kranzler, J.H. (2017) <i>Statistics for the Terrified</i> , Rowman & Littlefield.	☒
Essential	Few, S. (2012), <i>Show Me The Numbers</i> , Analytics Press, Burlingame, CA.	☒
Further	Schmuller, J. (2016), <i>Statistical Analysis With Excel For Dummies (4th Ed.)</i> , John Wiley and Sons	☒
Further	MacInnes, J. (2018), <i>Little Quick Fix: Know Your Numbers</i> , Sage,	☒
Further	Spiegel, M.R (2014) <i>Shaum's Outline of Statistics, fifth ed.</i> , McGraw Hill Education Limited	☒
Further	Gonick, L & Smith, W. (2000) <i>Cartoon Guide to Statistics</i> , William Morrow Paperbacks	☒
Further	Spence, R. (2014), <i>Information Visualization: An Introduction</i> Prentice Hall	☐

Further	Tufte, E. (2001) <i>The Visual Display of Quantitative Information (2nd Ed.)</i> Graphics Press USA	☐
Further	Tufte, E. (1997), <i>Visual Explanations, Images and Quantities, Evidence and Narrative.</i> Graphics Press	☐
Further	Tufte, E. (1990) <i>Envisioning Information</i> , Graphics Press USA	☐

Module Code	ACCB4017
Title	Software Development
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To introduce students to software constructs and to the development of software using a high level programming language. Simple design concepts and good programming practice will be adopted.

LEARNING OUTCOMES

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

- Understand the syntax and semantics of a high-level programming language and develop programs using good programming practices.
- Select and deploy basic software constructs using simple algorithms in the development of solutions to programming problems

INDICATIVE CONTENT

- The software life cycle – analysis, design, implementation and maintenance.
- Algorithm design – flow charts and pseudo-code.
- The programming environment – editor, compiler, debugger.
- High level language programming syntax and semantics e.g. C, C++, C#, etc.
- Data types, variables, operators, control structures, data structures, functions.
- Software testing and debugging.
- Documentation including user guides, technical guides, etc.
- Introduction to problem solving techniques for well-defined problems e.g. interpreting natural language problem definitions, variable identification techniques, divide and conquer, etc.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Programming assignment with associated documentation	2800 words equivalent	70%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
In-class practical	2 hours	30%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB4017	
Module Title	Software Development	
Classification	Reading List entry	Electronic*
Essential	Davenport, K. & Vine, M. (2014) <i>C Programming for the Absolute Beginner, 3rd Edition</i> , Cengage Learning PTR	☐
Essential	McGrath, M. (2012) <i>C Programming In Easy Steps 4th Edition</i> , In Easy Steps Limited Or 5 th edition (2018) Electronic only: http://ineasysteps.com/products-page/all-books/c-programming-easy-steps-5th-edition-ebook-pdf-2/	☐
Further	Greene, J. (2013) <i>Head First C#</i> , O'Reilly Media	☐

MODULE CODE: ACDA4004
TITLE: Micros, Peripherals and Interfaces
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

To provide the student with an understanding of the underlying concepts and principles of Microprocessors, Microcontrollers and the associated peripheral modules and interfacing techniques used to create programmable systems capable of tasks such as monitoring, communication and control.

LEARNING OUTCOMES

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

1. Explain Microprocessor and Microcontroller features and architectures.
2. Demonstrate an understanding of interfacing techniques
3. Demonstrate an understanding of low level programming language skills.

INDICATIVE CONTENT

- Microprocessor architectures (Von Neumann versus Harvard, microcontrollers, CISC, RISC).
- CPU features (interrupts, DMA, memory hierarchy, stack, queues, busses, memory management, cache etc).
- Microcontroller specific implementations e.g. in depth study of a specific PIC device and its associated in built modules.
- IDE use - Assembly language programming and testing.
- Parallel I/O – port buffering and signal conditioning. Tristate devices
- Serial I/O fundamentals – RS232, RS485, IIC, SPI etc .
- A/D and D/A conversion
- PWM techniques
- Simple conditioning techniques for signal acquisition, smoothing, debounce etc.
- Basic power drive techniques, e.g. low current 5v to drive a power relay etc

LEARNING AND TEACHING STRATEGY

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
Essay	2500 words	50%

Assessment Summary

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

READING LIST

Module Code	ACDA4004	
Module Title	Micros Peripherals and Interfaces	
Classification	Reading List entry	Electronic*
Essential	Inside the Machine: An Illustrated Introduction to Microprocessors and Computer Architecture Paperback – 25 May 2015 by Jon Stokes (Author), No Starch Press; 1 edition (25 May 2015)	☒
Essential	PIC Microcontrollers: An Introduction to Microelectronics – 11 Oct 2011 by Martin P. Bates (Author), Newnes; 3 edition (11 Oct. 2011)	☒
Further	Microprocessors and Interfacing (Oxford Higher Education) Paperback – 12 Jul 2012 by N Senthil	☐

	Kumar (Author), M Saravanan (Author), S Jeevananthan (Author), Satish Shah (Author) , OUP India (12 July 2012)	
Further	Digital Logic and Microprocessor Design with Interfacing, International Edition Paperback – 1 Jan 2017 by Enoch Hwang (Author), CL Engineering; 2 edition (1 Jan. 2017)	☐
Further	Microcontrollers: From Assembly Language to C Using the PIC24 Family Paperback – 27 Aug 2014 by Bryan Jones (Author), Robert Reese (Author), J. Bruce (Author), Cengage Learning PTR; 2 edition (27 Aug. 2014)	☐
Further	Microprocessors and Microcontrollers Paperback – 30 Dec 2013 by R. S. Kaler (Author), IK International Publishing House; 2 edition (30 Dec. 2013)	☐
Further	Embedded C Programming: Techniques and Applications of C and PIC MCUS Paperback – 19 Sep 2014 by Mark Siegesmund (Author) Newnes (19 Sept. 2014)	☐

MODULE CODE: ACDA4005
TITLE: Principles of Systems Engineering
DATED: 15/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

- To provide the students with a comprehensive and systematic understanding of the concepts underlying systems engineering.
- To provide the students with a holistic and interdisciplinary approach as a means of enabling the realisation of systems engineering in a test and evaluation environment.

LEARNING OUTCOMES

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

- Demonstrate an understanding of the holistic role of systems engineering, including needs analysis, developing options, assessing risk and constraints.
- Communicate their knowledge and skills in applying systems engineering tools and techniques to requirements engineering and system design.
- Apply the principles and tools to a realistic case study, demonstrating a greater understanding of systems concepts and thinking.

INDICATIVE CONTENT

- Systems and the Structure of Complex Systems.
- Systems Development Processes, including purpose, context and interaction.
- Engineering Design Methods and Tools (including Venn diagrams).
- Requirements Capture and Analysis.
- Functions and Functionality.
- Concept Design, including the relationship of System, Subsystem and component.
- Integration and Evaluation, Validation and Verification.
- Robust Design
- Systems Engineering Management.

LEARNING AND TEACHING STRATEGY

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	The assignment will consist of a practical-based report on the design of a typical munition or related device, applying the principles of systems engineering (2,000 words)	50%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	2 hours	50%

Assessment Summary

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

READING LIST

Module Code	ACDA4005	
Module Title	Principles of Systems Engineering	
Classification	Reading List entry	Electronic*
Essential	Kossiakoff, A., Sweet, W., Seymour, S., Biemer, S. <i>Systems Engineering Principles and Practice</i> , Wiley-Blackwell (2011).	☒
Further	Blanchard, B. <i>Systems Engineering Management 4th Edition</i> , Wiley (2009)	☐
Further	Kasser, J. <i>Holistic Thinking: Creating innovative solutions to complex problems</i> , CreateSpace Independent Publish Platform (2013)	☐
Further	<i>ACM Transactions on Information Systems</i>	☒
Further	<i>Journal of Data and Information Quality</i>	☒
Further	<i>Journal of the ACM</i>	☒
Further	<i>Journal of Systems Engineering and Electronics</i>	☒

MODULE CODE: ACDA4006
TITLE: Electrical and Electronic Principles
DATED: 15/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

- To provide the student with a sound knowledge of fundamental circuit/network analysis tools through real world component behaviour, and to apply these tools in a practical environment.

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

- Ohm's Law
- Series/parallel connections for R,L and C
- KVL and KCL
- Potential and Current divider networks
- Voltage and Current sources
- Thevenin and Norton equivalent circuits
- Principle of Superposition
- Mesh and Nodal analysis
- AC fundamentals
- Sinusoidal properties
- Resistance, Reactance and Impedance
- Complex notation
- Single phase AC circuits
- Maximum Power Transfer
- Tuned Circuits
- Semiconductors, diodes and transistors, Thyristors, Diacs and Triacs
- Electromagnetism , Electromagnetic Induction, Faraday's , Lens' Laws etc
- Principles of motors and generators

LEARNING AND TEACHING STRATEGY

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	
TOTAL	200	100%

ASSESSMENT

Assessment Component 1
☒ **Written exam**
☐ **Coursework**
☐ **Practical**

Mode of assessment	Volume	Weighting
Written exam	2 hours	50%

Assessment Component 2
☐ **Written exam**
☒ **Coursework**
☐ **Practical**

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

Assessment Summary

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

READING LIST

Module Code	ACDA4006	
Module Title	Electrical and Electronic Principles	
Classification	Reading List entry	Electronic*
Essential	Bird, John (2014) - <i>Electrical circuit Theory and Technology, Fifth Edition</i> , Routledge	☒
Further	Floyd, Thomas L (2012) <i>DC/AC Fundamentals: A Systems Approach</i> Prentice Hall	☐
Further	Sinclair I. and J. Dutton., <i>Practical Electronics Handbook</i> , Newnes (2007)	☒
Further	Journals Elektor Electronics World IEEE Xplore ACM Digital Library	☒
Further	Websites Various on-line video lectures MIT Open Courseware http://vl.fmnet.info/safety/ http://mingo.info-science.uiowa.edu/soft-eng/ http://www.fmeurope.org/	☒

MODULE CODE: ACDA4007
TITLE: Physics (OME)
DATED: 15/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

- To provide a basic understanding of the principles and applications associated with general aspects of physics.

LEARNING OUTCOMES

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

- Demonstrate an understanding of basic mechanics and structural aspects of physics and engineering science, with complementary analysis of appropriate problem examples.

INDICATIVE CONTENT

- Mechanics and structures
 - Free Body Diagrams
 - Reaction forces
 - Static equilibrium
 - Hooke's Law
 - Direct stress/strain, Shear stress/strain
 - Shear force and bending moment diagrams
 - Simple theory of elastic bending/torsion
 - Second moments of area, Neutral axis, Parallel axis theorem
 - Polar second moments of area
- Dynamics
 - Friction
 - Linear and Angular motion – inertia, radius of gyration etc.
 - Newton's Laws
 - Simple Harmonic Motion
 - Thermodynamics
 - Work/Energy/Power
 - Thermo-physics
- Pneumatics and Hydraulics
 - Awareness of pneumatics and hydraulics

LEARNING AND TEACHING STRATEGY

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 examination	2 hours	50%

Assessment Component 2

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

Mode of assessment	Volume	Weighting
Written Lab Report	2000 words	50%

Assessment Summary

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

READING LIST

Module Code	ACDA4007	
Module Title	Physics (OME)	
Classification	Reading List entry	Electronic*
Essential	F. Beer, E. Johnson et al, Mechanics of Materials, McGraw-Hill, 2015	☒
Further	Mechanics of Engineering Materials, P.P. Benham, R.J. Crawford, C.G. Armstrong, Mechanical Science, W. Bolton , Wiley-Blackwell (2006)	☐
Further	Mechanical Technology, D.H. Bacon, Butterworth-Heinemann , 1998	☒
Further	Journals IEEE Xplore, ACM Digital Library	☒

MODULE CODE: ACDA4008
TITLE: Mathematics
DATED: 15/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

- To provide in-depth coverage of important mathematical ideas and techniques necessary for an understanding of the mathematics encountered in sister modules.

LEARNING OUTCOMES

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

- Apply appropriate mathematical techniques to the solution of mathematical problems.

INDICATIVE CONTENT

- Fundamental Algebra/Trigonometry: Solution of Equations, matrix methods, complex numbers.
- Vector Analysis: vector rules and notation as applied to static and dynamic vector quantities.
- The Calculus: the methods of differentiation and integration, partial differentiation, 1st order differential equations.
- Statistics: Probability theory and statistical analysis.

LEARNING AND TEACHING STRATEGY

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 exam	1.5 hours	50%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written exam	1.5 hours	50%

Assessment Summary

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

READING LIST

Module Code	ACDA4008	
Module Title	Mathematics	
Classification	Reading List entry	Electronic*
Essential	Stroud, K.A. and Booth, D. J. (2013) <i>Engineering Mathematics, 7th Edition</i> Palgrave	☐
Further	Bird J.O. (2010) <i>Higher Engineering Mathematics, 8th Edition</i> , Newnes	☒
Further	Singh, K. (2011) <i>Engineering Mathematics through applications</i> , Palgrave	☐
Further	Websites http://www.khanacademy.org	☐

MODULE CODE: ACDA4009
TITLE: Signals and Systems
DATED: 15/08/2018

LEVEL: 4
CREDITS: 10

JACS CODE: H610

AIM(S)

- To develop the student's knowledge of signals both analogue and digital;
- To develop a knowledge of point to point communication systems both digital and analogue;
- To understand the need for and implementation of simple signal conditioning in analogue circuits;
- To understand the differences between point to point and multipoint communications and protocols.

LEARNING OUTCOMES

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

- Ability to recognise, understand and evaluate different signal types and protocols;
- Ability to define and implement a simple point to point signal mechanism suitable for a predetermined task

INDICATIVE CONTENT

- Analogue signals and simple conditioning.
- Digital signal protocols for point to point communications.
- Digital signal protocols for multipoint communications.
- Simple hardware transmission systems.
- Differential hardware transmission systems.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

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

ASSESSMENT**Assessment Component 1**

☒ **Written exam**

 ☐ **Coursework**

 ☐ **Practical**

Mode of assessment	Volume	Weighting
Exam	2 hours	100%

Assessment Summary

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

READING LIST

Module Code	ACDA4009	
Module Title	Signals and Systems	
Classification	Reading List entry	Electronic*
Essential	Haykin, Simon S; Moher, Michael (2006) - Introduction to analog and digital communications, Wiley	☐
Further	M. Vetterli, J. Kovacevic and V. Goyal, (2014) Foundations of signal processing, Cambridge University Press	☒
Further	Pathan, Al-Sakib Khan; Khan, Shafiullah; Alrajeh, Nabil Ali (2016) - Wireless sensor networks: current status and future trends, CRC Press	☒
Further	Journals IEEE Xplore ACM Digital Library	☒

MODULE CODE: ACDA4010
TITLE: Study Skills
DATED: 15/08/2018

LEVEL: 4
CREDITS: 10

JACS CODE: H610

AIM(S)

- To provide students with the essential knowledge and techniques that underpin and enhance the learning process. Students will be encouraged to develop a positive and reflective approach to learning, and to take responsibility for their own learning. Such skills promote a deeper understanding of the topics studied throughout the Higher education programme; they support sustainable lifelong learning, and are the transferable skills desired in the employment context.

LEARNING OUTCOMES

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

- Demonstrate transferable skills in a learning environment.
- Apply an academic, positive and professional approach to their studies.

INDICATIVE CONTENT

- Defining success, personal inspiration motivation goals and values.
- Understanding the learning process e.g. definitions, the learning process, learning styles, self-belief, confidence and positive engagement, reflection, life-long learning.
- Gathering relevant information e.g. note taking, using the library and online resources.
- Communicating and presenting information e.g. presentation techniques and styles.
- Academic and Professional writing e.g. planning and structuring reports, linking ideas, using facts, opinions, analytical thinking.
- Standard referencing systems e.g. Harvard and Numeric system.
- Revision and examination techniques e.g. preparation, organisation, memory aids.
- Identifying skills e.g. self-evaluation, skills needed for higher education, transferable skills, action plans for personal development.
- Employability skills and competencies, professional presentation and self-promotion, e-Portfolio, choosing the right jobs and employers.
- Successful Self-management e.g. time management, organising space and resources, positive attitude, emotional intelligence, managing change, stress management.
- Successful Problem-solving e.g. action-plans, solution-focused thinking, thinking outside the box, creative problem-solving techniques.
- People skills: evaluating people skills, intelligence types, collaboration and team-working, leadership.
- Professional, legal, ethical and sustainability issues related to Higher Education, Employment, and Professional Practice.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2000 words	100%

Assessment Summary

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

READING LIST

Module Code	ACDA4010	
Module Title	Study Skills	
Classification	Reading List entry	Electronic*
Essential	Cottrell, S. (2015 2 nd edition, <i>Skills for Success: Personal Development and Employability</i> , Palgrave Macmillan.	☒
Essential	Cottrell, S., (2013) 4 th edition, <i>The Study Skills Handbook</i> , Palgrave Macmillan.	☐
Further	Smale, B. and Fowlie, J. (2015 <i>How to Succeed at University: An Essential Guide to Academic Skills and Personal Development</i> , Sage Publications Ltd.	☒
Further	Cottrell, S., (2017 2 nd edition <i>Critical Thinking Skills: Developing Effective Analysis and Argument</i> , Palgrave Macmillan.	☐
Further	Duquenoy, P. (2007) 1 st edition, <i>Ethical, Legal and Professional Issues in Computing</i> , Thomson Learning.	☐
Further	Emden, J. and Becker, L. (2016) 2 nd , <i>Presentation Skills for Students</i> , Palgrave Macmillan.	☐
Further	Pears, R. and Sheilds, G. (2016) 8 th edition, <i>Cite Them Right: The Essential Referencing Guide</i> , Palgrave Macmillan.	☐
Further	Pedler, M., Burgoyne, J., Boydell, T. (2013), <i>A Manager's Guide to Self Development</i>	☒
Further	International Journal for Academic Development.	☐

Further	Journal of the International Consortium for Educational Development.	☐
Further	International Journal of Training and Development.	☐
Further	http://www.skills4study.com	☒
Further	http://www.palgrave.com/skills4study	☒
Further	http://www.cipd.co.uk	☒
Further	http://www.ltscotland.org.uk/studyskills	☒
Further	http://www.bized.co.uk/reference/studyskills/index.htm	☒
Further	http://www.how-to-study.com	☒
Further	http://www.employment-studies.co.uk	☒

MODULE CODE: ACDA4011
TITLE: Chemistry (OME)
DATED: 15/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

- To develop in the student an understanding of the basic chemistry and chemical mechanisms involved in the broad range of energetic and related materials used in OME.

LEARNING OUTCOMES

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

- Evaluate and communicate an understanding of reaction chemistry, the concepts of fuels and oxidisers, oxygen balance, energy, heat flow and energy release.
- Utilise data and information to formulate a plan that delivers the desired effect from an OME device

INDICATIVE CONTENT

- Atomic and molecular structures
 - Solid, liquid and gaseous states
 - Phase transformations
 - Bonding
- Chemical reactions.
- Fuels, oxidising agents and related materials used in OME
- Physical and chemical mechanisms and kinetics involved in OME
- Introduction to Materials Science
- Introduction to materials selection for OME devices
- OME effects
 - Flame, heat, light, sound and pressure effects

LEARNING AND TEACHING STRATEGY

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 Assessment.	2000 words.	50%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	2 hours	50%

Assessment Summary

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

READING LIST

Module Code	ACDA4011	
Module Title	Chemistry (OME)	
Classification	Reading List entry	Electronic*
Essential	Akhavan, J. <i>The Chemistry of Explosives</i> (Royal Society of Chemistry, 2011).	☒
Further	Atkins, P. <i>Reactions – The private life of atoms</i> (Royal Society of Chemistry, 2013).	☒
Further	Hall, C. <i>Materials – A very short introduction</i> (Royal Society of Chemistry, 2014).	☐
Further	Wayne, R.P. <i>Chemical Instrumentation</i> (Oxford Chemistry Primers, RSC 1994).	☐
Further	Metcalf, I.S. <i>Chemical Reaction Engineering – A first course</i> (Oxford Chemistry Primers, RSC 1997).	☐
Further	Lawrence, N. Wadhawan, J., Compton, R. <i>Foundations of Physical Chemistry: Worked Examples</i> (Oxford Chemistry Primers, RSC 1999)	☐
Further	Ritchie, G., Sivia, D.S. <i>Foundations of Physics for Chemists</i> (Oxford Chemistry Primers, RSC 2000).	☐
Further	Sivia, D.S., Rawlings, S.G. <i>Foundations of Science Mathematics</i> (Oxford Chemistry Primers, RSC 1999).	☐
Further	Winterton, R.H.S. <i>Heat Transfer</i> (Oxford Chemistry Primers, RSC 1997).	☐
Further	Brouard M. <i>Reaction Dynamics</i> (Oxford Chemistry Primers, RSC 1998)	☐

Module Code	ACDA4012
Title	Introduction to Electronics
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide an essential understanding of electrical and electronic concepts considered necessary as a foundation for an engineering degree courses and to show the relevance of those concepts in everyday applications

LEARNING OUTCOMES

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

- Demonstrate a sound grasp of basic electrical and electronic principles in analysing simple problems
- Explain and evaluate the operation of simple Electrical/Electronic networks

INDICATIVE CONTENT

- DC Electrical Circuit: Electrical current/voltage. Mechanical analogies. Resistors in series and parallel. Heating effect of current, variation of resistance with temperature incandescent lamp. Voltage divider and current divider. Simple circuit calculations, use of Ohm's law and Kirchhoff's laws
- Signals: DC, sinusoid, square wave. Period and frequency. Use of oscilloscope. Peak, mean and rms.
- AC circuits: Capacitors and inductors. Rate of change of current and voltage,
- C R and L R behaviour to sine and step voltages
- Diodes and Rectifiers: Simple ideas of semiconductors. Simple half wave rectifiers.
- Transistor Amplifiers/Switches: What is a transistor? Design of simple amplifiers.
- Operational Amplifiers: What is an op. Amp? Design of simple inverting and non-inverting amplifiers.
- Digital Circuits: Representation of information by logic levels. Basic gates, AND, OR, NAND, NOR, NOT, XOR. Simple combinational logic.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written assessment	1500 words	50%

Assessment Component 2

(Tick one)

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	1 hour	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA4012	
Module Title	Introduction to Electronics	
Classification	Reading List entry	Electronic*
Essential	Bird, J (2017) Electrical Circuit Theory and Technology 6 th Ed, Routledge	☒
Essential	Floyd, T L (2012) DC/AC Fundamentals: A Systems Approach, Prentice Hall	☐
Further	Sinclair, I., Dutton, J (2007) Practical Electronics Handbook, Newnes	☐

Module Code	ACDA4014
Title	Applied Design Project
Date	25/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To enable learners to pursue an independent work-based learning project which has been negotiated with both their organisation and their assigned tutor.
- To enable the student to integrate the skills and knowledge acquired during level four to produce a solution to a realistic problem.

LEARNING OUTCOMES

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

- Select specify and plan an appropriate project involving a workplace related article, formulation or process within the working environment and investigate and document the user requirements specific to the sector;
- Apply a range of underlying concepts, principles and techniques to develop the project in a novel context, producing a specification using the format and methodology required;
- Demonstrate, evaluate and communicate effectively the proposed project solution.

INDICATIVE CONTENT

- Planning
 - Outline relevant study areas and select an area of interest. Appraise the feasibility of the project in terms of personal workload, knowledge and skills, times and timescales;
- Legal and ethical issues;
- Specification
 - Produce a user requirement specification for the proposed project, and then a technical specification. Indicate costs and benefits. Determine acceptance criteria;
- Design
 - Consider possible solutions, evaluate them, and select one. Select a suitable design methodology and apply it. Review and select (a) suitable development environment(s)
 - Specify equipment;
- Development
 - Describe the new system in detail using e.g. UML methods, etc., plus any diagrams/charts/equations considered necessary.
 - Outline a high-level design.

- Specify equipment/personnel/training and performance criteria;
- Verification
 - Formulate a verification plan using a range of testing techniques. Apply the verification plan;
- Evaluation
 - Discuss and evaluate the results with reference to the acceptance criteria.
 - Demonstrate the project to a known audience.
- All project stages will require a realistic continually updated project plan for the whole project, together with a review of unforeseen eventualities.
- All project stages require adherence to a given set of documentation standards.

Study Time Allocation

Lectures on the Applied Design Project will include documentation standards, planning standards, and stage submission requirements which will be delivered to all Level 4 students. Individual tutorials will be on a one-to one basis, with a specialist tutor.

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	10	5%
Independent learning	70	35%
Placement learning	120	60%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	See note below 5000 Words or equivalent	100%

Students will produce a portfolio of work appropriate to the nature of their project. Portfolio elements will include a selection of the following, to be agreed with the external examiner:

- Written Report
- Presentation slides
- Demonstration of work
- Ethical approval form

Assessment Summary

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

This module is linked to the end point assessment of the apprenticeship see <https://www.instituteforapprenticeships.org/apprenticeship-standards/ordnance-munitions-explosives-technician/> for more information

INDICATIVE READING LIST

Module Code	ACDA4014	
Module Title	Applied Design Project	
Classification	Reading List entry	Electronic*
Essential	McCormac, C and Davis, J. (2012) <i>Research Project Success: The Essential Guide for Science and Engineering Students</i> , Royal Society of Chemistry	☐
Essential	O'Leary, Z. (2013) <i>Doing Your Research Project</i> , 2 nd Edition, SAGE Publications Ltd	☐
Essential	Yin, R K, (2008) <i>Case Study Research: Design and Methods</i> , 4 th Edition, Sage: Beverly Hills.	☐
Further	IEEE Xplore	☐
Further	ACM Digital Library	☐

Module Code	ACDA4015
Title	Electronics Principles and Concepts
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To provide the student with the fundamentals of electronics: definitions of voltage, current, resistance, Ohm's law, Power, circuit theorems.

LEARNING OUTCOMES

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

- Analyse simple circuits and networks using appropriate analysis tools.

INDICATIVE CONTENT

- Definitions of voltage, current, resistance, power and energy
- Ohm's Law
- Series and parallel connections of resistors
- Kirchhoff's Voltage Law and Kirchhoff's Current Law
- Potential and Current divider networks
- Circuit Theorems – Thévenin's and Norton's Theorems

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	2000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA4015	
Module Title	Electronics Principles and Concepts	
Classification	Reading List entry	Electronic*
Essential	Bird, John (2014) - <i>Electrical circuit Theory and Technology, Fifth Edition</i> , Routledge	☒
Further	Floyd, Thomas L (2012) <i>DC/AC Fundamentals: A Systems Approach</i> Prentice Hall	☐
Further	Sinclair I. and J. Dutton., <i>Practical Electronics Handbook</i> , Newnes (2007)	☒

Module Code	ACDA4016
Title	Introduction to Digital Electronics
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To provide the student with the fundamentals of electronics: Gates, registers

LEARNING OUTCOMES

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

- Analyse digital circuits and understand their operation.

INDICATIVE CONTENT

- Digital gates.
- Truth Tables
- Digital electronic concepts
- Digital circuit analysis

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

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

Mode of assessment	Volume	Weighting
Exam	1 Hour	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA4016	
Module Title	Introduction to Digital Electronics	
Classification	Reading List entry	Electronic*
Essential	The Art of Electronics - third Edition by Paul Horowitz, Winfield Hill. - 2015	☒
Further	Introduction to Digital Electronics (Essential Electronics Series) by J. Crowe and Barrie Hayes-Gill 1998	☐
Further	Digital Electronics: A Primer - Introductory Logic Circuit Design: 1 (Primers In Electronics And Computer Science) by Nixon Mark 2015	☐

Module Code	ACDA4017
Title	Introduction to Programmable Logic Controllers
Date	24/02/2021
Level	4
Credits	10
Pre-Requisites	None

AIM(S)

- To provide the student with the fundamentals of PLC operations, Ladder Logic Programming and PLC concepts.

LEARNING OUTCOMES

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

- Read, understand and identify the control signals within a simple Ladder logic program.
- Write a simple ladder logic control program for a PLC for a given control application.

INDICATIVE CONTENT

- PLC concepts
- Inputs and outputs
- Timing Diagrams
- Ladder Logic programming
- HMIs
- Remote applications

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Practical lab-based activity	2 hours	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA4017	
Module Title	Introduction to Programmable Logic Controllers	
Classification	Reading List entry	Electronic*
Essential	Jack, H (2010), Automating Manufacturing Systems with PLCs, , Lulu.com	☒
Further	Bolton, W (2015), Programmable Logic Controllers, Newnes	☒
Further	Golnaraghi, F and Kuo, B (2017), Automatic Control Systems, Mc Graw Hill	☒

MODULE CODE: ACDB4002
TITLE: Electrical and Electronic Principles
DATED: 16/08/2018

LEVEL: 4
CREDITS: 20

JACS CODE: H610

AIM(S)

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

LEARNING OUTCOMES

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

1. Investigate and analyse basic analogue and digital electronic circuits encountered during the course.
2. Apply appropriate software techniques (e.g. Multisim / Proteus) to simulate basic circuits.
3. Perform practical exercises to deploy test equipment, perform measurements and present results.

INDICATIVE CONTENT

- Use of simulation software such as Multisim or Proteus
- Definitions of Current, Voltage, Resistance, Power etc
- Series and parallel circuits
- Passive devices, resistors, capacitors, coils etc.
- Semiconductor devices e.g. diodes, transistors etc
- Amplifier principles, frequency response curves , input and output impedance
- Thevenin Equivalent Circuits
- Basic DC and AC theory, simple power supplies.
- Op-amps, basic configurations
- Passive filters
- Electromagnetism
- Timing and clock Circuits, RC, crystal oscillator modules etc.
- Transistor as a switch
- Commonly used ICs as building blocks, 555, 741, 7805 etc.
- Basic logic gates and configurations
- Boolean Algebra
- Combinational logic applications

LEARNING AND TEACHING STRATEGY

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
Coursework assignment	2500 words	50%

Assessment Summary

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

READING LIST

Module Code	ACDB4002	
Module Title	Electrical & Electronic Principles	
Classification	Reading List entry	Electronic*
Essential	Electrical and Electronic Principles and Technology, John Bird, Routledge; 6 edition (6 Mar. 2017)	☒
Further	Electronic and Electrical Engineering: Principles and Practice, Electronic, Lionel Warnes, Palgrave Macmillan; 3rd Edition (13 Dec. 2002)	☒

Module Code	ACDB4003
Title	Mathematics
Date	09/09/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide in-depth coverage of important mathematical ideas, techniques and tools necessary to understand the mathematics encountered in computing and electronics topics.

LEARNING OUTCOMES

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

- Apply appropriate mathematical techniques to the solution of mathematical problems.
- Use contemporary software tools to solve mathematical problems.

INDICATIVE CONTENT

- Fundamental Algebra/Trigonometry: Solution of Equations
- Matrix methods
- Complex numbers
- logic
- Sets, relations and functions
- Combinatorial analysis
- Graph theory
- Logs, exponentials and powers
- Co-ordinate Systems
- Vector Analysis: vector rules and notation as applied to static and dynamic vector quantities.
- The Calculus: the methods of differentiation and integration, partial differentiation, 1st order differential equations.
- Statistics: Probability theory and statistical analysis.
- Use of technical computing tools (e.g. C++, Python, MATLAB, Octave) for:
 - Calculating
 - Visualising
 - Scripting

- Programming
- Solving equations

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Assignment	2000 words	50%

Assessment Component 2

☒ 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%

INDICATIVE READING LIST

Module Code	ACDB4003	
Module Title	Mathematics	
Classification	Reading List entry	Electronic*
Essential	Stroud, K.A. and Booth, D. J. (2013) Engineering Mathematics, Palgrave	☒
Essential	Moore, H. (2018) MATLAB for Engineers: Global Edition, 5 th Edition Pearson	☒
Further	Stroud, K.A. and Booth, D. J. (2009) Foundation Mathematics, Palgrave	☒
Further	Verth, J.M and Bishop, L.M. (2015) Essential Mathematics for Games and Interactive Applications, Third Edition, CRC Press	☒

Further	Palm, W.J. (2010) Introduction to MATLAB for Engineers, 3 rd Edition, McGraw-Hill	☒
Essential	Lengyel, E. (2016) Foundations of Game Engine Development, Volume 1: Mathematics, Terathon Software.	☒
Further	Singh, K. (2011) Engineering Mathematics through applications, Palgrave	☐

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	1500 words	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	1500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

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

	Cottrell, S (2011) Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Macmillan	☐
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Module Code	ACHA4008
Title	Integrating Project
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written assessment	2000 words	60%

Assessment Component 2

(Tick one)

☐ Written exam ☐ Coursework ☒ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

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

Module Code	ACHA4009
Title	Introduction to Automotive Engineering
Date	14/05/2020
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To introduce students to the varied disciplines in the field of Automotive, Motorsport and Motorcycle Engineering
- To introduce CAD software and its applications to the automotive and motorsport sector

LEARNING OUTCOMES

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

- Show an appreciation for the varied disciplines required in the field of Automotive Engineering and associated pathways and to prove an understanding of the current state of the Automotive Industry and the requirements for more sustainable developments and advances in the field.
- Show a basic understanding of Computer Aided Design and be able to produce models and technical drawings using a piece of CAD Software.

INDICATIVE CONTENT

- Introduction to the Automotive, Motorsport and Motorcycle Sectors.
- Introduction to CAD software
- Challenges and legislative drivers for development in the industry
- Introduction to Engine Performance and Efficiency
- Introduction to Vehicle Handling and Dynamics
- Introduction to Data Acquisition and the importance of Metrology
- Introductory Aerodynamics & CFD
- Introductory CAE and Simulation
- Competitive Motorsport and the Automotive Industry.
- Sustainability, Green Technologies and Vehicle Life Cycles

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
CAD Assignment	2000 words	50%

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written report	2000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACHA4009	
Module Title	Introduction to Automotive Engineering	
Classification	Reading List entry	Electronic*
Essential	Cocco, G.(2005) Motorcycle Design and Technology, Giorgio NADA Editore	☐
Essential	Foale, T. (2002) Motorcycle Handling and Chassis Design, Tony Foale	☐
Essential	Hillier, V., and Coombes, P. (2004) Fundamentals of Motor Vehicle Technology, Stanley Thornes	☐
Essential	Lombard, M (2013) SolidWorks 2013 Bible, Wiley	☐
Further	Staniforth, A. (2006) Competition Car Suspension: A Practical Handbook, Haynes	☐
Further	Stone, R. (1999), Introduction to Internal Combustion Engines, Macmillan	☐

Further	Bolton, W. (2007) Engineering Science, Arnold	☐
Further	Leithman, S.(2009) Build Your Own Plug-In Hybrid Vehicle, McGraw Hill	☐
Further	Onwubolu, G.(2013) Computer-aided engineering design with SolidWorks	☐
Further	Society of Automotive Engineering, (2019) Journal of Automotive Engineering, SAE	☒

Module Code	ACMA4013
Title	Skills Development in the Workplace
Date	24/02/2021
Level	4
Credits	30
Pre-Requisites	None

AIM(S)

- To enable learners to develop practical skills in the subject area relevant to their chosen subject area and their personal development

LEARNING OUTCOMES

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

- Prepare and implement a personal study programme to develop their professional skills and to reflect on their learning experience
- Demonstrate knowledge and understanding of a particular subject related to their chosen professional practice.

INDICATIVE CONTENT

- Establishing a rationale for the particular area of study based on their own developmental needs and career aspirations
- Identifying expected learning outcomes, assessment criteria and measure of success
- Planning and implementing a study programme
- Learning support
- Application of knowledge and experiential learning
- The importance of critical reflection

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	15	5%
Independent learning	195	65%
Placement learning	90	30%
TOTAL	300	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Reflective journal	3,000 words	60%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Presentation/demonstration	Approx. 15 minutes	40%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4013	
Module Title	Skills Development in the Workplace	
Classification	Reading List entry	Electronic*
Essential	Heyler, R. (2015) The Work-based learning student handbook, 2 nd ed. Basingstoke: Palgrave Macmillan	☒
Further	Further reading and industry journals will be recommended based on the specific skills area	☐

Module Code	ACMA4014
Title	Technical Skills Development
Date	24/02/2021
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To develop experience of practical, technical skills relevant to a range of subjects
- To understand the health and safety considerations of working on practical applications.

LEARNING OUTCOMES

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

- Demonstrate a range of practical skills and related knowledge, relevant to the area of study.
- Understand the fundamental Health and Safety considerations relevant to relevant workshop/site environments.

INDICATIVE CONTENT

- Machine Shop equipment and processes – including bench fitting and machine tools.
- Introduction to Computer Numerical Control technologies
- Electrical/Electronic lab practical exercises
- Introduction to PCLs and control systems
- Introduction to Composites
- Construction Industry practical applications
- Computer system design
- Software development life cycle

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Practical Exercise	2000 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Logbook	2000 words equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACMA4014	
Module Title	Technical Skills Development	
Classification	Reading List entry	Electronic*
Essential	Black, B. J. (2015) Workshop Processes, Practices and Materials, Routledge	☒
Essential	Ford, E. (2015) Make: Getting Started with CNC: Personal Digital Fabrication with Shapeoko and Other Computer-Controlled Routers, Maker Media Inc.	☒
Further	Greaney, A. (2017) Composites Materials – A Quick Practical Guide, independently published	☒

Module Code	ADGD4005
Title	Introduction to Character Animation
Date	01/04/2019
Level	4
Credits	20 credits
Pre-Requisites	None

AIM(S)

- The aim is to provide the student with an understanding of animation principles and concepts within classical and digital animation techniques and how to communicate these effectively in a portfolio of motion studies.

LEARNING OUTCOMES

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

- understand the stages in presenting concepts of motion, performance, gesture and body mechanics to an audience and/or via player input notions;
- demonstrate a range of approaches (traditionally and digitally) in capturing style, movement and setting within early stages of learning character animation.

INDICATIVE CONTENT

- Observational analysis and recording of motion (life drawing, photography, film etc)
- Principles of Animation/Character Animation (e.g. pose to pose, slow-in, slow-out, etc.)
- Production based progression techniques (reference, thumbnails, storyboards, animatic, layout, etc.)
- Traditional drawn animation methods (e.g. via the production studio system roles)
- Model sheets and expression sheets
- An appreciation of forces and Newton's laws of motion
- An adoption of displaying weight and force and gravity – and how they influence performance/styles of character
- Introduction to animated cycles
- 2D & 3D computer animation approaches
- Timing for animation; screen/interactive timing
- Body mechanics, and animated turntables/moves in 3D space
- Key poses/gestures and acting/staging ideas

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		
TOTAL	200	100%

ASSESSMENT

Assessment Component 1 (of 1)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio presentation	e.g. Short 5 mins (per person) presentation displaying animation material and methodology/process	100%

Assessment Summary

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

READING LIST

Module Code	ADGD4005	
Module Title	Introduction to Character Animation	
Classification	Reading List entry	Electronic*
Essential	ROBERTS, S (2004) <i>Character Animation in 3D: Use traditional drawing techniques to produce stunning CGI animation</i> , Focal Press.	☐
Essential	JOHNSON, O. & THOMAS, F. (1995). <i>The Illusion of Life: Disney Animation</i> : Hyperion Press.	☐
Essential	WILLIAMS, R. (2002). <i>The Animator's Survival Kit: A Manual of Methods, Principles, and Formulas for Classical, Computer, Games, Stop Motion, and Internet Animators</i> : Faber & Faber.	☐
Further	COOPER, J (2019), <i>Game Anim: Video Game Animation Explained</i> , A.K.Peters/CRC Press.	
Further	KERLOW, I. V. (2009) <i>The Art of 3D Computer Animation and Effects</i> , John Wiley & Sons	☐
Further	HOOKE, E. (2003) <i>Acting for Animators: A Complete Guide to Performance Animation</i> , Heinemann	☐
Further	John Lasseter, (1987) "Principles of Traditional Animation Applied to 3D Computer Animation", Computer Graphics, pp. 35-44, 21:4, July 1987 (SIGGRAPH 87).	☒
Further	Living Lines Library https://livlily.blogspot.com/	☒
Further	Animation World Network https://www.awn.com/	☒
Further	KUNDERT-GIBBS, J., (2009) <i>Action! Acting Lessons for CG Animators</i> , John Wiley & Sons	☐

MODULE CODE: M4X01557
TITLE: Creative Practice 1
DATED: 26/01/2016

LEVEL: 4
CREDITS: 10

JACS CODE: W600

AIM(S)

The aim of this module is to immerse the student in industry-relevant production processes.

LEARNING OUTCOMES

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

- Understand and describe the production pipeline.
- Develop and produce simple new media objects within the context of a production team.

INDICATIVE CONTENT

- The production pipeline;
- Project management, scheduling, and control (including scope, documentation, time and people management, etc.);
- Developing and pitching ideas;
- Identify target audience;
- Sustainability: futures thinking, critical and creative thinking, systemic thinking;
- Addressing environmental impact;
- Project-dependent subject matters.

LEARNING AND TEACHING STRATEGY

This module is a common module to all SFDM programmes. Students will identify and develop ideas for subject-relevant media objects and, working in small groups that may or may not include students from other subject areas, bring these ideas to fruition.

Teaching will initially relate to the production process itself but will then need to adapt to the needs of the students and the nature of the projects they are doing. This will inevitably require flexibility by the academic staff, and free interchange between groups is dependent on simultaneous (or parallel) timetabling.

Techniques from Agile development methodologies (such as 5-minute stand-up sessions at the beginning and end of each class) will be adapted to facilitate the flow of ideas across groups, to keep track of group progress, and to provide formative feedback on a weekly basis.

The allocation of teaching to deliver the module is:

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

ASSESSMENT

Assessment Component 1 – Practical (50%)

Exemplar: Create a simple new media object from an original idea and externalize and evidence the production process of the new media object (for example in an individual learning journal, production diary, blog, or similar).

Assessment Component 2 – Coursework (50%)

Exemplar: Externalise and evidence the group planning and development work (for example in a mood boards, reference, concept art, Product Definition Document, storyboard, cue sheets, dope sheets, media files, presentations, etc.) Produce a 1000 word critical reflective analysis of the production process.

Assessment Summary

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

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
This module seeks to help the student develop knowledge and understanding, skills, and attributes related to sustainability, particularly those related to systems thinking, planning, interdisciplinarity, negotiation, and consensus. Problem-solving and critical thinking about their own practice are key elements of the module.	

BIBLIOGRAPHY

Essential

- Cottrell, S. (2008) *The Study Skills Handbook*. Palgrave Macmillan.
- Tharp, T. (2007) *The Creative Habit: Learn It and Use It for Life*. Simon and Schuster.

Recommended

- Belsky, S. (2011) *Making Ideas Happen: Overcoming the Obstacles Between Vision and Reality*. Penguin.
- de Bono, E. (2007) *How to Have Creative Ideas: 62 Exercises to Develop the Mind*. Vermilion.
- Duarte, N. (2008) *slide:ology: The Art and Science of Creating Great Presentations*. O'Reilly.
- Johnson, S. (2011) *Where Good Ideas Come From: The Seven Patterns of Innovation*. Penguin.
- Graham, N. (2010) *Project Management for Dummies*. Wiley.
- Nokes, S. (2007) *The Definitive Guide to Project Management*. FT/Prentice Hall.

Journals

Subject-specific titles as appropriate.

Websites

www.acm.org

www.ieeexplore.ieee.org

www.sciencedirect.com

MODULE CODE: M4X01558
TITLE: Creative Practice 2
DATED: 26/01/2016

LEVEL: 4
CREDITS: 10

JACS CODE: W600

AIM(S)

The aim of this module is to immerse the student in industry-relevant production processes.

LEARNING OUTCOMES

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

- Understand and describe the production pipeline.
- Develop and produce straightforward but competent new media objects within the context of a production team.

INDICATIVE CONTENT

- The production pipeline;
- Project management, scheduling, and control (including scope, documentation, time and people management, etc.);
- Developing and pitching ideas;
- Identify target audience;
- Sustainability: futures thinking, critical and creative thinking, systemic thinking;
- Addressing environmental impact;
- Project-dependent subject matters.

LEARNING AND TEACHING STRATEGY

This module is a common module to all SFDM programmes. Students will identify and develop ideas for subject-relevant media objects and, working in small groups that may or may not include students from other subject areas, bring these ideas to fruition.

Teaching will initially relate to the production process itself but will then need to adapt to the needs of the students and the nature of the projects they are doing. This will inevitably require flexibility by the academic staff, and free interchange between groups is dependent on simultaneous (or parallel) timetabling.

Techniques from Agile development methodologies (such as 5-minute stand-up sessions at the beginning and end of each class) will be adapted to facilitate the flow of ideas across groups, to keep track of group progress, and to provide formative feedback on a weekly basis.

The allocation of teaching to deliver the module is:

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

ASSESSMENT

Assessment Component 1 – Practical (50%)

Exemplar: Create a straightforward but competent new media object from an original idea and externalize and evidence the production process of the new media object (for example in an individual learning journal, production diary, blog, or similar).

Assessment Component 2 – Coursework (50%)

Exemplar: Externalize and evidence the group planning and development work (for example in a mood boards, reference, concept art, Product Definition Document, storyboard, cue sheets, dope sheets, media files, presentations, etc.) Produce a 1000 word critical reflective analysis of the production process.

Assessment Summary

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

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
This module seeks to help the student develop knowledge and understanding, skills, and attributes related to sustainability, particularly those related to systems thinking, planning, interdisciplinarity, negotiation, and consensus. Problem-solving and critical thinking about their own practice are key elements of the module.	

BIBLIOGRAPHY

Essential

Cottrell, S. (2008) *The Study Skills Handbook*. Palgrave Macmillan.

Tharp, T. (2007) *The Creative Habit: Learn It and Use It for Life*. Simon and Schuster.

Recommended

Belsky, S. (2011) *Making Ideas Happen: Overcoming the Obstacles Between Vision and Reality*. Penguin.

- de Bono, E. (2007) *How to Have Creative Ideas: 62 Exercises to Develop the Mind*. Vermilion.
- Duarte, N. (2008) *slide:ology: The Art and Science of Creating Great Presentations*. O'Reilly.
- Johnson, S. (2011) *Where Good Ideas Come From: The Seven Patterns of Innovation*. Penguin.
- Graham, N. (2010) *Project Management for Dummies*. Wiley.
- Nokes, S. (2007) *The Definitive Guide to Project Management*. FT/Prentice Hall.

Journals

Subject-specific titles as appropriate.

Websites

www.acm.org

www.ieeexplore.ieee.org

www.sciencedirect.com

MODULE CODE: M4X01897
TITLE: Visual Studies for Film and Digital Media
DATED: 26/01/2016

LEVEL: 4
CREDITS: 20

JACS CODE: W213

AIM (S)

To develop a technical and artistic awareness of the intrinsic relationship between observation, technique, process and ideas creation.

- To foster an expectation that the results of visual studies help to solve design problems, whilst being capable of existing as objects in their own right.

LEARNING OUTCOMES

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

- Externalise, evidence and appraise the practices of visual studies.
- Independently generate and evaluate new and innovative stylistic methods in the creation of conceptual design work.

INDICATIVE CONTENT

- Form, function and modularity
- Composition and framing conventions
- Formal aspects e.g. rhythm, proportion, pace, temporality, line, value and texture
- Colour theory, typography, perspective and grids
- Exploration of impression as an interpretive response to stimuli
- Affordance, accessibility and Golden Ratio
- Analysis of character construction, with anatomical, proportional and stylistic considerations
- Animation, movement / motion, character exercises
- Storyboarding
- Matte Painting & Background imaging
- Professional design methods / techniques
- Observational analysis / timing through drawing, photography and motion capture

LEARNING AND TEACHING STRATEGY

Key ideas and concepts will be delivered through lectures and demonstrations that will allow students to gain the knowledge applicable to the module. The module will function further through experimental practical exercises giving the student confidence to apply the gained knowledge from lectures and student lecturer directed research.

There will also be a number of seminar-style tutorials and discussion groups for the more theoretical parts of this module and the dissemination of student research.

Formative assessment will consist of presentations and class critiques of media gathering techniques and products. Summative assessment will be formal audio/visual presentations on a given topic together with an on-going written journal of research and production methods, the content of which will be available for external examiner scrutiny.

The allocation of teaching to deliver the module is:

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

ASSESSMENT

In the first assignment, student groups will produce a body of work evidencing engagement with the practice and principles of digital manipulation. By the end of the semester, the student should have a part portfolio of design work for presentation.

The second assignment will necessitate in-depth paired student involvement with the process and design of content applicable to a lecturer initiated design problem, completing the portfolio for assessment.

Assessment Component 1 – Practical 50%

Exemplar. An individual 10-minute presentation – with accompanying work – clearly demonstrating a student's ability to manipulate a range of physical and digital assets and how to externalise their knowledge and understanding in the appraisal and production of engaging content.

Assessment Component 2 – Coursework 50%

Exemplar. The student will submit a completed portfolio comprised of work produced throughout the module.

Assessment Summary

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

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
This module seeks to help the student develop the fundamental skills of research and visual inquiry. This forms part of the sustainable assessment/sustainable teaching agenda which sees the assessment process as developing skills that can be used beyond the end of the programme of study and also the skills the individuals need to know in terms of working learning and thriving in a future which is as yet unknown. It is the skill of Reflective Writing and the associated skill of Critical Reflection as described by Donald Schön that find the springboard to development in this module. Boud. D, Assessment 2020: <i>Creating Sustainable Assessment for Long-term Learning</i> University of Technology, Sydney (2020)	

BIBLIOGRAPHY

ESSENTIAL READING

- Baldwin, J. & Roberts, L. (2006) *Visual Communication: From Theory to Practice*. AVA.
- Berger, J. (1975) *Ways of Seeing*, Penguin Books.

RECOMMENDED READING

- Altiner, A., Cole, D. & Stoski, C. (2013) *d'artiste Matte Painting 3*. London: Ballistic Publishing.
- Safadi, S. (2013) *Digital Painting Techniques: Volume 5*. London: 3D Total Publishing.
- Scheer, D. (2015) *The Death of Drawing: Architecture in the Age of Simulation*. Routledge.
- Stott, T. (2014) *Play and Participation in Contemporary Arts Practice*.

Various authors (2009) Routledge.
 *Digital Painting Techniques: Practical Techniques of
 Digital Art Masters (Masters Collection)*. Focal Press.

Module Code	M4X02039
Title	Game Design and History
Date	26/01/2016
Level	4
Credits	20
Pre-Requisites	None

AIM(S)

- To provide a historical overview and critique of the evolution of the computer and video games industry, issues of game quality, the social impact of games, demographics, and industry structure.
- Students will also be introduced to the principles and techniques of game design theory and the established frameworks of games development methodologies.

LEARNING OUTCOMES

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

- Practically apply the theoretical content of the module to develop a Game Design Document to a professional level that will be used for future game development.
- Demonstrate a fundamental understanding of and reflection on the historical evolution of the games industry.

INDICATIVE CONTENT

- Historical overview of games and the games business (Embryonic era, early home consoles, home computers, 8-bit, 16-bit, 32-bit, 64-bit, 128-bit, current generation)
- The role and impact of amusement arcades
- Game platforms (e.g. traditional games, arcade games, portable games, internet games, multi-player games)
- Game design methodology and construction of a games design document
- Game taxonomies
- Play mechanics
- Player expectations
- Structure and responsibilities of a games development team

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
Collaborative Game Design Document	2000 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Individual Academic Report	2000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	M4X02039	
Module Title	Games Design and History	
Classification	Reading List entry	Electronic*
Essential	Donovan, T. (2010), Replay: The History of Video Games, Yellow Ant Media Ltd.	☐
Essential	Fullerton, T., Swain, C. and Hoffman, S. (2004), Game Design Workshop: Designing, Prototyping and Playtesting Games, San Francisco: CMP Books.	☐
Essential	Herman, L. (1997), Phoenix: The Fall and Rise of Videogames, Union, NJ: Rolenta Press.	☐
Essential	Kent, S. (2001), The Ultimate History of Video Games, New York: Three Rivers Press.	☐
Essential	Rogers, S. (2010), Level Up! The Guide to Great Video Game Design, Chichester: Wiley.	☐
Further	Adams, E. and Rollings, A. (2007), Game Design and Development. Fundamentals of Game Design, Upper Saddle River, NJ: Pearson Education Inc.	☐
Further	Crawford, C. (2003), Chris Crawford on Game Design, Indiana: New Riders Publishing.	☐

Further	McGonigal, J. (2012), Reality Is Broken: Why Games Make Us Better and How They Can Change the World, London: Vintage.	☐
Further	Wolf, M. (Ed.) (2008), The Video Game Explosion: A History from PONG to PlayStation and Beyond, London: Greenwood.	☐

MODULE CODE: M4X02041
TITLE: Environment and Level Design
DATED: 26/01/2016

LEVEL: 4
CREDITS: 20

JACS CODE: I620, I630

AIM(S)

- To introduce students to 3D computer modelling techniques, using industry-standard software packages and specific game engine development tools for the intention of blocking out level environments.
- To introduce the students to the theory and design principles involved in creating a coherent and navigable video game level

LEARNING OUTCOMES

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

1. Apply appropriate 3D modelling and surface shading techniques in relation to environment design/creation.
2. Demonstrate an understanding of level design, layout and construction in relation to a proposed design.

INDICATIVE CONTENT

- An introduction to both physical and digital level prototyping methods.
- Introduction into communicating navigation information with the player.
- Digital paint over and concept techniques.
- 3D modelling and surface shading for interior and exterior environments.
- UV unwrapping methods for organic and inorganic environmental geometry.

LEARNING AND TEACHING STRATEGY

Students will work within production teams for this module. Each individual member of the production team will take on specific roles in a view to develop the end result necessary for the module which, in this case, will be a completed production level or "Art Target". During the year, students attend a range of Lectures, tutorials and seminars, which provide stimuli, and ideas development so that each student can explore their creative practice beyond the parameters of their normal subject discipline. The evidence of researching atopic and exploring other ways of thinking in the development of work is recorded in the module

assignments as well as individual weekly target and blog reviews.

The allocation of teaching to deliver the module is:

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

ASSESSMENT

For the assessment of the module the students will be functioning in production teams. The assessment will be one coursework component for the semester; this will have the students demonstrate a completed production quality level idea or “Art Target”.

Assessment Component 1 – 100%

Practical: live group presentation 5 minutes per person.

The students will present their work in their production teams with each individual demonstrating their own contribution, will each team presenting the work over twenty minutes. This component will see the teams exhibit a completed production level or “Art Target” which will be generated from pre-existing concept work. The teams will need to demonstrate their production process and how the end result was achieved.

Assessment Summary

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

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
This module seeks to provide students will a collaborative learning environment with open discussion and design with other students, allowing them to view and assess the results of their own decisions and the collective decisions of their production team.	

BIBLIOGRAPHY

Essential

Cabera, C. and Urschel, J. (2014) *Digital Painting Techniques: Volume 6*. 3DTotal Publishing.

Rogers, S. (2014) *Level Up! The Guide to Great Video Game Design*. Wiley

Georgina, S. (2012) *Designing for screen: production design and art direction explained*. The Crowood Press Ltd

Recommended

Kremers, R. (2009) *Level Design: Concept, Theory, and Practice*. A K Peters/CRC Press.

Bim, J. (2013) *Digital lighting and rendering*. New Riders.

Background

Winslow, C. (2006) *The handbook of set design*. The Crowood Press Ltd.

Journals

ACM Digital Library.

Game Studies.

Journal of Computer Game Design.

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Websites

<http://gamasutra.com/>

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<http://www.develop-online.net/>

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MODULE CODE: M4X02046
TITLE: 3D Production Design and Animation
DATED: 24/11/2015

LEVEL: 4
CREDITS: 20

JACS CODE: W615

AIM(S)

- The aim of this module is to introduce coverage of both 3D computer modelling/visualisation together with animation techniques within CG design.
- At the start of the degree the module will aim to formalise design principles and classical animation methods within the 3D context to initiate the student's aesthetic design and animation ability and synthesis.

LEARNING OUTCOMES

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

- Apply appropriate 3D modelling, lighting and texturing techniques via traditional design and fine art sensibilities to a CG animated production.
- Acquire an understanding of the basic animation principles and the artistic and technical conditions that determine the movement of forms within three dimensional environments.

INDICATIVE CONTENT

In this module, students may study the following areas:

- Composition/visual geometrics.
- Aesthetics – intent and purpose, line, colour, pattern, space and light.
 - Geometry types (e.g. polygons, NURBS, subdivision surfaces)
 - Shader types (e.g. Lambert, Blinn, Phong, Mental Ray shaders)
 - Texturing - file and procedural techniques
 - UV mapping and projection techniques
 - Lighting - CG light types, global illumination, final gather
 - Cameras & Sound Design- real-world and virtual camera settings, grammar of cinematography
 - Rendering techniques and formats
- Animated motion – within 2D/3D digital manipulation
- Deformation of 3D geometry when using joints, linking objects, skeletons, deformers
- Physics & Newton's laws of motion, forces and their representation in 3D space
- Character – 12 principles of animation (Disney, etc.)
- Creating & Manipulating control curves and parent/child relationships.

- Forward Kinematics
- Inverse Kinematics - Interactive IK and Applied IK
- Motion Paths, Constraints, Joints, Rigging & binding systems

LEARNING AND TEACHING STRATEGY

During the year, students attend a range of lectures, seminars, tutorials and workshops, which provide an understanding of the 3D workspace, applying modelling and animation procedures, constructing effective 3D visualisations and motion, etc. Through iterative design and development students will explore their creative practice within foundational 3D exercises and examples.

A strong emphasis is on classical art skills development and these are placed to help foster an advanced lexicon of visual diversity and styles whilst honing observational skills which will subsequently be implemented within 3D computer set exercises and lab-based practical applications. Through further research and development students will apply the theoretical concepts to practical situations and work progressively towards the visualisation of a complete 3D space/scene.

Further classes will expand upon the finer details of capturing ideas of human space and environment and students will be given the necessary skills and experimentation to allow for ambitious and evocative animated sequences of work.

The allocation of teaching to deliver the module is:

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

ASSESSMENT

The module outcomes will be assessed via the development and realisation of a 3D animated scene. Students will be asked to consider work related to architectural and environmental modelling and incorporate animated components.

It is expected the students will adopt cinematic tendencies in devising the camera placement and produce strong qualities of design and storytelling with effective and evocative presentations of spatial awareness, colour, animation, etc.

Assessment Component 1 – Coursework: Production (Practical) 70%

Exemplar.

Students to simulate and animate 3D objects and structures in a short 3D sequence, (e.g. 20 secs) to evoke their design and appearance within a CG environment. (Equivalent to 3500 words).

Assessment Component 2 – Coursework: Production (Written) 30%

Exemplar.

Students will be expected to display an analytical and evaluative approach to the project brief as well as demonstrating proficient technical and aesthetic practical skill in the final production. In addition students will be expected to compile a research and design blog that details their weekly research and analysis, the key factor being evaluation of the processes involved with production. (Equivalent to 1500 words).

Assessment Summary:

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

EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

Does the module contribute to ESD?	Yes
Within this technically-orientated module it is anticipated that students will all make use of e-books, online journals and resources in the study of digital animation techniques, utilising current/contemporary materials and files (e.g. software tutorials) for prospective/future students but also building upon the submissions and work from previous students and years. Study skills sessions on referencing and research, document structuring and use of case studies, etc. will all be given due attention to enable the students to develop their analytical and critical faculties. Additionally: This module seeks to help the student develop the fundamental skills of research and visual inquiry. This forms part of the sustainable assessment/sustainable teaching agenda which sees the assessment process as developing skills that can be used beyond the end of the programme of study and also the skills the individuals need to know in terms of working learning and thriving in a future which is as yet unknown. Boud. D, <i>Assessment 2020: Creating Sustainable Assessment for Long-term Learning</i> University of Technology, Sydney (2020) Available at https://www.uts.edu.au/sites/default/files/davidboudKeynote.pdf Accessed 10:30, 17th October 2014	

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- CAPIZZI, T. (2002) *Inspired 3D Modelling & Texture Mapping*, Premier Press, Inc.
- PALAMAR, T. (2012) *Mastering Maya 2013*, John Wiley & Sons
- LUHTA, E. and ROY, K. (2012) *How to Cheat in Maya 2013: Tools and Techniques for Character Animation* Focal Press
- LEE L. (2008) *Advanced Maya Texturing and Lighting*, John Wiley & Sons
- BIRN J. (2006) *Digital Lighting and Rendering*, New Riders
- THOMAS, F.
and JOHNSON, O. (1995) *The Illusion of Life* Hyperion; 0786860707
- WILLIAMS, R. (2001) *The Animator's Survival Kit* Faber and Faber; 0571202284

Recommended:

- DEMERS, O., URSZENYI, C.
AND MAESTRI, G. (2001), *Digital Texturing & Painting*, New Riders Publishing.
- KELLER E. (2013) *Maya Visual Effects: The Innovator's Guide*, John Wiley & Sons.
- MENACHE, A. (2011), *Understanding Motion Capture for Computer Animation*, Morgan Kaufmann
- KITAGAWA M. (2008) *MoCap for Artists: Workflow and Techniques for Motion Capture*, Focal Press.

Journals

ACM Digital Library Database (with reference to SIGGRAPH)

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Websites

www.acm.org

www.fxguide.com

<http://www.3dworldmag.com>

<http://www.digitalartsonline.co.uk/>

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<http://www.3dbuzz.com>

<http://www.creativecrash.com/>

<http://forums.cgsociety.org>

<http://www.3dtotal.com>