



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

MODULE DIRECTORY

LEVEL 6

ACADEMIC DISCIPLINE OF APPLIED COMPUTING

WALES INSTITUTE OF SCIENCE AND ART

2023-2024

CONTENTS PAGE

Page No

INTRODUCTION.....	1
MODULES	2

INTRODUCTION

This Module Directory includes all the modules for Level 6 within the discipline of Applied Computing in the academic year 2023-2024.

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	ACCA6011
Title	Artificial Intelligence and Machine Learning
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To develop students' systematic understanding of AI and machine learning principles and techniques used in Software Engineering, Games, Visualisation and Interactive Applications.

LEARNING OUTCOMES

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

- Critically analyse, evaluate and apply A.I. and machine learning methods to solve given problems.
- Analyse practical problems and synthesise appropriate software solutions using selected AI/machine learning methods.

INDICATIVE CONTENT

- Definition and review of Artificial Intelligence, General History, Contextualised AI eg Games AI.
- Review of probability and statistics
- Trigger systems, terrain analysis, obstacle evasion, movement, influence maps
- Decision-making and the development of methods for controlling and implementing behaviour of agents, for example, fuzzy logic, knowledge representation, state machines. rule-based systems, decision trees, etc.
- Search, Local search methods
- Evolutionary computing.
- Machine Learning: unsupervised/ supervised learning, Classifying, Naïve Bayes, Clustering, K-means, Function approximation/ neural nets, Bayesian networks

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
Implementation	2500-word equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6011	
Module Title	Artificial Intelligence and Machine Learning	
Classification	Reading List entry	Electronic*
Essential	Russell, S. and Norvig, P. (2016) Artificial Intelligence: A Modern Approach (3rd edition) Prentice Hall	☒
Essential	Millington, I. (2019) Artificial Intelligence for Games, 3 rd edition, CRC Press	☒
Essential	Geron, A. (2019) Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems. O'Reilly	☒
Further	Bishop, C.M. (2006) Pattern Recognition and Machine Learning, Springer	☐
Further	Mark, D. (2009) Behavioral Mathematics for Game AI, Delmar	☐
Further	Schwab, B. , AI Game Engine Programming (2nd Edition), Charles River Media (2009)	☐
Further	Barber, M. (2012) <i>Bayesian Reasoning and Machine Learning</i> , Cambridge University Press	☐

Module Code	ACCA6020
Title	Independent Project
Date	25/06/2020
Level	6
Credits	40
Pre-Requisites	None

AIM(S)

- To develop the ability of students to engage critically and innovatively with theory and/or practice relevant to their studied subject areas in order to produce a discipline specific in-depth project.

LEARNING OUTCOMES

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

- Demonstrate intellectual skills in the identification of an appropriate topic, problem or challenge for investigation pertinent to their field of study and formulate a suitable plan for further research utilising relevant investigative methods in order to produce a response.
- Evidence in-depth knowledge and critical understanding of principles necessary to underpin their education within their chosen field of study and problem solving techniques applicable to this.
- Evidence independence of thought and critical evaluation in the production of an independent piece of work, demonstrating transferable skills through exercising initiative and personal responsibility in planning own learning and self-management.
- Organise their knowledge and learning through use of a range of media, and present their work appropriately in a manner that can be understood by specialist and non-specialist audiences.

INDICATIVE CONTENT

- Research paradigms, methods, and techniques of research and enquiry.
- Conducting and writing literature reviews.
- Ethical concerns and the research process.
- Resource, project, and skills management processes and techniques.
- Presenting and illustrating data and information.
- Communication of general, specialist, technical ideas and results.
- Problem solving, creative, entrepreneurial thinking and approaches.
- Collaboration, adaptability and reflection.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	36	9%
Independent learning	364	91%
Placement learning	0	0%
TOTAL	400	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	Minimum of 3 elements (equivalent to 10,000 words)	100%

Assessment Summary

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

INDICATIVE READING LIST

This will be guided by the student's individual project.

Module Code	ACCA6020	
Module Title	Independent Project	
Classification	Reading List entry	Electronic*
Essential	Cottrell S, (2015) <i>Skills for Success Personal Development and Employability</i> , 3 rd edition, Palgrave. London.	☒
Essential	ASET, 2013 <i>Good Practice Guide for Workbased Learning and Placement Learning in Higher Education</i>	☒
Essential	Gray, D.E. (2018) <i>Doing Real World Research</i> , London: SAGE.	☐
Further	Gallagher K, (2016) <i>Essential Study and Employment Skills For Business and Management Students</i> , Oxford	☐
Further	Gottschall, Jonathan (2013), <i>The Storytelling Animal: How Stories Make Us Human</i> , Houghton Mifflin	☐
Further	Storr, Will (2020), <i>The Science of Storytelling</i> , William Collins	☐
Further	Cohen, L. Manion, L. and Morrison, K. (2017) <i>Research Methods in Education</i> , 8 th edition London: Routledge.	☒
Further	Flick, U. (2014) <i>An Introduction to Qualitative Research</i> , London: SAGE.	☐
Further	Aubrey, K. & Riley, A. (2017) <i>Understanding and Using Challenging Education Theories</i> , London: SAGE.	☒

Further	Brinkmann, S. and Kvale, S. (2018) <i>Doing Interviews (Qualitative Research Kit)</i> . Sage	☐
Further	Gibbs, G. (2018) <i>Analysing Qualitative Data (Qualitative Research Kit)</i> . Sage	☒
Further	Creswell, J. W. (2012). <i>Qualitative inquiry and research design: Choosing among five approaches</i> . Sage	☐
Further	Obschonka, M., Hakkarainen, K., Lonka, K. et al. Entrepreneurship as a twenty-first century skill: entrepreneurial alertness and intention in the transition to adulthood. <i>Small Bus Econ</i> 48 , 487–501 (2017). https://doi.org/10.1007/s11187-016-9798-6	☒
Further	https://ec.europa.eu/jrc/en/entrecomp	☒

Module Code	ACCA6021
Title	Graphics and Games Programming
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To achieve a systematic understanding of core Graphics & Games Programming principles and techniques including the use of graphics APIs, mathematical principles and related algorithms and data structures used to create complex graphical scenes.

LEARNING OUTCOMES

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

- Select, analyse and deploy suitable algorithms and techniques to solve given problem specifications.
- Apply their knowledge and understanding to develop 3D graphics applications using industry standard development tools and application programming interfaces (APIs).

INDICATIVE CONTENT

- Graphics hardware/terminology
- Development tools
- Graphics platform APIs e.g. DirectX, OpenGL
- Application of suitable programming languages (C/ C++)
- Hardware acceleration and the graphics pipeline.
- Transformations, object, world and camera spaces
- Projections, perspective
- Clipping and hidden surface removal
- Rasterization
- Rendering Algorithms

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
Coursework	1600 words	40%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Assignment	2400 words	60%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6021	
Module Title	Graphics and Games Programming	
Classification	Reading List entry	Electronic*
Essential	Hearn, D and Baker, P.M (2013) Computer Graphics with OpenGL, Prentice Hall 4 th Edition	☒
Essential	Kessenich, Sellers, Shreiner (2016) OpenGL® programming guide: the official guide to learning OpenGL®, version 4.5 with SPIR-V, 9 th Edition, Addison Wesley.	☒
Further	Foley, VanDam, Feiner, Hughes (2013), Computer Graphics: Principles and Practice 3rd edition, Addison Wesley	☐
Further	Van Verth, J.M, Bishop, L.M (2015) Essential Mathematics for Games and Interactive Applications. A Programmers Guide, Morgan Kaufmann	☐
Further	Hill, F.S. and Kelley, S. M, (2015) Computer Graphics using OpenGL, 3rd Edition, Prentice Hall International Inc.	☐

Module Code	ACCA6022
Title	Switching, Routing and Wireless
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To study the technical issues related to routing and switching techniques, to have an in-depth knowledge of architecture, components, and operations of routers and switches in a larger and more complex network.

LEARNING OUTCOMES

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

- Demonstrate a detailed understanding of theoretical and practical knowledge relating to routing and switching concepts.
- Implement routing and switching techniques within a network infrastructure, configure routing protocols, VLANs and perform network maintenance.

INDICATIVE CONTENT

- Switching concepts – layer 2 & 3
- Routing concepts – Static and dynamic, implementation and troubleshooting
- Routing Information Protocol v1 & v2
- Virtual Local Area Networks (VLANs)
- Inter VLAN routing
- Spanning tree protocols
- VLAN Trunking protocols and Dynamic Trunking protocols
- LAN Security concepts and implementation
- Wireless LAN

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 portfolio	Students will complete practical works as an in-class tests or as a workshop journal	75%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Online test	1 hours	25%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6022	
Module Title	Switching, Routing and Wireless	
Classification	Reading List entry	Electronic*
Essential	www.netacad.com username and password is required	☒
Essential	Switching, Routing, and Wireless Essentials Companion Guide (CCNAv7) Published Aug 18, 2020 by Cisco Press . Part of the Companion Guide series. ISBN-10: 0-13-672935-5 ISBN-13: 978-0-13-672935-8	☒
Further	Scaling Networks Essentials v6 Companion Guide by Cisco Networking Academy, Cisco Press. Published Aug 3, 2017	☒
Further	W Odom (2019) CCNA 200-301 Official Cert Guide Library, Cisco Press part of the Official Cert Guide series	☐

Module Code	ACCA6023
Title	Enterprise Networking, Security and Automation
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To study the technical issues related to advance routing protocols and switching techniques within network infrastructure. To have a detailed knowledge of interior and exterior gateway routing protocols, various switching techniques and to understand the fundamental technical principles underlying autonomous systems.

LEARNING OUTCOMES

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

- Demonstrate a conceptual understanding of WAN technologies and protocols used in enterprise networks.
- An ability to design, deploy and troubleshoot enterprise networks, security measures and automation techniques.

INDICATIVE CONTENT

- Advanced routing protocols, distance vector and link state routing protocols
- OSPF – single and multi-area
- Network design and management
- Network security concepts
- Access control lists
- Network Address Translation for IPv4 & IPv6
- Virtual Private Networks and IPSec concepts
- Network QoS
- Network virtualisation and automation

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 portfolio	Students will complete practical works as an in-class tests or as a workshop journal	75%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Online exam	1hours	25%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6023	
Module Title	Enterprise Networking, Security and Automation	
Classification	Reading List entry	Electronic*
Essential	www.netacad.com username and password is required	☒
Essential	Enterprise Networking, Security, and Automation Companion Guide (CCNAv7), By Cisco Networking Academy, Published Jul 16, 2020 by Cisco Press. Part of the Companion Guide series ISBN-13: 978-0-13-663432-4	☒
Essential	Scaling Networks v6 Companion Guide by Cisco Networking Academy, Cisco Press. Published Aug 3 2017	☒
Further	W Odom (2019) CCNA 200-301 Official Cert Guide Library, Cisco Press part of the Official Cert Guide series	☐

Module Code	ACCA6024
Title	Cloud-Based Web Services
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To give students an understanding of advanced web development concepts and how they are to be deployed in a cloud environment.

LEARNING OUTCOMES

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

- Understand the theoretical concepts which underpin cloud-hosted web development.
- Design, develop, test and deploy a web application in a cloud environment.

INDICATIVE CONTENT

- Web development frameworks (e.g. node.js)
- Web service-based applications, especially RESTful Web Services
- Object-relational mapping (ORM)
- Cross-Origin Resource Sharing (CORS)
- Asynchronous JavaScript And XML (AJAX)
- Testing
- Developing containerised web applications.
- Database web programming, e.g. SQL/NoSQL.
- Microservices.
- PaaS deployment of web applications.
- Scaling of web applications in the cloud (horizontal vs vertical scaling).

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
Implementation + Essay	2500-word equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Implementation + Essay	2500-word equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6024	
Module Title	Cloud-Based Web Services	
Classification	Reading List entry	Electronic*
Essential	J. Verona (2018), Practical DevOps: Implement DevOps in your organization by effectively building, deploying, testing, and monitoring code, 2nd Edition, Packt Publishing	☐
Further	S. Kane (2018), Docker: Up & Running: Shipping Reliable Containers in Production, O'Reilly Media	☐
Further	ACM	☒
Further	IEEE	☒

Module Code	ACCA6025
Title	Cloud Computing Administration
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a systematic understanding of the major concepts and technologies upon which service-level cloud computing is built. The module will expose students to some of the more advanced cloud computing concepts that underpin more sophisticated cloud computing implementations.

LEARNING OUTCOMES

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

- Demonstrate a systematic understanding of cloud computing concepts, principles and practice in the analysis and design of a robust solution from end user perspective.
- Exercise effective judgment in the analysis, planning, deployment and evaluation of core cloud design principles with respect to best practice

INDICATIVE CONTENT

- Design, deployment, and operation of cloud services and distributed systems
- Understanding roles, access requirements and availability
- Application and Server management, server OS – Windows, Linux & Unix, Virtual Machines
- Application architecture and services, load balancing, resiliency and scalability
 - Amazon web services, MS Azure, Google Cloud, IBM Cloud Services
- Cloud security management
- Financial planning, costing metrics and pricing models
- Quality of service and service level agreements
- Disaster recovery strategy, redundancy

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	6000 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	ACCA6025	
Module Title	Cloud Computing Administration	
Classification	Reading List entry	Electronic*
Essential	Thomas Erl, Ricardo Puttini, Zaigham Mahmood (2013) Cloud Computing: Concepts, Technology & Architecture Prentice Hall	☒
Essential	Christina J. Hogan, Strata R. Chalup, Thomas A. Limoncelli (2015) Practice of Cloud System Administration, The: DevOps and SRE Practices for Web Services, Volume 2, Addison-Wesley Professional ISBN: 9780133478549	☒
Further	Ray Rafaels (2015) Cloud Computing: From Beginning to End, CreateSpace Independent Publishing Platform	☒
Further	IEEE Transactions on Cloud Computing	☒
Further	IEEE, IEEE Cloud Magazine	☒
Further	Science Direct	☒
Further	Scopus	☒

Further	ACM Transactions on Internet Technology (TOIT) Systems	☒
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Module Code	ACCA6026
Title	Data Warehousing and Data Mining
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a comprehensive and systematic understanding of the concepts underlying modern data warehouse systems. The student's technical skills will be extended to allow them to extract business intelligence from a dataset using both data analysis and data mining tools.

LEARNING OUTCOMES

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

- Analyse critically the structure, capabilities and role of a data warehouse within a modern business environment.
- Select and perform appropriate data analysis and reporting on data within a data warehouse environment and critically evaluate the results
- Provide business intelligence through the creative application of appropriate data mining processes and the critical evaluation of their results.

INDICATIVE CONTENT

- Source systems, data warehouses and data marts, dimensional modelling
- Business requirements, ETL process, data cleaning
- Reporting systems, data presentation, dashboards
- Data analysis and data mining; clustering, classification, time series analysis
- Data governance and data protection

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	2500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6026	
Module Title	Data Warehousing and Data Mining	
Classification	Reading List entry	Electronic*
Essential	Loth, A., (2019) <i>Visual Analytics with Tableau</i> , Wiley	☒
Essential	Kimball, R. & Ross, M. (2016) <i>The Kimball Group Reader: Relentlessly Practical Tools for Data Warehousing and Business Intelligence</i> , Wiley	☒
Further	• Few, S. (2012), <i>Show Me The Numbers</i> , Analytics Press, Burlingame, CA.	☒
Further	Witten, I.H., Elbe, F., Hall, M.A., & Pal, C.J. (2016), <i>Data Mining: Practical Machine Learning Tools and Techniques</i> , Morgan Kaufmann.	☒

Module Code	ACCA6027
Title	Software Engineering Principles and Practice
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to evaluate and deploy appropriate software methodologies, software development methods, tools and techniques in the design and development of web applications following professional practices.

LEARNING OUTCOMES

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

- Critically evaluate software development approaches, software development methodologies, software design techniques and software testing
- Demonstrate a sound understanding of team work principles and practice
- Apply software development principles, patterns and techniques in the development of web application software

INDICATIVE CONTENT

- Software development process and approaches e.g. Software Development Life-Cycle (SDLC), Agile, SCRUM
- Software development methodologies and approaches e.g. Waterfall, Spiral, Iterative Development, RUP
- Software development methods e.g. Feature Driven Development
- Software design methods e.g. User Stories vs Use Cases, Class Diagrams
- Software testing e.g. Black Box vs White Box, Unit Testing, Equivalence Partitioning
- Software quality and complexity e.g. coding standards, Cyclomatic complexity
- Software development tools for collaboration e.g. version control
- Software design principles e.g. cohesion vs coupling
- Software design patterns e.g. Singleton, Factory Pattern
- Web Engineering approaches e.g. server-side vs client-side testing approaches, usability testing

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
Essay and Implementation	5000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6027	
Module Title	Software Engineering Principles and Practice	
Classification	Reading List entry	Electronic*
Essential	Sommerville, I. (2015), Software Engineering, , Pearson	☒
Essential	Thomas, D., Hunt, A., (2019), The Pragmatic Programmer: your journey to mastery, 20th Edition	☒
Further	Gamma, E., Helm, R. Johnson, R., Vlissides, J., (1994), Design patterns : elements of reusable object-oriented software, Addison Wesley	☒
Further	Martin, R., (2008), Clean Code: A Handbook of Agile Software Craftsmanship, Prentice Hall	☒
Further	Adewole, A., (2018) C# and .NET Core Test Driven Development: Dive into TDD to create flexible, maintainable, and production-ready .NET Core application, Packt Publishing	☒
Further	Sutherland, J., (2015) Scrum: The Art of Doing Twice the Work in Half the Time, Random House Business	☒
Further	Skarin, M., (2015), Real-World Kanban: Do Less, Accomplish More with Lean Thinking, Pragmatic Bookshelf	☒

Module Code	ACCA6028
Title	Socket Programming and Concurrency
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To provide the student with the major concepts involved in the implementation, testing and debugging of scalable, concurrent applications.

LEARNING OUTCOMES

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

- Critically appraise the major concepts, principles and practice to design web services.
- Demonstrate a comprehensive knowledge and understanding of complex client/server concepts, principles and tools to build, test, debug and critically evaluate software components in scalable, distributed applications.

INDICATIVE CONTENT

- Network programming e.g. BSD sockets. Including UDP/TCP clients and servers, byte ordering, etc.
- Real-time multiplayer/multiuser development with particular focus on multithreading and processing, including critical regions, mutexes, semaphores, etc
- Remote method execution between components and an application front-end (for example, RMI interface).
- Concurrency including race conditions, semaphores, mutexes, async, etc.
- Service-Oriented Architectures (SOA)
- Multithreading
- Message Passing Interface
- Dispatch models.
- Use of threads within distributed components.
- Messaging and message queues for passing information

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
Implementation + report	2500 word equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6028	
Module Title	Socket Programming and Concurrency	
Classification	Reading List entry	Electronic*
Essential	Subbu Allamaraju. RESTful Web Services Cookbook. 2010, Yahoo Press	☐
Essential	Rian Quinn. Hands-On System Programming with C++: Build performant and concurrent Unix and Linux systems with C++17. 2018, Packt Publishing	☐
Further	Balachandar, B. M. RESTful Java Web Services: A pragmatic guide to designing and building RESTful APIs using Java. 2018 3rd Edition, Packt Publishing	☐
Further	ACM	☒
Further	IEEE	☒
Further	Computer Networking	☒
Further	Data Communications	☒

Module Code	ACCA6029
Title	Industrial Based Research
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To provide the students with the ability to critically analyse and research complex industry-related problems and/or systems. This includes development of appropriate system requirements for work-based projects.

LEARNING OUTCOMES

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

- Review and implement appropriate research methods for investigating a problem relevant to the employer.
- Communicate an in-depth understanding of the problem on the context of the organisation's needs and current research.
- Manage resources appropriately including collaboration with experts within the organisation.

INDICATIVE CONTENT

- Research methodologies for industrial research
- Research and investigative skills relevant to the student's workplace
- Work design and technology: for example, business process re-engineering, work redesign options such as job rotation, job enlargement, job enrichment.
- Stimulants/drivers for change: for example, technology, nature of the workforce, social trends, competition, etc.
- Appropriate development and structuring of an industrial research proposal: problem identification, formulating aims/hypotheses, sampling, ethical issues and the practicalities of design

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	10	5%
Independent learning	180	90%
Placement learning	10	5%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Presentation / Demo	15 minutes	25%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Reflective Industrial Research Report	4,000 - 5,000 words	75%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6029	
Module Title	Industrial Based Research	
Classification	Reading List entry	Electronic*
Essential	Marder, M. (2011) Research Methods for Science, Cambridge University Press: Cambridge	☒
Essential	Hughes, B. (2015), 5th Edition Project Management for IT-Related Projects, British Computer Society	☒
Further	http://www.acm.org	☒
Further	http://www.ieee.org	☒
Further	http://www.bcs.org	☒
Further	http://www.theregister.co.uk	☒

Module Code	ACCB6000
Title	Advanced Cyber Security
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with Cyber Security concepts and a deep understanding of how they are applied using Internet technologies. Students will gain a thorough understanding of up-to-date security threats and vulnerabilities posed to the Internet and an understanding of the legal, policy and technical approaches that are necessary to mitigate such risks.

LEARNING OUTCOMES

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

- Demonstrate a systematic understanding of a wide range of current research and technological advances in Cyber Security.
- Consistently apply the principles and practices of Cyber Security for mitigating the key technical internet security vulnerabilities and threats that organisations face.

INDICATIVE CONTENT

- Fundamentals of Computer Security.
- Networking Concepts.
- Cryptography.
- Internet Security Technologies.
- Security of Computer Communications.
- Wireless Security.
- Windows Security.
- Linux Security.
- Web Applications and Security.
- Defensive Network Infrastructure – Intrusion Detection/Firewalls.
- Malware, Virus and Worms.
- Network Traffic Analysis and Forensics using Wireshark.
- Data Loss Prevention.

- Penetration Testing.

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	5000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB6000	
Module Title	Advanced Cyber Security	
Classification	Reading List entry	Electronic*
Essential	The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws, 2ed. Author: D. Stuttard.	☒
Essential	Cisco CyberOps Associate CBROPS 200-201 Official Cert Guide By Omar Santos Published Dec 10, 2020 by Cisco Press. Part of the Certification Guide series. Copyright 2021 ISBN-10: 0-13-680783-6 ISBN-13: 978-0-13-680783-4	☒
Essential	Cracking the Coding Interview: 189 Programming Questions and Solutions 6th Edition. Author: Gayle Laakmann.	☒
Essential	Basic Security, Penetration Testing and How to Hack. Author: Isaac Sharpe.	☐
Essential	Cyber Insecurity: Navigating the Perils of the Next Information Age. Author: Richard Harrison.	☒
Essential	Counter Hack Reloaded: A Step-by-Step Guide to Computer Attacks and Effective Defenses (2nd Edition) 2nd Edition. Authors: Edward Skoudis, and Tom Liston.	☒
Essential	www.netacad.com username & password required	☒
Further	Applied Cryptography: Protocols, Algorithms and Source Code in C. Author: Bruce Schneir. (2015)	☒
Further	The Art of Exploitation, 2nd Edition. Author: Jon Erickson.	☐

Further	Beginner to Expert Guide to Computer Hacking, Basic Security, and Penetration Testing (Computer Science Series) Kindle Edition. Author: James Patterson.	☐
Further	Hacking for Beginners – Computer Virus, Cracking, Malware, IT Security (Cyber Crime, Computer Hacking, How to Hack, Hacker, Computer Crime, Network Security, Software Security), Author: Joseph Connor.	☐
Further	Journals IEEE/ACM, IEEE/ACM Transactions on Networking IEEE, IEEE Network Magazine Science Direct Scopus ACM Transactions on Database Systems ACM Transactions on Information Systems	☒
Further	Websites http://www.veracode.com/directory/owasp-top-10 http://www.vulnerabilityassessment.co.uk/Penetration%20Test.html http://www.softwaretestinghelp.com/penetration-testing-tools/ https://www.owasp.org/index.php/Main_Page DoD Cyber Crime Center (http://www.dc3.mil) http://www.digitalforensicsmagazine.com/ www.dvwa.co.uk	☒

Module Code	ACCB6014
Title	GPU Programming
Date	09/09/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- Critically evaluate the principles and techniques used in GPGPU programming for games development, emphasising strategies for real-time optimizations of algorithms and techniques required to simulate, animate and render graphical scenes used in games programming.

LEARNING OUTCOMES

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

- Critically evaluate suitable strategies and techniques used in real-time graphics rendering utilizing GPU hardware acceleration.
- Synthesize appropriate GPU techniques and algorithms to address complex graphical programming problems

INDICATIVE CONTENT

- Graphics hardware/terminology and games platforms.
- Hardware acceleration and the shader graphics pipeline.
- Shader development tools.
- Illumination models, HDRI, BRDFs
- Stereoscopic output for virtual reality displays.
- Pixel, vertex and geometry shader development.
- Texture mapping / baking techniques – hemisphere, reflection, specular mapping, bump mapping, parallax mapping
- Shadow mapping.
- Particle systems
- Fluids
- Procedural Texturing and Animation techniques.
- Emerging technologies, methods and techniques used to model photo-realistic scenes in real-time.
- Representing parametric curves and surfaces

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	2,000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB6014	
Module Title	GPU Programming	
Classification	Reading List entry	Electronic*
Essential	Kessenich, Sellers, Shreiner (2016) OpenGL® programming guide: the official guide to learning OpenGL®, version 4.5 with SPIR-V, 9 th Edition, Addison Wesley.	☒
Essential	Akenine-Moller, T and Haines, E, (2018), Real Time rendering, 4 th Edition. A.K Peters	☒
Further	Ebert, Musgrave, Peachey, Perlin, Worley, (2003) Texturing & Modelling. A Procedural Approach. 3 rd edition, Morgan Kaufmann	☒
Further	Hearn, D and Baker, P.M (2013) Computer Graphics with OpenGL, Prentice Hall 4 th Edition	☐

Further	Watt, Alan (1998) 3D Computer Graphics 2 nd Edition, Addison Wesley	☐
Further	Van Verth, J.M, Bishop, L.M (2004) Essential Mathematics for Games and Interactive Applications. A Programmers Guide, Morgan Kaufmann	☐
Further	GPU Gems 1, 2 & 3. (2007) Programming Techniques, Tips and Tricks for Real-Time Graphics. Edited by Fernando, Pharr, Nguyen, Addison Wesley	☒

Module Code	ACCB6017
Title	Usability Engineering
Date	12/07/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To build upon students' interface design skills to give the ability to apply and analyse techniques of usability engineering.

LEARNING OUTCOMES

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

- Research and evaluate cognitive and social information processing
- Select, apply and analyse critically techniques of interface evaluation
- Synthesize a solution to a complex design problem from the concepts and principles of usability engineering and software development
- Critically analyse, individually and as part of a team exercise, input and output hardware appropriate for specialised applications, for example for use by disabled people, and for three-dimensional modelling applications

INDICATIVE CONTENT

- Cognitive aspects of information: perception: sensory inputs and the human memory system; concept formation and knowledge representation; cognitive processing: attention, reasoning,
- The social aspect of information: semiotics and language; verbal and non-verbal languages
- Interface evaluation methods (for example, observation, verbal protocol analysis, structured expert reviewing).
- The scope and role of usability engineering methods (for example, task analysis, GOMS, communicating sequential processes).
- Usability engineering methodologies to create a suitable interface and their relation to the software design process.
- I/O devices for specialised design needs (for example, 3-dimensional interfaces and interfaces for users with disabilities).

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
Essay	2500 words	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%

INDICATIVE READING LIST

Module Code	ACCB6017	
Module Title	Usability Engineering	
Classification	Reading List entry	Electronic*
Essential	Shneiderman, B (2017) <i>Designing the User Interface: Strategies for Effective Human-Computer Interaction (6th Edition)</i> , Addison-Wesley	☐
Further	Rogers Y, Sharp, H, & Preece, J (2015) <i>Interaction Design: Beyond Human-Computer Interaction. 4th Edition</i> , John Wiley & Sons, Inc	☐
Further	Lazar, J., Fend, JH and Hochheiser, H (2017) <i>Research Methods in Human-Computer Interaction 2nd Edition</i> , Wiley	☐
Further	MacKenzie, S. (2014) <i>Human-Computer Interaction: An Empirical Research Perspective</i> , Morgan Kaufmann	☐

Further	BCS Human Computer Interaction Group Proceedings	☐
Further	ACM Publications: Communications, Interactions, SIGCHI	☐
Further	http://www.usability.gov/	☒
Further	http://www.w3.org/standards/webdesign/accessibility Web accessibility standards	☒
Further	http://www.nngroup.com/articles/ Short usability articles from Jacob Neilson	☒

Module Code	ACCB6019
Title	Emerging Trends
Date	25/03/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to demonstrate a theoretical or practical understanding of current technologies, concepts or practices.

LEARNING OUTCOMES

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

- Analyse the principles and concepts associated with an emerging field of computing such as the professional practices being adopted in industry, a novel technology or a new application of an existing technology.
- Evaluate the effectiveness, benefits, drawbacks or suitability of deploying appropriate technologies or approaches to the solution of a problem as part of a team and/or as an individual.

INDICATIVE CONTENT

- Current or emerging technologies within fields such as networking, web development, software applications, data analytics
- Software or network design methodologies
- Professional practices
- Testing approaches within programming, network implementations, usability, etc.
- Software tools and libraries such as network simulation tools, rootkits, graphics SDKs, game engines, software libraries, software development tools, testing tools, etc.
- Critical, analytical thinking and writing

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	May take the form of an essay, a presentation and/or an implementation 4000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB6019	
Module Title	Emerging Trends	
Classification	Reading List entry	Electronic*
Essential	The nature of this module requires up to date sources. These will be provided to the students during the module. Essential texts will change during the course of the module.	
Further	Bejtlich, R. (2015) The Tao of Network Security Monitoring: Beyond Intrusion Detection, Boston: Addison-Wesley	☒
Further	Stallings, W. (2017) Cryptography and Network Security: Principles and Practice (7th Edition), Pearson Education Limited	☒
Further	Sommerville, I. (2015), Software Engineering, , Pearson	☒

Module Code	ACDA6000
Title	Applied Programmable Logic Controllers
Date	13/10/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To design and document hardware and software for control systems using industry standard methods. To implement a control system using PLC based hardware and software.

LEARNING OUTCOMES

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

- Design and implement appropriate algorithms using suitable industry standard software tools such as Siemens Step 7, with appropriate documentation to fulfil a control application scenario
- Design, critically analyse and document the hardware and software required for fault diagnostics, operator controls, and safe operation of a PLC.

INDICATIVE CONTENT

- PLC architectures and concepts,
- Sequence function charts,
- timing diagrams,
- ladder logic programming
- Instruction mode programming
- Functional block programming
- Dynamic system modelling
- Control Systems and controller design

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 / Report	5,000 Words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA6000	
Module Title	Applied Programmable Logic Controllers	
Classification	Reading List entry	Electronic*
Essential	Jack, H. (2010) <i>Automating Manufacturing Systems with PLCs</i> Lulu.com	☒
Essential	Golnaraghi, F. and Kuo, B. (2017) <i>Automatic Control Systems</i> New York: McGraw Hill	☒
Further	Bolton, W. (2015) <i>Programmable Logic Controllers</i> Oxford: Newnes	☒

Module Code	ACDA6001
Title	Electronics II
Date	13/10/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To develop an advanced appreciation of the structure and design of digital systems and finite state machines in particular.

LEARNING OUTCOMES

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

- Synthesise and critically evaluate of innovative VHDL designs through the use of state of the art simulation and synthesis software.
- Implement advanced digital designs including multi-input systems controllers.

INDICATIVE CONTENT

- Review of combinational and sequential circuit design including finite state machines.
- System controller design: system synchronisation, handshaking, state assignment, next state decoder, output decoder.
- PLDs and FPGAs.
- VHDL: model development, behavioural modelling, the VHDL language, program design, modelling FSMs.
- Schematic capture, synthesis and simulation tools for PLD and FPGA design (e.g. Mentor Graphics, Altera and Xilinx).

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	2,500 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	ACDA6001	
Module Title	Electronics II	
Classification	Reading List entry	Electronic*
Essential	Ashenden, P. (2007) <i>Digital Design (VHDL): An Embedded Systems Approach Using VHDL</i> Burlington, MA: Morgan Kaufmann	☒
Essential	Brown, S. and Vranesic, Z. (2008) <i>Fundamentals of Digital Logic with VHDL Design</i> New York: McGraw Hill	☐
Further	Haskell, R. and Hanna, D. (2015) <i>VHDL by Example</i> , Auburn Hills: LBE Books	☐

Module Code	ACDA6002
Title	Electronic Systems Design
Date	13/10/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To produce suitable system designs, using open-ended multi-disciplinary problems with a limited time period, and appreciating practical constraints.

LEARNING OUTCOMES

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

- Demonstrate the ability to deploy accurately established techniques to produce suitable system designs over a range of technological applications.

INDICATIVE CONTENT

- Appropriate theoretical methods for designing practical systems.
- Researching
- Planning
- Self-management
- Costing
- Design approaches
- PCB Design
- Report writing

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	2,500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2,500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA6002	
Module Title	Electronic Systems Design	
Classification	Reading List entry	Electronic*
Essential	Horowitz, P. and Hill, W. (2015) <i>The Art of Electronics</i> Cambridge: Cambridge University Press	☒
Essential	Sinclair, I. (2014) <i>Sensors and Transducers</i> Oxford: Newnes	☐
Essential	Wobschall, D. (1987) <i>Circuit Design For Electronic Instrumentation</i> New York: McGraw Hill	☐
Further	Patranabis, D. (2011) <i>Sensors and Transducers</i> _ New Delhi: PHI Learning	☐

Module Code	ACDA6004
Title	Power Electronics and Drives
Date	13/10/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To develop in the student an in depth understanding of power electronic circuits and systems, their use in power supply and energy storage systems and their use in electrical drive systems.
- To develop the appropriate skills necessary for the analysis and design of power electronic systems including electrical drive systems.

LEARNING OUTCOMES

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

- Analyse and design power electronic systems employing established and emerging techniques.
- Analyse electrical drive systems and apply established and emerging techniques to ensure effective operation of these systems.

INDICATIVE CONTENT

- Power Electronic Converters - Power electronic components and circuits. AC to DC, DC to AC, DC to DC, and AC to AC conversion processes.
- Calculation of peak, mean and RMS values of voltage and current associated with each converter. Maximum Power Point Tracking. Grid synchronization. Calculation of harmonic distortion factors. Switching losses, conversion efficiency (for example in solar PV). Power factor calculations. Protection of devices.
- Switch Mode and Uninterruptible Power Supplies -Design and analysis of switch mode circuits and systems.
- Design and analysis of uninterruptible power supply systems, incorporating energy storage systems. Charge and discharge control algorithms for various battery types.
- DC and AC Motor Drives including an overview and analysis of electrical machine systems analysis of AC machine and DC machine systems and their representation by equivalent circuits.
- Application of power electronic converters to motors to provide variable speed and variable torque as required by electric vehicles.
- Analysis of electrical drive systems, consisting of DC and AC machines and a broad range of power electronic converters.

- Analysis and design of speed and torque control techniques for electrical drives, including vector control.

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	2,500 words equivalent	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	ACDA6004	
Module Title	Power Electronics and Drives	
Classification	Reading List entry	Electronic*
Essential	Rashid, M. H. (2011) <i>Power Electronics Handbook, Devices, Circuits and Application</i> Elsevier.	☒
Essential	Wildi, T. (2013) <i>Electrical Machines, Drives and Power Systems</i> . Boston: Prentice Hall.	☒
Essential	Mohan, N. (2011) <i>Power Electronics</i> Hoboken, NJ: Wiley	☐
Further	Vukosavic, S. (2013) <i>Electrical Machines (Power Electronics and Power Systems)</i> Springer.	☐
Further	Lander, C. W. (1993) <i>Power Electronics, 3rd Edition</i> . New York: McGraw Hill Higher Education.	☐
Further	Krishnan, R. (2001) <i>Electric Motor Drives Modelling, Analysis, and Control</i> . Boston: Prentice Hall.	☐

Further	Mohan, N., Undeland, T. M. and Robbins, W. P. (2002) <i>Power Electronics: Converters, Applications and Design</i> 3 rd ed Hoboken, NJ: Wiley	☐
Further	Fitzgerald, A. E., Kingsley, C. and Umans, S. D. (2002) <i>Electric Machinery</i> 6 th ed. New York: McGraw Hill Higher Education	☐
Further	Hughes, A. (2005) <i>Electric Motors and Drives: Fundamentals, Types and Applications</i> Oxford: Newnes	☐

MODULE CODE: ACDA6007
TITLE: Remote Sensing and Imaging
DATED: 15/08/2018

LEVEL: 6
CREDITS: 20

JACS CODE: H610

AIM(S)

- This module provides students with a comprehensive and systematic understanding of the capabilities and technologies of modern remote sensing and imaging systems. The student's technical skills will be developed to allow them to select appropriate systems for given case studies, to identify any operational issues that might negatively affect an operations project, and to identify workable solutions to these problems.

LEARNING OUTCOMES

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

- Demonstrate a sound understanding of the capabilities of modern remote sensing and imaging systems;
- Demonstrate a sound understanding of the technologies underlying modern remote sensing and imaging systems;
- Critically discuss the operational issues encountered by users of modern remote sensing and imaging systems;
- Evaluate, select and apply appropriate technologies and techniques to meet the requirements of an operations project.

INDICATIVE CONTENT

- Lenses and optics suitable for optical, lidar and radar systems;
- IR/UV signatures; stealth;
- Aerial vs. Satellite imaging; advantages and disadvantages;
- Advanced image analysis diagnostic techniques (such as cross and auto correlation) through the use of appropriate software application.
- Imaging technologies; accuracy, resolution and distortion;
- Real-time data acquisition; high speed digital video; video tracking;
- Applications of remote sensing and imaging.

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
Report	3500 words	70%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Exam	2 hours	30%

Assessment Summary

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

READING LIST

Module Code	ACDA6007	
Module Title	Remote Sensing and Imaging	
Classification	Reading List entry	Electronic*
Essential	T. Lillesand, R. Kiefer and J. Chipman, Remote Sensing and Image Interpretation, Enschede, Wiley, 2015	☒
Essential	Paul Gibson and Clare Power, Introductory Remote Sensing Principles and Concepts, Routledge, 2000	☒
Further	W. G. Rees, Physical Principles of Remote Sensing, 3 rd edition, 2012	☒
Further	Journals http://remotesensing.usgs.gov/index.php (USGS) https://eros.usgs.gov/ (USGS)	☒

MODULE CODE: ACDA6008
TITLE: Scientific Principles of OME Design
DATED: 15/08/2018

LEVEL: 6
CREDITS: 20

JACS CODE: H610

AIM(S)

- To develop in the student a systematic understanding of the scientific principles behind the design of OME, their mode of operation and the outcomes to be expected from their correct functioning.

LEARNING OUTCOMES

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

- Demonstrate a systematic understanding of the scientific principles behind OME design.
- Critically analyse and select appropriate OME to produce a given effect.

INDICATIVE CONTENT

- Material properties relevant to shock
- Penetration mechanics
- Formation of EFPs and shaped charge jets.
- Ballistics design
- Fluid-structure interactions
- Designing for blast and fragmentation effects
- Arming, fusing and firing.

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	2 hours	50%

Assessment Component 2

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

Mode of assessment	Volume	Weighting
Report	3000 words	50%

Assessment Summary

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

READING LIST

Module Code	ACDA6008	
Module Title	Scientific Principles of OME Design	
Classification	Reading List entry	Electronic*
Essential	Akhavan, J <i>The Chemistry of Explosives</i> (Royal Society of Chistry, 2011)	☒
Further	Agrawal, J.P. <i>High Energy Materials</i> (Wiley, 2010)	☐
Further	Carlucci, D.E & Jacobson, S.S <i>Ballistics: Theory and Design of Guns and Ammunition</i> (CRC Press, 2013)	☐
Further	Klapotke, Thomas M <i>Chemistry of High Energy Materials</i> (de Gruyter, 2011)	☐
Further	Maytas, R & Pachman, J <i>Primary Explosives</i> (Springer, 2013)	☐
Further	Zukas, J.A. & W. Walters <i>Explosive Effects and Applications</i> (Springer, 2013)	☐

MODULE CODE: ACDA6015
TITLE: Technical Authoring
DATED: 15/08/2018

LEVEL: 6
CREDITS: 20

JACS CODE: H610

AIM(S)

- To underpin the importance of technical authoring and communication and provide a comprehensive and systematic understanding of the knowledge required, including; preparing technical instructions and manuals and supporting documents, communicating complex and technical information, gathering and disseminating technical information to customers, designers, and manufacturers.

LEARNING OUTCOMES

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

- Systematically understand the requirements for visual aids, the principles of cognitive psychology, analyse source material and communicate ideas effectively.
- Design and deliver instructional materials, manage complex writing and design projects and use appropriate multimedia applications.

INDICATIVE CONTENT

- Process analysis.
- Cognitive and educational psychology that relate to visual aids, such as visual perception, gestalt grouping, matching of intellectual and visual inferences
- Professional communication for engineers and scientists.
- Editing and visual design.
- Document control and publications management.
- Specialized documents; proposal writing and document design.
- The advantages of a multimedia approach to technical authoring.
- Manipulate data using a variety of tools to provide insight and information.
- Develop ways of writing and communicating with different audiences.

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
Report	3000 words	50%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Presentation	15 min presentation	50%

Assessment Summary

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

READING LIST

Module Code	ACDA6015	
Module Title	Technical Authoring	
Classification	Reading List entry	Electronic*
Essential	Riordan, D, Technical Report Writing Today, Wadsworth Publishing, 2013	☐
Further	R. Lachman, J. L. Lachman and E. C. Butterfield, Cognitive Psychology and Information Processing: An Introduction, Psychology Press; 22 Dec. 2015	☒
Further	Smith, S.C.H, Academic Presentations: EAP Foundation, Evident Press, 2018	☒

MODULE CODE: ACDA6017
TITLE: OME Major Project
DATED: 15/08/2018

LEVEL: 6
CREDITS: 40

JACS CODE: H610

AIM(S)

- To provide an opportunity for the student to develop and demonstrate their ability to manage a significant project of their own choice, related to the major themes of their chosen course.

LEARNING OUTCOMES

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

- Critically evaluate technical and other literature and to apply the evidence gathered in order to solve a complex problem
- Demonstrate a professional and systematic approach to the solution of complex problems
- Demonstrate high level professional skills to present information both orally and in a written form
- Demonstrate the ability, as an individual, to plan a complex project and to produce a convincing artefact as a solution to the problem
- Understand and effectively apply the legal ethical and professional issues in the development of a project

INDICATIVE CONTENT

- Overview of research and development methodologies suitable for student projects.
- Overview of common statistical techniques
- Visualisation of different data types
- Ethical issues
- Sustainability issues
- Establishing and justifying metrics, analysis of test results e.g. including software benchmarking,
- Contingency planning
- Development of documentation for academic projects
- Presentation of work produced to an academic audience
- Subject-specific content as required

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	25	6%
Independent learning	375	94%
Placement learning	0	0%
TOTAL	400	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	Project Proposal (1000 words)	10%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Presentation	Presentation and Q&A (10mins & 10mins)	10%

Assessment Component 3

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	Dissertation (8000 words)	75%

Assessment Component 4

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Exhibition Board	N/A	5%

The OME Major Project module deviates from the standard assessment recommendations given in the quality handbook due to its special role within the programme. This module has been developed and perfected over many years and it was found that without several levels of intermediate assessment then students tended to fall behind on this module. The inclusion of the exhibition board was included to boost the employability skills of graduates which is presented to invited employers at the annual graduation show.

Assessment Summary

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

READING LIST

Module Code	ACDA6017	
Module Title	OME Major Project	
Classification	Reading List entry	Electronic*
Essential	Avison, D. and Fitzgerald, G. (2007), <i>Information Systems Development: Methodologies, Techniques and Tools</i> , 4 th Edition McGraw-Hill: Maidenhead.	☒
Essential	Kranzler, J.H. (2017) <i>Statistics for the Terrified</i> , 6 th Edition , Rowman & Littlefield, Lanham.	☒
Essential	McCormac, C and Davis, J. (2012) <i>Research Project Success: The Essential Guide for Science and Engineering Students</i> . RSC Publishing, Cambridge	☒
Essential	O'Leary, Z. (2013) <i>The Essential Guide to Doing Your Research Project</i> , 3 rd Edition, SAGE Publications Ltd	☒
Essential	Saunders, M., Lewis, P. and Thornhill, A. (2015), <i>Research Methods for Business Students</i> , 7 th Edition FT/Prentice Hall: Harlow	☒
Further	Baase, S. (2012), <i>A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition</i> , 4 th Edition Pearson: NY	☒
Further	Collis, J. and Hussey, R. (2014) <i>Business Research: a Practical Guide for Undergraduate and Postgraduate Students</i> , 4 th Edition, Palgrave Macmillan: Basingstoke	☒
Further	Cottrell, S.(2017) <i>Critical Thinking Skills: Developing Effective Analysis and Argument</i> , Palgrave Study Guides, 3 rd Edition, Palgrave Macmillan: Basingstoke	☒
Further	Davies, M. B. and Hughes, N. (2014) <i>Doing a Successful Research Project: Using Qualitative Or Quantitative Methods</i> . 2 nd Edition, Palgrave Macmillan: Basingstoke	☒
Further	Dawson, C.W. (2015) <i>Projects in Computing and Information Systems: a Student's Guide</i> , 3 rd Edition Pearson Higher Education	☐
Further	Denscombe, M (2015) <i>The Good Research Guide</i> , 5 th Edition OU Press: Buckingham	☒

Further	Few, S (2012) <i>Show Me the Numbers: Designing Tables and Graphs to Enlighten</i> , Analytics Press: Burlingame.	☐
Further	Quinn, M. J. (2016) <i>Ethics for the Information Age: International Edition</i> , 7 th Edition, Pearson: NY	☐
Further	Yin, R K, (2013) <i>Case Study Research: Design and Methods</i> , 5 th Edition, Sage: Beverly Hills.	☐

Module Code	ACDA6019
Title	Advanced Radio Frequency Systems
Date	13/10/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To develop in depth knowledge and understanding of RF transmission systems, and their uses in various communication systems.

LEARNING OUTCOMES

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

- Synthesise and critically evaluate RF transmission and reception systems through the use of simulation software
- Critically analyse RF antenna systems and their suitability to given applications.

INDICATIVE CONTENT

- Antenna theory
- Common antenna radiation patterns
- Waveguides
- S Parameters
- Impedance matching, maximum power transfer, Standing wave ratio
- Transmission line theory

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
Lab report	2,500 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	ACDA6019	
Module Title	Advanced Radio Frequency Systems	
Classification	Reading List entry	Electronic*
Essential	Huang, Y. and Boyle, K. (2008) Antennas from Theory to Practice, John-Wiley & Sons Ltd	☐
Essential	Kraus, J. and Fleisch, D. (2010) Electromagnetics with Applications, 5 th Edition, McGraw-Hill	☐
Essential	Collins, T.F., Getz, R., Pu, D. and Wyglinski A. M. (2018) Software-Defined Radio for Engineers, Artech House	☐
Further	Grayver, E. (2013) Implementing Software Defined Radio, Springer	☐
Further	Bird, J. (1997) Electrical Circuit Theory & Technology, Newnes	☐

Module Code	ACDA6020
Title	Advanced Chemistry of OME
Date	17/08/2022
Level	6
Credits	20
Pre-Requisites	Chemistry (OME)

AIM(S)

- To build on the concepts introduced in the level 4 Chemistry (OME) module. Expanding and extending ideas developed, introducing more detailed explanation of the chemical principles associated with the functioning of OME devices. Introduction of the concepts of materials chemistry and effects.

LEARNING OUTCOMES

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

- Critically analyse concepts of heat and thermodynamics, to explain the chemistry of solid phases and their interaction with other phases.
- Demonstrate a detailed understanding of reaction chemistry, ranging from complex chemical reactions to chemical compatibility of OME components.
- Analyse critically the design of chemical components for the lifetime of an OME system or device, from manufacture, through storage, use and/or disposal.

INDICATIVE CONTENT

- Advanced chemical reactions and chemical kinetics.
- Advanced System Thermodynamics and energy release.
- Materials chemistry – states of matter, phase transformations, polymers, crystals, glasses.
- Mechanical properties of the solid state.
- Chemical compatibility and testing methods.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	6,000 words equivalent Group Presentation, Lab Report and Practical	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA6020	
Module Title	Advanced Chemistry of OME	
Classification	Reading List entry	Electronic*
Essential	Akhavan, J. (2022) <i>The Chemistry of Explosives: Edition 4</i> , Cambridge : Royal Society of Chemistry	☒
Essential	JSP 333: <i>Services textbook of explosives</i> , (2020) Ministry of Defence.	☒
Further	Atkins, P. (2010) <i>The Laws of Thermodynamics: a Very Short Introduction</i> , Cambridge : Royal Society of Chemistry	☐
Further	Atkins, P., de Paula, J. and Keeler, J. (2017) <i>Atkins' Physical Chemistry</i> , Cambridge : Royal Society of Chemistry	☐
Further	Carrington, G. (1994) <i>Basic Thermodynamics</i> , Cambridge : Royal Society of Chemistry	☐
Further	Scott, S.K. (1995) <i>Beginning Mathematics for Chemistry</i> , Cambridge : Royal Society of Chemistry	☐
Further	Pilling, M.J. and Seakins, P.W. (1995) <i>Reaction Kinetics</i> , Cambridge : Royal Society of Chemistry	☐
Further	Agrawal, J.P. (2010) <i>High Energy Materials</i> , New Jersey : John Wiley	☐
Further	Klapötke, T. M. (2017) <i>Chemistry of High Energy Materials</i> , Berlin : de Gruyter	☐
Further	Maytas, R. and Pachman, J. (2013) <i>Primary Explosives</i> , New York : Springer	☐
Further	Janssen, T.J. (2011) <i>Explosive Materials: Classification, Composition and Properties</i> , Hauppauge, NY : Nova Science Publishers	☐
Further	Wayne, R.P. (1994) <i>Chemical Instrumentation - Oxford Chemistry Primers</i> , Oxford : OUP	☐
Further	Metcalfe, I.S. (1997) <i>Chemical Reaction Engineering, a First Course - Oxford Chemistry Primers</i> , Oxford : OUP	☐

Further	Lawrence, N., Wadhawan, J. and Compton, R. (1999) <i>Foundations of Physical Chemistry: Worked Examples - Oxford Chemistry Primers</i> , Oxford : OUP	☐
Further	Ritchie, G. and Sivia, D.S. (2000) <i>Foundations of Physics for Chemists - Oxford Chemistry Primers</i> , Oxford : OUP	☐
Further	Sivia, D.S. and Rawlings, S.G. (1999) <i>Foundations of Science Mathematics - Oxford Chemistry Primers</i> , Oxford : OUP	☐
Further	Sivia, D.S., Rawlings, S.G. (1999) <i>Foundations of Science Mathematics, Worked Problems - Oxford Chemistry Primers</i> , Oxford : OUP	☐
Further	Winterton, R.H.S. (1997) <i>Heat Transfer - Oxford Chemistry Primers</i> , Oxford : OUP	☐
Further	Brouard, M. (1998) <i>Reaction Dynamics - Oxford Chemistry Primers</i> , Oxford : OUP	☐

Module Code	ACDA6021
Title	Data Capture and Evaluation
Date	17/08/2022
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To explore and evaluate the methods of data capture used during any OME research & development and test & evaluation activity. Use the appropriate range of tools and techniques to determine product performance to specification or support gathering fundamental science and technologies.

LEARNING OUTCOMES

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

- Demonstrate an in-depth knowledge in using range of tools and techniques to capture an OME event.
- Demonstrate a critical understanding and knowledge of data, capturing and analysing to determine product performance within OME field.

INDICATIVE CONTENT

- Major categories of qualitative data collection techniques
- How to evaluate and trust qualitative or quantitative data
- Standardisation, normalisation and filtering methods
- Describe recording equipment, oscilloscopes, data loggers, amplifiers, etc.
- Software for statistical analysis and data visualisation
- Evaluate monitoring techniques; blast gauges, high speed cameras, doppler radar, etc
- Time bases, sample rates / bit rates and sampling frequency (Nyquist)
- define the criteria for determining the validity of research
- 3D data scanning for inspection and test, data handling

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA6021	
Module Title	Data Capture and Evaluation	
Classification	Reading List entry	Electronic*
Essential	Kinney, G. (1985) <i>Explosive Shocks in Air</i> eISBN 978-3-642-86682-1	☐
Essential	Cooper, P. W. (2013) <i>Explosives Engineering</i> New York : Wiley VCH	☐
Essential	Mader, C. (1998) <i>Numerical Modelling of Explosives and Propellants 3rd ed</i> eISBN 978-1-4200-5239	☐
Essential	Zucas, J. A. and Walters, W. P. (1997) <i>Explosive Effects and Applications</i> New York : Springer - ISBN 978-0-387-955582	☐
Further	Needham, C. E. (2010) <i>Blast Waves</i> eISBN 978-3-642-05288-0	☐
Further	Spiegelhalter, D. (2019) <i>The Art of Statistics: Learning from Data</i> Manhattan : Penguin Random House	☒

Further	Spence, R. (2006) <i>Information Visualization: Design for Interaction</i> New Jersey : Prentice Hall	☐
Further	Loth, A. (2019) <i>Visual Analytics with Tableau</i> , New Jersey : John Wiley	☒
Further	Bourne, N. (2013) <i>Materials in Mechanical Extremes</i> Cambridge : CUP ISBN 978-1-10702375-8	☐
Further	Lillesand, L., Kiefer, R. and Chipman, J. (2015) <i>Remote Sensing and Image Interpretation</i> New Jersey : John Wiley	☐
Further	Persson, P-A., Hilmberg, and Lee, J. <i>Rock Blasting and Explosives Engineering</i> (1993) Boca Raton : CRC Press ISBN 0-8493-8978-X	☐
Further	Suceska, M. (1995) <i>Test Methods for Explosives</i> New York : Springer ISBN 978-1-4612-69045	☐

Module Code	ACDA6022
Title	OME Safety Management and Legislation
Date	17/08/2022
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To provide a comprehensive and systematic knowledge of explosives safety, legislation and regulations and its impact on OME design.

LEARNING OUTCOMES

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

- Comprehensively interpret and communicate the legal requirements for explosives legislation.
- Critically evaluate key safety and security requirements for the design, manufacture, transport and storage of explosives.

INDICATIVE CONTENT

- Explosives authorisations and licensing
- Building construction and type
- Impact of legislation on OME design
- Separation Distances and structural Justifications
- Safety requirements
- Security provisions
- Storage and transport

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

(Tick one)

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Case Study/Incident Investigation Report	6,000 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACDA6022	
Module Title	OME Safety Management and Legislation	
Classification	Reading List entry	Electronic*
Essential	Explosives Regulations 2014 (amendment) Regulations 2016 (ER 2014)	☒
Essential	ER2014 Guidance on Regulations - Safety Requirements L150	☒
Essential	ER2014 Guidance on Regulations - Safety Provisions L150	☒
Further	JSP 333: <i>Services textbook of explosives, Ministry of Defence</i> , 2020	☒
Further	DSA02 – DNSR Defence Nuclear Safety Regulations of the Defence Nuclear Enterprise (May 2021), Ver 1.0	☒
Further	DSA03 – DNSR Defence Nuclear Safety Regulations of the Defence Nuclear Enterprise - Guidance (May 2021), Ver 1.0	☒

MODULE CODE: M6X01111
TITLE: User Experience Design
DATED: 03/06/2014

LEVEL: 6
CREDITS: 20

JACS CODE: I140

AIM(S)

- To support students in the development of pervasive and engaging user experiences, in particular those focussed on media-rich multi-modal interaction with ubiquitous and personal computing devices. Students will gain experience of prototyping and testing of single-user and multi-user interactions within a web environment.

LEARNING OUTCOMES

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

1. Critically reflect upon current design practice, selecting appropriate techniques and technologies for a wide range of interactions.
2. Research user needs within both personal and social interactivity spheres for unconstrained problems.
3. Select and apply appropriate UX methodologies and good practices to prototype innovative interaction within a social context.
4. Critically analyse and reflect upon the results of UX testing.

INDICATIVE CONTENT

- Principles and techniques of UX/user-centred design; best practices; criticisms
- Human beings; ergonomics, psychophysics, psychology, perception and cognition
- UX Elements; visual design, information architecture, interaction design, usability, multimodality
- Interaction requirements; social and emotional requirements; single-user and multi-user interactions
- Prototyping, modeling, patterns, personae; scenarios; gamification
- UX testing; designing and running testing workshops

LEARNING AND TEACHING STRATEGY

Essential concepts and principles will be delivered formally in lectures supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study driven examples will be explored in detail to accentuate best-practice and practically explore issue resolution.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	
TOTAL	200	100%

ASSESSMENT

Description of each assessment component and its weighting, together with an example for new forms of assessment:

Assessment Component 1 – Written - 30%

Critically review the physiological and psychological requirements of UX design.

Exemplar: 'For two of the given case study examples, critically review, compare and contrast the physiological and psychological requirements placed upon the user by the two examples. Identify any problems that are raised by these examples and suggest solutions for them that are applicable to both ordinary- and extraordinary users.'

Assessment Component 2 – Coursework - 70%

Perform extensive UX testing on applications and devices to produce reports that critically evaluate their strengths and weaknesses and provide recommendations for further improvement.

Exemplar:

'For any two of the mobile devices listed, perform a professional-level usability analysis of two of the applications listed. This analysis should consider task analysis, heuristic analysis and scenario-based user testing, and should critically compare the usability of the different versions of the software. Potential problems should be identified and creative solutions suggested for these based upon your knowledge of both theoretical principles and current design practices.'

Assessment Summary

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

BIBLIOGRAPHY

Essential

Beynon, D. (2013), *Designing Interactive Systems (3rd Ed.)*. Pearson.

Krug, S. (2013), *Don't Make me Think Revisited*. Voices That Matter.

Norman, D. (2013), *The Design of Everyday Things (revised and expanded edition)*. MIT Press.

Background

Caddick, R. and Cable, S. (2011), *Communicating the User Experience: A Practical Guide for Creating Useful UX Documentation*. Wiley.

Garrett, J.J. (2010), *The Elements of User Experience*. Voices That Matter

Kumar, J.M. and Herger, M. (2013), *Gamification at Work: Designing Engaging Business Software*. The Interaction Design Foundation.

Soegaard, M and Dam, R.D. (Eds.) (2013), *Encyclopedia of Human-Computer Interaction* (2nd Ed). The Interaction Design Foundation.

Unger, R. and Chandler, C. (2012), *A Project Guide To UX Design*. Voices That Matter.

Journals

ACM Transactions on Computer-Human Interaction

ACM Transactions on Graphics

IEEE Explore

IEEE Spectrum

IEEE Transactions on Human-Machine Systems

IEEE Transactions on Systems, Men and Cybernetics

IEEE Transactions on Visualisation and Computer Graphics

Websites

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

<http://www.usability.gov/>

<http://www.interaction-design.org/>

MODULE CODE:	M6X01898
TITLE:	SFDM Major Project Stage 1
DATED:	26/01/2016
LEVEL:	6
CREDITS:	20
JACS CODE:	W600

AIMS

Stage 1 of the Major Project offers the student an opportunity to thoroughly research a problem area and to communicate that information with intended solutions to an audience in a manner that reflects practices and standards found in industry.

LEARNING OUTCOMES (Stage 1)

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

- Identify and critically evaluate an intellectually challenging idea that would be appropriate for their Major Project.
- Communicate effectively the research areas, design solutions, technical requirements, and overall specification relevant to their Major Project idea, using contemporary methods and techniques.

INDICATIVE CONTENT

- Project definition.
- Research opportunities, methods, and techniques.
- Project synopsis.
- Project treatment.
- Project planning.
- Target audience identification and user expectation.
- Further development in project design or definition such as test recordings, proof of concept demos, scripts, real or virtual models, storyboards, etc.
- Audio-visual communication techniques.
- Specific to the student's research needs, with advice and support from specialist academic staff.

LEARNING AND TEACHING STRATEGY

Introductory lectures will delineate the indicative content above, encouraging the depth of research and development necessary for a project of this size, duration and level. The material specific to the student's individual research needs will be addressed through a scheduled programme of one-to-one tutorials.

Activity type	Hours	Percentage
Scheduled learning	24	12
Independent learning	176	88
Placement learning		
TOTAL	200	100%

ASSESSMENT

Assessment Component 1 – Practical: Oral Presentation (50%)

Exemplar. Each student presents his/her proposal in a manner that simulates a 'pitch' in industry, where the student formally presents all the research and preparatory work together with a detailed indication of intent for the following stages.

A minimum of two, but normally three lecturers are present for the assessment. The presentation lasts twenty minutes with a further ten minutes to explore the proposal more fully by questions and answers. After the student has left the room, another ten minutes are allocated for the lecturers to discuss and allocate appropriate grades.

Assessment Component 2 – Coursework: Essay (50%)

Exemplar. An in-depth and analytical study of an area of research associated with the individuals chosen subject or area of interest. Approx. 3000 words.

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 subject-specific 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 provide the skills the individuals need to know in terms of working, learning, and thriving in a future which is as yet unknown. Boud. D, Assessment 2020: <i>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	

BIBLIOGRAPHY

Project-specific texts determined in conjunction with supervisors.

MODULE CODE: M6X02056
TITLE: Advanced Character Animation
DATED: 24/11/2015

LEVEL: 6
CREDITS: 20

JACS CODE: W615

AIM(S)

- To support the other (practical) work conducted at Level 6 by heightening and extending the student's character animation skills and techniques within the context of emerging trends and innovations in the animation industry.
- To formulate effective 3D strategies and industry-facing methods in advancing the visual components that aid in designing both realistic and stylistic-based sequences.

LEARNING OUTCOMES

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

- Critically analyse and cultivate their animation ability to high-end levels of character performance and/or realism.
- Select, evaluate and employ industry method processes, trends, techniques and production environments to progress their own developing animation skillset.

INDICATIVE CONTENT

Content will be largely dependent upon the student's own self-directed specialist area as they select their course of character animation investigations to develop practical character/story-based animated demonstrations of their research findings.

The module will initially task the graduate students to define the animation being analysed and the research and practical parameters to the studies of the scene/purpose/animation to be conducted. Research methodology and identifiable (and feasible) techniques will be encouraged within the 3D animation/character subject.

Planning and development of the animated examples – together with reviews of the findings will continue through the module.

It is expected that topics to be considered may isolate technical and/or artistic categories specific to the student's research needs, with advice and support from specialist academic staff, but expected to be within one of the following:

- Generalist and specialist Animator/Lead Animator/Story dept. roles
- Animation production and pipeline considerations
- Progression of animation specialisms in:

- Pre-production and Concept design
- Character animation
- 3D Character deployment
- Principles of animation
- Use of technology to benefit animation workflows
- Story design and evocation
- Story mechanics
- Rigging
- Effects Animation

LEARNING AND TEACHING STRATEGY

This module offers the student the opportunity to conduct self-directed and in-depth research into a specialist 3D effects area relevant to the programme of study. The resulting artefact will be based upon an understanding of contemporary and novel software techniques in the 3D computer animation/film/visual effects industries.

Students will (initially) be given a series of software and technical demonstrations in contemporary 3D animation developments, to illustrate and acquire knowledge at the forefront of the 3D computer animation discipline. This will be contextualised within industrial roles and production processes in both lecture and seminar format. Guest industry speakers and or tours can take place as appropriate in conjunction with this module.

Students will also engage in tutorials with the tutor, designed to identify and support their particular goals in professional development and specialisms within 3D effects and computer animation.

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

Assessment Component 1 – Coursework (practical) 100%

Exemplar

The final submission will be a single or series of innovative self-directed animations (to total some 20-30 seconds) derived from their studies into a relevant CG subject. This may be packaged as a technical document, blog, research paper, online tutorial, but whatever the presentation form it will need to contain animated examples or representations in 3D in support of the topic considered.

Assessment Summary

Activity type	Percentage
Written exam	
Coursework	100%
Practical	
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 subject-specific 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 provide the skills the individuals need to know in terms of working, learning, and thriving in a future which is as yet unknown. Boud. D, Assessment 2020: <i>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	

BIBLIOGRAPHY

Recommended

Project-specific texts, sites, files determined in conjunction with module tutor(s).

It is anticipated that students would want to study/refer to some of the following, for Character Animation students, to begin:

- | | |
|---------------------|---|
| KELLER E. (2013) | <i>Maya Visual Effects: The Innovator's Guide</i> , John Wiley & Sons. |
| OSIPA, J., (2010) | <i>Stop Staring: Facial Modelling and Animation Done Right</i> , John Wiley & Sons |
| CHOPINE, AMI (2011) | <i>3D Art Essentials: The Fundamentals of Modelling, Texturing and Animation</i> , Focal Press |
| ROBERTS, S. (2004). | <i>Character Animation in 3D: Use traditional drawing techniques to produce stunning CGI animation</i> , Focal Press. |
| O'HAILEY, T. (2013) | <i>Rig it Right! Maya Animation Rigging Concepts</i> Focal Press |

SAWICKI, M. (2007)

*Filming the Fantastic: A Guide to Visual Effects
Cinematography*, Focal Press

Journals

Project-specific publications determined in conjunction with module tutor(s).

Websites

Project-specific sites and supporting files determined in conjunction with module tutor(s).