



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

MODULE DIRECTORY

LEVEL 5

COMPUTING

WALES INSTITUTE OF SCIENCE & ART

2021-2022

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INTRODUCTION

This Module Directory includes all the modules for Level 5 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	ACCA5023
Title	Network Operating Systems and Services
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a sound understanding of the concepts, principles, skills and techniques required to manage and deploy network resources in a Network Operating Systems environment, e.g. Windows, or Linux.

LEARNING OUTCOMES

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

- Apply a systematic understanding of network operating system environments to deploy, manage and maintain critical network services and resources.
- Analyse a given network to produce suitable security audit/disaster recovery strategy, working individually and as part of a team.

INDICATIVE CONTENT

- Overview of Directory Services.
- Directory Services administration, e.g. user, computer accounts, group accounts.
- The name resolution process.
- Deployment, configuration and testing of a Domain Name System (DNS) server.
- Dynamic Host Configuration Protocol (DHCP) and its relevance to network deployment.
- Deployment, configuration and testing of a Dynamic Host Configuration Protocol (DHCP) server.
- Identification of the risks and threats to the security of resources and data (digital and physical).
- Disaster prevention and recovery methods.
- Principles and common levels of Redundant Array of Inexpensive Disk (RAID) arrays, e.g. 0, 1, 5, 6, 10.
- Virtualisation.
- Failover clustering and associated principles, e.g. quorum-based decision-making.
- Network load balanced clustering.

- Monitoring programs: use of network monitoring and management tools/protocols.
- Network penetration testing as pertains to the services explored.
- Legal, social and ethical issues.

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	2500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Coursework	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5023	
Module Title	Network Operating Systems and Services	
Classification	Reading List entry	Electronic*
Essential	Bekim Dauti (2019) Windows Server 2019 Administration Fundamentals: A beginner's guide to managing and administering Windows Server environments, 2nd Edition. Packt Publishing	☐
Essential	Evi Nemeth et al. (2017) UNIX and Linux System Administration Handbook. Addison Wesley	☐
Further	ACM	☒

Further	IEEE	☒
Further	Computer Networking	☒
Further	Data Communications	☒

Module Code	ACCA5024
Title	Advanced Networking
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide the student with a systematic knowledge of OSI reference model and TCP/IP protocol model. Students will gain a detailed understanding of the various hardware devices used in modern network design and will understand the essential technical principles of protocols used in various layers of OSI model and IP Addressing.

LEARNING OUTCOMES

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

- Demonstrate a knowledge and understanding of network principles and protocols used in OSI and TCP/IP model.
- Implement simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

INDICATIVE CONTENT

- Networking today
- Understanding devices used to implement networks
- Protocols and standards
- OSI and TCP/IP models and layers
- IPv4 and v6 addressing
- Design and implementing networks using routers and switches
- Testing and troubleshooting
- Fundamentals of network security

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 work as in-class tests or as a workshop journal.	75%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Online test	1 hour	25%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5024	
Module Title	Advanced Networking	
Classification	Reading List entry	Electronic*
Essential	Introduction to Networks v6 Companion Guide by Cisco Networking Academy (2016), Cisco Press	☒
Essential	www.netacad.com username and password required	☒
Further	W Odom (2019) CCNA 200-301 Official Cert Guide Library, Cisco Press part of the Official Cert Guide series	☒

Module Code	ACCA5025
Title	Cloud Computing Architecture
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a systematic understanding of the principles underlying the architecture of cloud computing infrastructure and the deployment of applications within that infrastructure.

LEARNING OUTCOMES

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

- Demonstrate an understanding of virtualisation for the deployment of applications.
- Critically evaluate a cloud computing infrastructure, within the context of “as a Service” applications.

INDICATIVE CONTENT

- Virtualisation principles and best practice.
- Virtual machines and virtual networks.
- Type 1 hypervisors, e.g. Hyper-V.
- “as a Service” cloud-based models, e.g.:
 - Infrastructure as a Service
 - Platform as a Service
 - Software as a Service
- Introductory containerisation.
- Web Service design and deployment.

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
Practical + Report	2500 words equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5025	
Module Title	Cloud Computing Architecture	
Classification	Reading List entry	Electronic*
Essential	Stephen Orban. Ahead in the Cloud: Best Practices for Navigating the Future of Enterprise IT. 2018, CreateSpace	☒
Essential	Thomas Erl, Robert Cope, Amin Naserpour. Cloud Computing Design Patterns. 2017, Prentice Hall	☐
Further	ACM	☒
Further	IEEE	☒
Further	Computer Networking	☒
Further	Data Communications	☒

Module Code	ACCA5026
Title	Databases and Application Development
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a systematic understanding of the concepts underlying the design and development of databases and data applications for real-world problems.

LEARNING OUTCOMES

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

- Critically evaluate the concepts, technologies and techniques used in the design and development of databases and data applications.
- Select and deploy appropriate concepts, technologies and techniques to design and implement database solutions and backend data applications for real-world problem scenarios.

INDICATIVE CONTENT

- Relational database concepts e.g. data independence, normalisation techniques, transaction management.
- Database query languages e.g. Structured Query Language (SQL).
- NoSQL and NewSQL database concepts.
- Data models e.g. entity-relationship, object-oriented, object-relational, and NoSQL models.
- Software programming languages, development libraries, frameworks, object-oriented design methods, design patterns, and architectural models for data applications.
- Data access, management and manipulation techniques, options for preserving data and dynamic data content, and displaying data user interfaces and views.
- Security, authorisation and authentication measures in databases and data applications.
- Testing, debugging, and evaluation techniques and tools.

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	6 - 8 elements	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5026	
Module Title	Databases and Application Development	
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	Joshi, B., 2019, <i>Beginning Database Programming Using ASP.NET Core 3: With MVC, Razor Pages, Web API, jQuery, Angular, SQL Server, and NoSQL</i> , Apress	☒
Further	Freeman, A., 2020, <i>Pro ASP.NET Core 3: Develop Cloud-Ready Web Applications Using MVC 3, Blazor, and Razor Pages</i> , 8 th Edition, Apress	☒
Further	Lock, A., 2018, <i>ASP.NET Core in Action</i> , Manning Pub	☒
Further	Kleppmann, M., 2017, <i>Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems</i> , O'Reilly Media	☒
Further	Sharp, J., 2018, <i>Microsoft Visual C# Step by Step</i> (9th Edition), Microsoft Press	☒
Further	Troelsen, A., Japiske, P., 2017, <i>Pro C# 7: With .NET and .NET Core</i> , 8 th Edition, Apress	☒

Module Code	ACCA5027
Title	Geographical Information Systems
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To introduce the student to the science technology and management of geographical information. The student should develop a critical understanding of the underlying theories of GIS through examination of current GIS software trends. A coherent understanding of geovisualisation is regarded as a key concept and will be developed throughout the module.

LEARNING OUTCOMES

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

- Evaluate and critically appraise a variety of application areas, which could benefit from a GIS solution.
- Demonstrate a conceptual understanding of visual perception and communications.
- Accurately identify spatial databases and understand the concepts of manipulating and representing spatial data solutions.

INDICATIVE CONTENT

- Identifying types of data involved in Geo-information systems including DIGIMAP.
- Fundamental theories of spatial databases and spatial analysis including SQL.
- Geovisualisation and cartographic representation of sociodemographic data.
- The principles of thematic mapping and attributes of spatial data sets.
- Evaluating usage of GIS within the organisations including location-based services, location intelligence and epidemiology studies.
- Using appropriate GIS software for data analysis.
- Development of end user GIS applications

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Research Report	2500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report / Demo	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5027	
Module Title	Geographical Information Systems	
Classification	Reading List entry	Electronic*
Essential	Longley, P, Goodchild, M, Maguire, D, Rhind, D (2015) <i>Geographical Information Systems and Science</i> , Wiley	☒
Essential	Heywood, I., Cornelius, S. and Carver, S. (2011) <i>An Introduction to Geographical Information Systems</i> , Prentice Hall	☒
Further	Daniel, L., Loree, P. and Whitener, A. (2002) <i>Inside MapInfo Professional</i> , Onward Press,	☐
Further	Worboys, M. and Duckham, M. (2004)	☐
Further	Whitener, A. (1997) <i>MapBasic Developers Guide</i> , Onword Press	☐
Further	http://www.mapinfo.co.uk	☒
Further	http://www.agi.org.uk/	☒
Further	http://www.ordnancesurvey.co.uk/oswebsite/	☒
Further	http://ukdataservice.ac.uk/	☒
Further	http://digimap.edina.ac.uk/digimap/home	☒

Module Code	ACCA5028
Title	Indie Game Development
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To synthesise software development concepts and the principles and techniques of games development with the aim of producing an independent (indie) game artefact.

LEARNING OUTCOMES

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

- Develop a systematic understanding of the principles, concepts, and techniques used in the development of games.
- Synthesise and deploy appropriate technologies, software programming techniques, design patterns, frameworks, and games engine platforms in the development of indie games.

INDICATIVE CONTENT

- Fundamentals of games development, such as concept development, gameplay design, core mechanics, user interfaces, game characters, storytelling, AI techniques, etc.
- Games development engines, e.g. Unity, Unreal, for developing cross-platform and mobile games.
- Frameworks and software design patterns for common problems in games development.
- Data persistence techniques for saving and loading data between sessions in games, e.g. JSON, serialisation and deserialization.
- Testing, debugging, and evaluation. Optimisation and performance 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

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	6 - 8 elements	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5028	
Module Title	Indie Game Development	
Classification	Reading List entry	Electronic*
Essential	Adams, E., 2013, <i>Fundamentals of Game Design</i> , 3 rd Edition, New Riders	☒
Essential	Bond, J. B., 2017, <i>Introduction to Game Design, Prototyping, and Development: From Concept to Playable Game with Unity and C#, 2nd Edition</i> , Addison-Wesley Professional	☒
Essential	Hocking, J., 2018, <i>Unity in Action: Multiplatform game development in C#, 2nd Edition</i> , Manning Publications	☒
Further	Nystrom, R., 2014, <i>Game Programming Patterns</i> , Genever Benning	☒
Further	Baron, D., 2019, <i>Hands-On Game Development Patterns with Unity 2019: Create engaging games by using industry-standard design patterns with C#, Packt Publishing</i>	☒
Further	Daglow, D. L., 2018, <i>Indie Games: From Dream to Delivery</i> , Sausalito Media LLC	☒
Further	Chandler, H. M., Chandler, R., 2010, <i>Fundamentals of Game Development</i> , Jones & Bartlett Learning	☐
Further	Felicia, P., 2019, <i>Unity from Zero to Proficiency (Beginner): A Step-by-step guide to coding your first game</i>	☒

Module Code	ACCA5029
Title	Network Programmability
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To give students the ability to work with network programmability and automation tools, with a further focus on software devops.

LEARNING OUTCOMES

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

- Demonstrate a robust understanding of the key principles of network programmability tools and languages to solve specific problems.
- Apply appropriate analysis, design, implementation and testing techniques for programming and automation of network devices.

INDICATIVE CONTENT

- Configuration management and orchestration tools, e.g. Chef, Puppet, Ansible, Saltstack, Terraform, Pulumi.
- Principles and practice of Infrastructure as Code (IaC).
- Key scripting languages for network programmability, e.g. Python, JavaScript, Bash, PowerShell.
- Software design principles for network engineers: devops, continuous integration, source control, etc.
- Necessary auxiliary technologies for network programmability, e.g. Linux, Mako, Ruby, XML, JSON, YAML.
- Data modelling languages, e.g. YANG.
- API programming for networking and automation, e.g. the NAPALM library.
- Programming for IoT implementation

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Implementation + report	2500 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5029	
Module Title	Network Programmability	
Classification	Reading List entry	Electronic*
Essential	Jason Edelman, Scott S. Lowe, Matt Oswalt. Network Programmability and Automation: Skills for the Next-Generation Network Engineer. 2018, O'Reilly Media	☐
Essential	Kief Morris. Infrastructure as Code: Managing Servers in the Cloud. 2016, O'Reilly Media	☐
Further	Betsy Beyer, Jennifer Petoff, Chris Jones, Niall Richard Murphy. Site Reliability Engineering. 2016, O'Reilly	☐
Further	Sam Washington & M.O Faruque Sarker. Learning Python Network Programming 2015, Packt Publishing	☐
Further	ACM	☒
Further	IEEE	☒
Further	Computer Networking	☒
Further	Data Communications	☒

Module Code	ACCA5030
Title	Software Engineering Principles and Testing
Date	09/09/2020
Level	5
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 testing of software.

LEARNING OUTCOMES

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

- Evaluate software development approaches, software development methodologies, software design techniques and approaches for collaborative working
- Recognise the importance of software testing and demonstrate knowledge of the essential principles of test development
- Apply effective judgement in the selection and deployment of software development principles and techniques in the implementation of 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 quality and complexity e.g. coding standards, Cyclomatic complexity
- Software development tools e.g. UML design tools, code coverage tools, software configuration management (SCM)
- Essential software testing principles and concepts e.g. Black Box vs White Box, Unit Testing
- Software test frameworks
- Software design principles and patterns e.g. cohesion vs coupling, Decorator Pattern

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	ACCA5030	
Module Title	Software Engineering Principles and Testing	
Classification	Reading List entry	Electronic*
Essential	Sommerville, I. (2015), Software Engineering, , Pearson	☒
Essential	Ammann, P., Offutt, J., (2016) Introduction to Software Testing, 2 nd Edition, Cambridge University Press	☒
Further	Gamma, E., Helm, R. Johnson, R., Vlissides, J., (1994), Design patterns : elements of reusable object-oriented software, Addison Wesley	☒
Further	Crispin, L., (2008), Agile Testing: A Practical Guide for Testers and Agile Teams, Addison-Wesley	☒
Further	Martin, R., (2008), Clean Code: A Handbook of Agile Software Craftsmanship, Prentice Hall	☒
Further	Langr, J., (2013), Modern C++ Programming with Test-Driven Development: Code Better, Sleep Better, Pragmatic Bookshelf	☒
Further	Sutherland, J., (2015) Scrum: The Art of Doing Twice the Work in Half the Time, Random House Business	☒

Module Code	ACCA5031
Title	Web and Mobile Technologies
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a systematic understanding of web and mobile using client- and server-side technologies.

LEARNING OUTCOMES

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

- Evaluate the concepts, principles, technologies and techniques used in the development of web and mobile applications.
- Design and implement web and mobile applications using client- and server-side programming language(s) to resolve a range of problem scenarios.

INDICATIVE CONTENT

- Client-side scripting languages eg JavaScript
- Server-side programming languages eg PHP
- Syntax, semantics, constructs including data types, variables, operators, arrays, lists etc.
- Web-based database programming techniques providing typical CRUD functionality
- Reading and validating data from web forms eg cleaning data, string processing
- Handling stateless HTTP eg cookies, sessions
- Dynamic content eg time-driven events
- Use of web-based data for different audiences eg mobile applications
- Programming for mobile applications
- Use of cross-platform techniques for mobile applications
- The DOM

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	2000 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Coursework	2000 words equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5031	
Module Title	Web and Mobile Technologies	
Classification	Reading List entry	Electronic*
Essential	Welling, L. (2016) PHP and MySQL Web Development, 5th Edition, Addison Wesley	☐
Further	Nixon, R. (2016) <i>Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5</i> , 4 th Edition, O'Reilly Media	☐
Further	Snider, E (2019) <i>Mastering Xamarin.Forms: App architecture techniques for building multi-platform, native mobile apps with Xamarin.Forms 4</i> , 3rd Edition, Packt Publishing	☐
Further	Bennett, J (2018) <i>Xamarin in Action: Creating Native Cross-Platform Mobile Apps</i> , Manning Publications	☐

Module Code	ACCA5032
Title	Object Oriented Programming and Algorithms
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a conceptual understanding of abstract data types, data structures and algorithms used in web development and the ability to apply these concepts using object oriented (OO) development methods in web development scenarios

LEARNING OUTCOMES

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

- Critically evaluate the suitability of selected algorithms and data structures to solve given problems
- Develop OO solutions to solve a given problem scenario(s) often encountered in web development

INDICATIVE CONTENT

- Abstract data types (ADT)
- Simple data structures e.g. stacks, queues
- Complex data structures and algorithms e.g. lists, linked lists, heaps
- Graphs – properties and graph traversal
- Trees – properties, traversal, balancing
- Hashing
- Algorithms for sorting
- Algorithms for searching
- Containers and iterators
- Object oriented concepts e.g. classes, objects, encapsulation, inheritance and polymorphism
- Essential object oriented programming principles for web development

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 and Essay	2500 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	ACCA5032	
Module Title	Object Oriented Programming and Algorithms	
Classification	Reading List entry	Electronic*
Essential	Greene, J., Stellman, A., (2020) Head First C#, 4 th Edition, O'Reilly	☐
Essential	Cormen, T.H., Leiserson, C.E., (2009) Introduction to Algorithms, MIT Press	☒
Further	Weisfeld, M., (2018), The Object-Oriented Thought Process, Addison Wesley	☒
Further	Sharp, J., (2018), Microsoft Visual C# Step by Step, Microsoft Press	☐
Further	Sedgewick, R., (2011) Algorithms, 4th edition, Addison-Wesley	☐

Module Code	ACCA5033
Title	Changemakers: Creativity and Value Creation
Date	25/06/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To develop the concepts and practice of creativity and value creation for the development of innovative, aspiring and progressive solutions.

LEARNING OUTCOMES

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

- Demonstrate knowledge and critical understanding of innovation, creativity and enterprising mindset, recognising the values and the contribution creativity makes to the common good.
- Conceive, articulate and apply creative thinking within a work-based or academic context to develop novel solutions and/or value creation.

INDICATIVE CONTENT

- Creativity in theory and practice.
- Value creation in theory and practice.
- Creative and ethical leadership: skills and challenges.
- Driving innovation and change, the intra and entrepreneurial individual.
- Critical thinking, troubleshooting and problem solving, developing novel solutions.
- Information gathering for inspiration, vision creation and ideation.
- Developing the enterprising and data driven mindset.
- Contemporary technologies: virtual and augmented reality and artificial intelligence to enhance creativity and innovation.
- Time management practices for an entrepreneurial mindset.
- Being resourceful, in the context of making do with less.
- Reflection and self-reflection.

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
Online portfolio of set exercises	2,000 words or equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Assignment	2,000 words or equivalent	50%

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 subject area.

Module Code	ACCA5033	
Module Title	Changemakers: Creativity and Value Creation	
Classification	Reading List entry	Electronic*
Essential	Hargreaves, J., and Page, L. (2013) <i>Reflective Practice</i> . (Key Themes in Health and Social Care Series). Polity Press.	☒
Essential	Nardi, P.M. (2017) <i>Critical Thinking : Tools for Evaluating Research</i> . University of California Press	☒
Essential	Westerman, G., Bonnet, D. and McAfee, A., <i>Leading Digital: Turning Technology Into Business Transformation</i> . (Audiobook) Recorded Books. 2017.	☒
Further	Schiama, G. (2011) <i>Managing Knowledge Assets and Business Value Creation in Organizations : Measures</i>	☒

	<i>and Dynamics</i> Hershey, Pa.: Business Reference Service.	
Further	Rescher, N. (2014). <i>A System of Pragmatic Idealism, Volume II The Validity of Values, A Normative Theory of Evaluative Rationality</i> (Princeton Legacy Library). Princeton: Princeton University Press.	☒
Further	Turner, E. (2020) <i>Be Less Zombie: How great companies create dynamic innovation, fearless leadership and passionate people</i> . John Wiley & Sons.	☒

Module Code	ACCA5034
Title	Data Security and Compliance
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with the basic concepts and understanding about threats and vulnerabilities present in systems. They must learn how to use the information assets securely to support the goals and objectives of organisations through information security governance, risk management and regulatory compliance.

LEARNING OUTCOMES

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

- Understand the key issues associated with inspection, protection, detection of and reaction to threats to information assets.
- Provide an overview of the field of information security assurance, governance, policies, risk management and regulatory compliance.

INDICATIVE CONTENT

- Introduction to Information Security
- The Need for Security
- Legal, Ethical, and Professional Issues in Information Security
- Planning for Security
- Risk Management
- Regulatory Acts
- Security Governance Concepts, Principles, and Policies
- How does security governance interact with risk management?
- Security Technology: Access Controls, Firewalls, and VPNs
- Security Technology: Intrusion Detection and Prevention Systems and Other Security Tools
- Cryptography
- Physical Security
- Implementing Information Security
- Security and Personnel
- Information Security Maintenance

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	5,000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5034	
Module Title	Data Security and Compliance	
Classification	Reading List entry	Electronic*
Essential	Principles of Information Security, 6th Edition Michael E. Whitman Herbert J. Mattord Copyright 2018	☐
Essential	Ladley, J. (2012), Data Governance: How to Design, Deploy and Sustain an Effective Data Governance Program, Morgan Kaufmann, MA, USA.	☒
Essential	Plotkin, D. (2013), Data Stewardship: An Actionable Guide to Effective Data Management and Data Governance, Morgan Kaufmann, MA, USA.	☒
Further	CISSP Guide to Security Essentials, 2nd Edition. Peter H. Gregory, Copyright 2015. ISBN-10: 130584601X ISBN-13: 9781305846012	☒
Further	Information Security Governance: A Practical Development and Implementation Approach by Krag Brotby. ISBN: 978-1-118-58551-1. August 2017	☒
Further	Gregory, P.H. (2015) CISSP Guide to Security Essentials, 2nd Edition. Course Technology.	☒
Further	Quinn, M. J. (2015), Ethics for the Information Age: International Edition, Pearson: NY, 2015	☒

Further	Brotby, K. (2017), Information Security Governance: A Practical Development and Implementation Approach, Wiley.	☒
Further	IEEE/ACM, IEEE/ACM Transactions on Networking	☒
Further	IEEE, IEEE Network Magazine	☒
Further	Science Direct	☒
Further	Scopus	☒
Further	ACM Transactions on Database Systems	☒
Further	ACM Transactions on Information Systems	☒
Further	CISCO Academy Website, cisco.netacad.net (password access only)	☒

Module Code	ACCA5035
Title	Changemakers: Building your Personal Brand for Sustainable Employment
Date	25/06/2020
Level	5
Credits	20
Pre-Requisites	none

AIM(S)

- To build the skills and competencies necessary for career resilience and professional development for the future work context.

LEARNING OUTCOMES

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

- Evaluate personal employability skills and their congruence with the skills required for professional practice in a real or simulated environment.
- Build a personal brand and promote a professional identity for a specific opportunity.

INDICATIVE CONTENT

- Analysing your employment sector in order to identify problems, gaps in the market and how you can add value for sustainable employability.
- Building your brand and promoting a professional identity through personal skills analysis and personal development planning.
- Contemporary technologies: developing an online personal presence (e.g. basic website building/social media/blogs/vlogs etc.).
- Search techniques for employment/self-employment opportunities.
- Adopting project management approaches (defining the problem; setting the goals and objectives, milestones and monitoring, evaluation).
- Collaboration, networking, building social capital, negotiation and influencing.
- Awareness, emotional intelligence, well-being and resilience.
- Ethics, values, diversity, inclusion, intercultural awareness and responsible stewardship: issues, challenges and actions.
- Cultural and linguistic expression.

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
Online portfolio	2,000 words or equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Assignment	2,000 words or equivalent	50%

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 subject area.

Module Code	ACCA5035	
Module Title	Changemakers: Building your Personal Brand for Sustainable Employment	
Classification	Reading List entry	Electronic*
Essential	Lock, D. (2018). <i>Project management</i> . Routledge	☒
Essential	Dweck, C. (2017) <i>Mindset: Changing The Way You think To Fulfil Your Potential</i> . Robinson Publishers.	☒
Essential	Griffith, B.A. (2014) <i>Working in Teams: Moving From High Potential to High Performance</i> . SAGE Publications Inc.	☒
Essential	Baguley, P. (2003). <i>Teams and team-working</i> (New ed.). London: Teach Yourself.	☐
Essential	Gensler, H. J. (2017). <i>Ethics : A contemporary introduction</i> (3 rd ed., Routledge contemporary introductions to philosophy). New York: Routledge.	☐
Essential	Well-being of Future Generations (Wales) Act 2015 (Online). Available at http://www.legislation.gov.uk/anaw/2015/2/contents/enacted	☒
Further	Smale, B. and Fowlie, J. (2015) <i>How to Succeed at University an Essential Guide to Academic Skills and Personal Development (2nd Ed.)</i> . Los Angeles, [Calif.]: SAGE Study Skills Ser. Web.	☒
Further	Phillips, S. (2014) <i>The complete guide to professional networking : the secrets of online and offline success</i> . London, England : Kogan Page	☒
Further	Snow, S. (2018) <i>Dream Teams: Working Together Without Falling Apart</i> . Piatkus.	☒
Further	<i>Williams, B. (2020) Diversity in the Workplace: Eye-Opening Interviews to Jumpstart Conversations about Identity, Privilege, and Bias</i> . Rockridge Press	☒
Further	Dawson, P. and Andriopoulos, C. (2017) <i>Managing Change, Creativity and Innovation</i> . SAGE Publications Ltd.	☒
Further	Clements, P., & Jones, J. (2008). <i>The diversity training handbook a practical guide to understanding & changing attitudes</i> (3rd ed.). London ; Philadelphia: Kogan Page.	☒

Module Code	ACCA5036
Title	Scripting and Programming Concepts
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To instruct the development of software using a high level programming languages. 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 high-level programming languages 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
- Scripting languages eg Python, JavaScript, Ruby.
- 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	4500 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA5036	
Module Title	Scripting and Programming Concepts	
Classification	Reading List entry	Electronic*
Essential	Robbins, J., (2018), Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics, O'Reilly Media	☐
Essential	Romano, F (2018) <i>Learn Python Programming: The no-nonsense, beginner's guide to programming, data science, and web development with Python 3.7</i> , 2nd Edition, Packt	☒
Further	Cannon, J (2014) <i>Python Programming for Beginners: An Introduction to the Python Computer Language and Computer Programming</i> , CreateSpace Independent Publishing Platform	
Further	McGrath, M (2013) <i>Python in Easy Steps</i> , In Easy Steps Limited	

MODULE CODE: ACCB5000
TITLE: Computer Forensics
DATED: 22/08/2018

LEVEL: 5
CREDITS: 20

JACS CODE: I111

AIM(S)

To provide students with computer forensics concepts and understanding for the need of computer forensics. Students will learn best practices for general incidence response. The module will then focus on the tools and techniques to perform a full computer forensic investigation.

LEARNING OUTCOMES

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

1. Use their knowledge, of the fundamentals of computer forensics, to evaluate and formulate a range of problems and solutions with respect to the relationship between IT and forensics.
2. Communicate accurately and reliably the legal aspects of forensics and the best practices for incidence response.

INDICATIVE CONTENT

- Introduction to Computer Forensics.
- Computer Forensics Investigation Process.
- Searching and Seizing Computers.
- Presenting Digital Evidence.
- First Responder Procedures.
- Understanding Hard Disks and File Systems.
- Data Acquisition and Duplication.
- Recovering Deleted Files and Deleted Partitions.
- Forensics Investigation using CAINE Live DVD.
- Forensics Investigation Using AccessData FTK.
- Network Forensics Investigation using Wireshark.
- Steganography and Image File Forensics.

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 – Coursework

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Essay	4000 words	100%

Assessment Summary

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

READING LIST

Module Code	ACCB5000	
Module Title	Computer Forensics	
Classification	Reading List entry	Electronic*
Essential	The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics. Author: John Sammons.	☐
Essential	Digital Evidence and Computer Crime: Forensic Science, Computers, and the Internet. Author: Eoghan Casey.	☐
Essential	Digital Forensics with Open Source Tools. Authors: Cory Altheide and Harlan Carvey	☐
Essential	X-Ways Forensics Practitioner's Guide: Authors: Brett Shavers and Eric Zimmerman.	☐
Further	Incident Response and Computer Forensics, Second Edition. Authors: Chris Prosis, Kevin Mandia, and Matt Pepe.	☐
Further	Incident Response: Computer Forensics Toolkit. Author: Douglas Schweizer.	☐
Further	Forensic Computing: A Practitioner's Guide, Second edition. Authors: Tony Sammes and Brian Jenkinson.	☐
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.tandf.co.uk/15567281 www.cfft.nist.gov http://www.jdfsl.org/ CERIAS Forensics Research (http://www.cerias.purdue.edu/research/forensics/) DoD Cyber Crime Center (http://www.dc3.mil) http://www.digitalforensicsmagazine.com/ http://nij.ncjrs.org/publications/pubs_db.asp	☒

Module Code	ACCB5011
Title	Advanced Software Development
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a conceptual understanding of abstract data types, data structures and algorithms used in computer science and software engineering and the ability to apply these concepts using object oriented (OO) development methods

LEARNING OUTCOMES

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

- Critically evaluate the suitability of selected algorithms and data structures to solve given problems
- Develop OO solutions to solve a given problem scenario(s)

INDICATIVE CONTENT

- Abstract data types (ADT)
- Simple data structures e.g. stacks, queues
- Complex data structures and algorithms e.g. lists, linked lists, heaps
- Graphs – properties and graph traversal
- Trees – properties, traversal, balancing
- Hashing
- Algorithms for sorting
- Algorithms for searching.
- Containers and iterators
- Object oriented concepts e.g. classes, objects, encapsulation, inheritance and polymorphism
- Essential object oriented programming principles

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Implementation and Essay	2500 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	ACCB5011	
Module Title	Advanced Software Development	
Classification	Reading List entry	Electronic*
Essential	Horton, I., Weert, P.V., (2018), Beginning C++17: From Novice to Professional, 5 th Edition, Apress	☐
Essential	Cormen, T.H., Leiserson, C.E., (2009) Introduction to Algorithms, MIT Press	☐
Further	Greene, J., Stellman, A., (2020) Head First C#, 4 th Edition, O'Reilly	☐
Further	Weisfeld, M., (2018), The Object-Oriented Thought Process, Addison Wesley	☐
Further	Sedgewick, R., (2011) Algorithms, 4th edition, Addison-Wesley	☐

Module Code	ACCB5017
Title	Games Architecture and Mechanics
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To achieve a systematic understanding of core games software, tools and concepts used in games and physics engines.

LEARNING OUTCOMES

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

- Demonstrate a sound understanding of the architecture of games and physics engine components necessary for the development of games software.
- Deploy appropriate languages, tools and techniques in the development of games and game physics applications.

INDICATIVE CONTENT

- Games programming principles and techniques
- Games programming design patterns
- Application and use of software libraries, SDKs and APIs used in Games programming
- Application of specified programming language (C/C++)
- Cross platform development for game development QT, SDL2, etc.
- Importing game resources e.g. textures, audio, 3D models, etc
- Principles of 3D graphics and the Graphics pipeline
- Graphics APIs, eg OpenGL
- Physics Engine architecture
- Mechanics
- Bounding Volumes
- Collision Detection
- Collision Response
- Numerical Integration and updates

- Physics Engine APIs and libraries, eg Bullet, PhysX, 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
Written Assessment	2500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written Assessment	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB5017	
Module Title	Games Architecture and Mechanics	
Classification	Reading List entry	Electronic*
Essential	Millington. I. (2010) Game Physics Engine Development 2 nd Edition, CRC Press	☒
Essential	Van Verth, J.M, Bishop, L.M (2015) Essential Mathematics for Games and Interactive Applications. A Programmers Guide, Morgan Kaufmann	☒
Essential	Hearn, D and Baker, P.M (2010) Computer Graphics with OpenGL, 4 th Edition, Prentice Hall	☒
Essential	Nystrom, R (2014) Games Programming Patterns, Genever Benning	☒
Further	Shreiner, D, et al (2016) OpenGL Programming Guide, 9th Edition, Addison-Wesley	☒

Further	Lengyel, E (2011) Mathematics for 3D Game Programming and Computer Graphics 3 rd Edition, Cengage Learning	☐
Essential	Lengyel, E. (2016) Foundations of Game Engine Development, Volume 1: Mathematics, Terathon Software.	☐
Further	Lengyel, E. (2016) Foundations of Game Engine Development, Volume 2: Rendering, Terathon Software.	☐

Module Code	ACCB5021
Title	Statistical Programming
Date	09/09/2020
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To develop the knowledge and skills required to perform more advanced statistical analysis of experimental and informatics data.
- To develop the knowledge and skills required to perform basic statistical programming in an appropriate programming language.

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 experimental data
- Manipulate data and implement statistical programming techniques on large datasets
- Select and apply appropriate visualisation methods for the presentation of analytical data

INDICATIVE CONTENT

- Data input and output in multiple formats, including graphical plots
- Scripts and functions
- Performing basic statistical analyses including correlation analysis and statistical tests.
- Building packages with suitable documentation and examples
- Data preparation for import into analysis and visualisation tools

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 problems	2500 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Programming problems	2500 words equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB5021	
Module Title	Statistical Programming	
Classification	Reading List entry	Electronic*
Essential	Matloff, N (2013) <i>The Art of R Programming</i> , No Starch Press	☒
Further	Kranzler, J.H. (2010) <i>Statistics for the Terrified</i> , Pearson	☒
Further	Cotton, R (2013) <i>Learning R</i> , O'Reilly	☒
Further	Alvaro, F (2016) <i>R: Easy R Programming for Beginners</i> , Pearson	☒
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	☒

MODULE CODE: M5X01568
TITLE: Creative Practice 3
DATED: 26/01/2016

LEVEL: 5
CREDITS: 10

JACS CODE: W600

AIM(S)

The aim of this module is to extend and develop the students' comprehension of industry-relevant production processes, to develop students' ability to work effectively in teams.

LEARNING OUTCOMES

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

- Successfully manage the production pipeline.
- Develop and produce relatively complex 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.

At L5 the emphasis will move from a basic understanding of processes, methodologies, and techniques to one of development and extension. We would be expecting students to be able to adapt the production pipeline effectively to the needs of the project; to be able to work effectively in a team; to have a broader skills base; and to therefore be able to produce more sophisticated outputs. With this increased sophistication we would also expect the need for specialist skills from other subject areas to become more of a necessity with the likelihood of multi-disciplinary teams therefore increasing.

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: production practical (50%)

Exemplar: Create a relatively complex 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). The student will need to show how the idea was adapted and shaped to fit the needs of the project, comparing and/or synthesising differing methodologies, materials, conceptual frameworks, etc.

Assessment Component 2 – Coursework: production written (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 1250 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: M5X01569
TITLE: Creative Practice 4
DATED: 26/01/2016

LEVEL: 5
CREDITS: 10

JACS CODE: W600

AIM(S)

The aim of this module is to extend and develop the students' comprehension of industry-relevant production processes and to develop students' ability to work effectively in teams.

LEARNING OUTCOMES

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

- Successfully manage the production pipeline.
- Develop and produce sophisticated and professional 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.

At L5 the emphasis will move from a basic understanding of processes, methodologies, and techniques to one of development and extension. We would be expecting students to be able to adapt the production pipeline effectively to the needs of the project; to be able to work effectively in a team; to have a broader skills base; and to therefore be able to produce more sophisticated outputs. With this increased sophistication we would also expect the need for specialist skills from other subject areas to become more of a necessity with the likelihood of multi-disciplinary teams therefore increasing.

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: production practical (50%)

Exemplar: Create a sophisticated and professional 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). The student will need to show how the idea was adapted and shaped to fit the needs of the project, comparing and/or synthesising differing methodologies, materials, conceptual frameworks, etc.

Assessment Component 2 – Coursework: production written (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 1250 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: M5X02042
TITLE: The Game Designer's Context
DATED: 26/01/2016

LEVEL: 5
CREDITS: 20

JACS CODE: I620

AIM(S)

- To further develop the student's understanding of the interrelated historical, social, cultural, and technological contexts within which games designers operate. This includes game theory, study of gaming demographics, interactive narrative and general narrative theory.
- Application of project management methodologies and production of industry-level documentation in preparation for the final year of study.

LEARNING OUTCOMES

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

1. Demonstrate a critical insight and understanding of industry-standard professional production practises when managing collaborative game development projects, using this experience and information to inform design decisions on future game proposals.
2. Practically apply the theoretical content of the module to develop a Game Design Document to a professional level that can be used for the purpose of game development.

INDICATIVE CONTENT

- Application of production management methods in a working environment (e.g. use of Gantt charts, role allocation and agile development to establish and achieve manageable goals, etc.).
- Analysis of current gamer demographics.
- Ludology: game mechanics, game play, flow and game design, game critique and analyses, interactivity, exploration, immersion and suspension of disbelief.
- Application of prototyping as a method of developing gameplay mechanics.
- Introduction to film, literary and narrative theory, including interactive narrative, branching narrative, emergent narrative, storytelling and structures, and character design.
- Creation of professional industry-level Design Documentation used in active projects.

LEARNING AND TEACHING STRATEGY

This module is lecture-based to cover the indicative content above. Regular formative supervision and tutorial sessions are provided to support students in their individual research, essay writing, and preparation for presentations required for the assessment of the module. Application of game theory and project/team management will be conducted in practical exercises throughout the course of the module.

These sessions will represent a formative aspect of the assessment which culminates in the production of the two major assessment points required for this module.

The allocation of teaching to deliver the module is:

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

ASSESSMENT

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

Assessment Component 1 – 50%

Practical: Live 20 minute Presentation

Exemplar: Each student must present a game idea as a pitch to support the written component of their assessment (see Component 2 below). Each individual presentation will last 20 minutes and will outline a proposal for a game idea that could be developed in their final year as part of a collaborative Major Project. The presentation will allow students to communicate and demonstrate their ideas, background research, and justification of design and proposed implementation of their project.

Assessment Component 2 – 50%

Coursework: Individual Game Design Document

Exemplar: Using information obtained from relevant Game Design literature and lecture notes, students must construct a comprehensive Game Design Document that will serve as a design blueprint and guideline for group-based Final Major Projects in the third year. This document should cover, in detail, the plan of the entire game from start to finish and should act as an accessible and useful resource for future team members working on the game prototype.

The Game Design Document produced should communicate specifics of the game design to the team involved with the game's development in the Final Year. This will help to establish a coherent and professional development phase, as it will serve as the foundation for a game developed as a Final Major Project. This document will be completed to a professional level and submitted via Turnitin.

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 enable students to use historical knowledge and an understanding of the consequences of past actions to envision how the future may be shaped (e.g. case studies of both poorly executed and successful managed game projects). In addition, collaborative work in design teams through the course of the module allows all students to evaluate the consequences of their own actions and of collective actions through project planning and implementation of both practical and theory-based work. Project management and co-ordinating teams also allow students to demonstrate their capacity to be flexible and resourceful, adapting their problem-solving mindset to fit changing or unforeseen circumstances such as scaling project goals, contingency plans, optimization of team members and project resources, etc.	

BIBLIOGRAPHY

Essential

Fullerton, T., Swain, C. and Hoffman, S. (2004), *Game Design Workshop: Designing, Prototyping and Playtesting Games*, San Francisco: CMP Books.

Glassner, A. (2004), *Interactive Storytelling: Techniques for 21st Century Fiction*, Natick, Massachusetts: A.K. Peters.

Newton, R. (2007), *Project Management Step by Step: How to Plan and Manage a Highly Successful Project*, Pearson Business.

Rogers, S. (2010), *Level Up! The Guide to Great Video Game Design*, Chichester: Wiley.

Recommended

Adams, E. and Rollings, A. (2007), *Game Design and Development. Fundamentals of Game Design*, Upper Saddle River, NJ: Pearson Education Inc.

Crawford, C. (2003), *Chris Crawford on Game Design*, Indiana: New Riders Publishing.

Johnson, H. and Sims, C. (2012), *Scrum: A Breathtakingly Brief and Agile Introduction*, Dymaxicon.

McGonigal, J. (2012), *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*, London: Vintage.

Shore, J. and Warden, S. (2007), *The Art of Agile Development*, O'Reilly Media.

Background

Marx, C. (2007), *Writing for Animation, Comics and Games*, Oxford: Focal.

McKee, R. (1999), *Story: Substance, Structure, Style, and the Principles of Screenwriting*, London: Methuen Publishing.

Rollings, A. and Morris, D. (2004), *Game Architecture and Design*, Indianapolis, Indiana: New Riders.

Salen, K. and Zimmerman, E. (2004), *Rules of Play: Game Design Fundamentals*, London: MIT.

Schell, J. (2008), *The Art of Game Design: A Book of Lenses*, London: Morgan Kaufmann.

Journals

EDGE, Bath: Future Publishing.

Games and Culture, Thousand Oaks, CA.; London: Sage Publications.

MCV: The Interactive Entertainment Weekly, Hertfordshire, Intent Media.

Websites

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

<http://gamasutra.com/>

<http://uk.ign.com/>

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

<http://libweb.anglia.ac.uk/referencing/harvard.htm>

MODULE CODE: M5X02043
TITLE: Game Design and Asset Creation 1
DATED: 26/01/2016

LEVEL: 5
CREDITS: 20

JACS CODE: I620, I630

AIM(S)

- This module aims to develop the students' ability to research, discuss, critically evaluate and design games and characters for appropriate gaming environments.
- To apply continued testing, analysis and refinement in gameplay mechanics within a game engine environment.

LEARNING OUTCOMES

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

1. Apply knowledge of theoretical design and practical implementation in relation to a functional gameplay and aesthetic prototype.
2. Demonstrate an ability to analyse and document the design process and individual contribution to the evolution of the production process.

INDICATIVE CONTENT

- Allocating roles within a production team, with emphasis on: Design, Art, Technical and Animation.
- UI, gameplay and mechanic design.
- Asset creation, modelling, sculpting, texturing and surface shaders.
- Development of character based control systems and implementation of gameplay mechanics.
- Motion capture and keyframe animation.
- Animation cycles for game character.
- Identify and target suitable audiences.

LEARNING AND TEACHING STRATEGY

Working within production teams students will continue to work from an existing games concept. Students will be tasked to implement their concepts by producing functioning interactive environments to demonstrate appropriate gameplay elements and character interaction within a functional prototype. Students will be expected to present their findings and concepts to their peers through weekly target and blog reviews, extending the

contemporary knowledge base of the group as a whole.

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 – 50%

Practical: live group presentation 10 minutes per person.

The students will present their work in their production teams with each individual demonstrating their own contribution, with each team presenting the work over the accumulated time allocation. This component will see the teams exhibit the gameplay prototype in its current form and demonstrate their production process, target audiences and detail how the end result is going to be achieved.

Assessment Component 2 – 50%

Coursework: written report (2000 words)

The students will develop a 2000 word report based upon their own individual contribution to the production cycle, an overall analysis of the production process and effectiveness of the completed gameplay prototype.

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 provide students will a flexible design and testing environment allowing them to adapt their design methodologies in relation to tackling previously unforeseen problems in order to achieve distinct technical milestones. The module's production team strategy allows communication between each individual student to aid resourcefulness in their continued problem solving process.	

BIBLIOGRAPHY

Essential

Rogers, S. (2014) *Level Up! The Guide to Great Video Game Design*. Wiley.
Hoffman, S. (2004) *Game Design Workshop: Designing, Prototyping and Playtesting Games*. Focal Press.
Bowater, C. and Stenning, D. (2015) *Beginner's Guide to Digital Painting in Photoshop: Characters*. 3DTotal Publishing.
Cabera, C. and Urschel, J. (2014) *Digital Painting Techniques: Volume 6*. 3DTotal Publishing.

Recommended

Kremers, R. (2009) *Level Design: Concept, Theory, and Practice*. A K Peters/CRC Press.
Bim, J. (2013) *Digital lighting and rendering*. New Riders.
Georgina, S. (2012) *Designing for screen: production design and art direction explained*. The Crowood Press Ltd
Simblet, S. (2001) *Anatomy for the Artist*. DK
Williams, R. (2009) *The Animator's Survival Kit*. Faber & Faber

Background

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

Journals

ACM Digital Library.
Game Studies.
Journal of Computer Game Design.
International Journal of Computer Games Technology.

Websites

<http://gamasutra.com/>
<http://uk.ign.com/>
<http://www.develop-online.net/>
<http://www.3dbuzz.com>
<http://www.lynda.com>

MODULE CODE: M5X02044
TITLE: Game Design and Asset Creation 2
DATED: 26/01/2016

LEVEL: 5
CREDITS: 20

JACS CODE: I620, I630

AIM(S)

- This module aims to provide students with the technical understanding and practical ability to efficiently implement a refined proof of concept and interactive game demonstration.
- To provide students with the insight and understanding of managing a project into the final development stages.
- To develop the student's knowledge and understanding of games related marketing for targeted audiences and demographics.

LEARNING OUTCOMES

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

1. Apply knowledge of theoretical design and practical implementation in relation to a refined proof of concept and interactive game demonstration.
2. Demonstrate an ability to analyse and document the design process involved in developing a refined proof of concept and interactive game demonstration.
3. Develop and implement specific game orientated marketing materials for the chosen target audience.

INDICATIVE CONTENT

- Project review and progression analysis.
- UI, gameplay and mechanic implementation.
- Implementation of assets, texturing and surface shaders.
- Development of character based control systems and implementation of gameplay mechanics.
- Game development trailer.
- Implementing animation cycles for game character.
- Generate and implement marketing materials for suitable audiences.

LEARNING AND TEACHING STRATEGY

Working within production teams students will continue to work from an existing games prototype culminating in a proof of concept and interactive game demonstration. Students will

be tasked to implement their concepts by producing functioning interactive environments to demonstrate appropriate gameplay elements and character interaction within an interactive game demonstration. Students will be expected to present their results and conclusions to their peers through weekly target and blog reviews, extending the contemporary knowledge base of the group as a whole.

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 – 50%

Practical: live group presentation 10 minutes per person.

The students will present their work in their production teams with each individual demonstrating their own contribution, with each team presenting the work over the accumulated time allocation. This component will see the teams exhibit their proof of concept, the interactive game demonstration in its completed form and demonstrate their production process, target audiences, marketing material and detail how the end result was achieved.

Assessment Component 2 – 50%

Coursework: written report (2000 words)

The students will develop a 2000 word report based upon their own individual contribution to the production cycle, an overall analysis of the production process and effectiveness of the completed proof of concept and the interactive game demonstration.

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 provide students with a flexible design and testing environment allowing them to adapt their design methodologies in relation to tackling previously unforeseen problems in order to achieve distinct technical milestones. The module's production team strategy allows communication between each individual student to aid resourcefulness in their continued problem solving process.	

BIBLIOGRAPHY

Essential

Rogers, S. (2014) *Level Up! The Guide to Great Video Game Design*. Wiley.
Hoffman, S. (2004) *Game Design Workshop: Designing, Prototyping and Playtesting Games*. Focal Press.
Bowater, C. and Stenning, D. (2015) *Beginner's Guide to Digital Painting in Photoshop: Characters*. 3DTotal Publishing.
Cabera, C. and Urschel, J. (2014) *Digital Painting Techniques: Volume 6*. 3DTotal Publishing.

Recommended

Kremers, R. (2009) *Level Design: Concept, Theory, and Practice*. A K Peters/CRC Press.
Bim, J. (2013) *Digital lighting and rendering*. New Riders.
Georgina, S. (2012) *Designing for screen: production design and art direction explained*. The Crowood Press Ltd
Simblet, S. (2001) *Anatomy for the Artist*. DK
Williams, R. (2009) *The Animator's Survival Kit*. Faber & Faber

Background

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

Journals

ACM Digital Library.

Game Studies.

Journal of Computer Game Design.

International Journal of Computer Games Technology.

Websites

<http://gamasutra.com/>
<http://uk.ign.com/>
<http://www.develop-online.net/>

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

MODULE CODE: M5X02049
TITLE: 3D Character and Creature Animation
DATED: 24/11/2015

LEVEL: 5
CREDITS: 20

JACS CODE: W615

AIM(S)

- To develop the student's understanding of human locomotion and their representation on realistic bipedal creatures and characters. At the start of Level 5 this is placed in order to advance the studies in biophysical animation functions and gain further insights and overviews of species relationship studies (e.g. inc. anatomical forms).

LEARNING OUTCOMES

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

- Determine the underlying sub-structures and conduct anatomical analysis that affect motion in humans and extend these capabilities towards effective character and creature realisations.
- Extend the theoretical standing and technical animation process in these areas and incorporate such methods to the wider fields of digital and 3D visual effects.

INDICATIVE CONTENT

Students will develop their 3D design, modelling and realisation skills with a focus upon:

- Pre-production exercises (e.g. posture/model, thumbnails, storyboarding plans):
- Observational and movement analysis
- Biological and mechanical structures
- Character/creature anatomical/physiological studies
- Principles of animated motion (e.g. straight-ahead and pose-to-pose animation):
- Acting techniques and staging for animators
- Character design techniques in 2D and 3D digital forms
- Character animation techniques in 2D and 3D digital forms
- Performance and expression in motion
- Importance of sound to animation and character
- Physical characteristics and setting/environmental considerations:
- Body language, posture and gesture
- Scene structure and composition
- Film references
- Sound design
- Modelling procedures for optimum character performance
- Creature Technical Director areas of simulating secondary actions (e.g. cloth, hair, etc.)

- Facial expressions and phoneme/visemes for lip-sync animation
- Joints, bones, chains, smooth/rigid skinning
- Deformers, blend Shapes, function curve manipulation/enhancement
- Constraints, Spline-IKs, Clusters, etc. for generating character control devices
- Particle effects, fluids, dynamically-driven simulations for characters
- Interface design elements to enhance creature performance/animation
- Motion Capture/Facial recognition systems
- Advanced rigging systems and tools
- Anthropomorphic application of IK systems

LEARNING AND TEACHING STRATEGY

Lectures will be primarily tutorial based, with students learning key concepts and skills on a topic-based schedule. Where necessary lectures will incorporate presentation-based learning to disseminate more theoretical concepts, and group & one-to-one seminars to help guide students and reinforce learned techniques. The Module develops key areas of character-led technical design and innovation, underpinning the working practices of 3d computer animation production and effects. It is expected that the class content will cover the structural phases required to generate effective creature and character shots, gestures and motions through to the specific technical knowledge required in the rendering and compositing of images and sequences.

These may vary from the implementation of walking bipeds or character defined designs and conditions to analysis of pre-recorded animals and action to the synthesis and combination of these factors for fantasy or imaginary characters, effects or locations.

It is envisaged that much of the practice-based work will be carried out in small groups ("design teams") and that these activities will reflect real-world scenarios. Through experimentation and tutorial guidance the student will develop an understanding of the technical requirements in the production of advanced 3D character animation and creature effects shots.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	180	60%
Independent learning	120	40%
Placement learning		
TOTAL	300	100%

ASSESSMENT

Assessment Component 1 – Coursework (practical) 100%.

Exemplar

Portfolio approach of an assemblage of animation pieces.

Students to make appropriate use of 3D techniques and display a degree of understanding in the modelling, design and stylisation of a character types/archetypes/personality, etc. within a short (e.g.20 secs) sequence. The 3D animation(s) will act as a demo reel of their studies in character and/or creature based motions, gestures or situations.

Assessment Summary:

Activity type	Percentage
Written	
Coursework	100%
Practical	
TOTAL	100%

BIBLIOGRAPHY

Essential

AUTODESK MAYA PRESS (2012), *Learning Autodesk Maya 2013: Foundation, Modelling and Animation, and Special Effects*, John Wiley & Sons

O'HAILEY, T. (2013) *Rig it Right! Maya Animation Rigging Concepts* Focal Press;

PALAMAR, T. (2009) *Maya Studio Projects: Dynamics*, Sybex.

ROBERTS, S. (2004). *Character Animation in 3D: Use traditional drawing techniques to produce stunning CGI animation*, Focal Press.

Recommended

MUYBRIDGE, E. (1989) *The Human Figure in Motion* Dover Publications

BRIDSON R. (2008) *Fluid Simulation for Computer Graphics*, A K Peters/CRC Press.

OKUN, J. A. (2012) *The VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures*, Focal Press. ISBN: 0240812425

FLAKE, G. (2000), *The Computational Beauty of Nature: Computer Explorations of Fractals, Chaos, Complex Systems and Adaptation*, MIT Press. ISBN: 0262561271

WRIGHT, S., (2011)

Compositing Visual Effects: Essentials for the Aspiring Artist,
Focal Press.

(e)Journals & electronic resources via:

Students will be recommended to study the following (via the library, if available):

ACM Digital Library

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

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

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

Websites

www.acm.org

www.fxguide.com

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

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

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

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

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

<http://forums.cgsociety.org>

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

MODULE CODE: M5X02050
TITLE: Art Direction for the Animated Short
DATED: 24/11/2015

LEVEL: 5
CREDITS: 20

JACS CODE: W610

AIM(S)

- The aim of this module is to further develop the student's individual visual aesthetic and awareness along with the necessary technical skills required for evocative 3D scenes and designs for animation.
- This module considers a variety of theoretical and practical approaches in the devising various forms of animated sequences. Key areas will involve the factors that contribute to the vision and communication of an animated film-narrative and structure.

LEARNING OUTCOMES

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

- Display an awareness of the contexts and motivations underlying narrative and structural breakdowns and their influences within classical and digital animated expression(s).
- Produce pre-production material, research and designs that capture the animated vision of the student for an intended cinematically-driven short 3D animation.

INDICATIVE CONTENT

To introduce the techniques and methods involved in the pre-visualisation of a scene or short within a 3D/Visual Effects project at the advanced level of second year.

To cover the work of other animation artists and designers (initially):

- Animation innovators and auteurs, movements and styles
- Emerging trends and influences in 3D computer animation sequences
- Research and analysis of visual material and self-sustained visual research.
- Conceptual and Production Design
- Technical composition and design principles for animated film.
- Motion studies and scene development through digital drawing, traditional media, camera, digital techniques
- Preliminary workshops focusing on formal aspects of design, 3D space and form.
- Mood boards, lighting, character model sheets, scripts, production bible.
- Drawing practice and development with particular attention to the use of line, tone, and perspective, rhythm for the depiction of objects, characters and scenes.
- Narrative and storytelling conventions and structures
- National identities and political viewpoints in interpreting animation and film
- Visual metaphors, signs and symbols in animated film
- Artistic development in communicating ideas and meaning in 3D
- Digital/3D storyboarding and pre-visualisation methods

- Digital design methods in the manufacture of film sequences
- Terminology and practices for films that utilise 3D characters, effects, etc.
- Sound design for animation
- Postmodern media theories as applied to the animation and 3D CGI
- Ideological stances through the moving image and animation
- Genre and auteur approaches
- Avant-garde, independent movements and commercial short (animated) film varieties
- Cinema media and culture
- Categorisations of class, race, gender, age, social representation and stereotyping

LEARNING AND TEACHING STRATEGY

Lectures will be used to introduce key ideas and theoretical concepts associated with developing cinematic goals, sequences and the generation of an animated film style. Students will be required to immerse themselves in a detailed analysis of the content and filmic techniques in order to translate such values for their own stylistic animated representations.

During seminars and practical tutorials, students will apply theoretical concepts of cinematic narrative methods in devising concept art and designs. Students will work progressively towards the visualisation of an animation artist's vision. Digital pre-visualisation methods will be covered together with explorations into sequence design. Students will be directed towards implementing an effective cinematic quality as a guide for an emotionally evocative and visually artistic 3D artefact(s).

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. A portfolio of work comprising the entire student's research and design material towards an intended 3D short animation (approx. 40 secs). This may include a series of character studies, a script, model sheet, mood boards, pre-visualisation sequences and animatics. (Equivalent to 5000 words).

Assessment Summary

Activity type	Percentage
Written	
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 Cinematography. 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) Available at https://www.uts.edu.au/sites/default/files/davidboudKeynote.pdf Accessed 10:30, 17th October 2014 Schön, D. A. (1987). <i>Educating the reflective practitioner: Toward a new design for teaching and learning in the professions.</i> San Francisco.	

BIBLIOGRAPHY

Essential:

- BLOCK, B., (2007) *The Visual Story: Creating the Visual Structure of Film, TV and Digital Media*, Focal Press
- SULLIVAN, K., (2008) *Ideas for the Animated Short: Finding and Building Stories*, Focal Press
- BORDWELL, D., & THOMPSON, K. (2010) *Film Art: An Introduction*, McGraw-Hill Higher Education
- LACEY, N., (2000) *Narrative and Genre: Key Concepts in Media Studies*, Palgrave Macmillan

- MERCADO, G., (2010) *The Filmmaker's Eye: Learning (and Breaking) the Rules of Cinematic Composition*, Focal Press
- PROFERES, N., (2008) *Film Directing Fundamentals: See Your Film Before Shooting*, Focal Press

Background:

- FROST, J. B. (2009) *Cinematography for Directors: A Guide for Creative Collaboration*. Michael Wiese Productions.
- STUMP, D. (2014) *Digital Cinematography: Fundamentals, Tools, Techniques, and Workflows*. Focal Press.
- McCLEAN, S.T., (2007) *Digital Storytelling: The narrative Power of Visual Effects in Film* MIT Press
- BOGGS, C. & POLLARD, T. (2003). *A World in Chaos: Social Crisis and the Rise of Postmodern Cinema*, Rowman & Littlefield Publishers
- BROWN, B (2011) *Cinematography: Theory and Practice: Image Making for Cinematographers and Directors*. Focal Press.

Websites

<http://sightandsounddigital.bfi.org.uk>

<http://www.totalfilm.com/www.acm.org>

www.fxguide.com

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

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

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

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

<http://www.bfi.org.uk>

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

<http://www.awn.com>

<http://www.guardian.co.uk/film>

MODULE CODE: M5X02051
TITLE: 3D Filmmaking
DATED: 24/11/2015

LEVEL: 5
CREDITS: 20

JACS CODE: W614

AIM(S)

- The aim is for students to use the appreciation from the preceding module – *Art Direction for the Animated Short* – and now develop a single piece of animation-art, to inform their own individual exploration and 3D artistic skills through imagery, storytelling and structure.
- This module is further designed to develop the student's attitude and knowledge of the animated film world and to help students best prepare for aspects for furthering their practical work and personal artistic vision and portfolio of work.

LEARNING OUTCOMES

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

- employ personal innovation, creativity and experimentation through 3D animation and acquire visual competency and artistry in their methods of communication.
- define an imaginative, engaging quality and articulate cinematic notion of animated filmmaking through aesthetic and technical control of cg tools and techniques

INDICATIVE CONTENT

In this module, students may study the following areas:

- Animation innovators and auteurs, movements and styles
- Emerging trends and influences in 3D computer animation sequences
- Narrative and storytelling conventions and structures
- Digital design methods in the manufacture of film sequences
- 3D Exercises in scene construction and camera techniques
- Step-by-step 3D methodology and sequencing towards the development of a scene
- Digital audio visual/image gathering technology and practice for the moving image.
- Lighting technology, theory and practice.
- Performance: How acting relates to the animator
- Sound Design and the impact on film/animation
- Facial animation characteristics
- Character analysis and Personality
- Principles of Performance
- Psychological Performance, gesture and polarity
- Volume size and movement
- Cinematography principles and considerations in devising 3D content
- Identifying 3D filmmaking methods
- Terminology and practices for films that utilise 3D characters, effects, etc.
- Cinema media and culture

- Meeting deadlines
- Target audience

LEARNING AND TEACHING STRATEGY

Lectures will be used to introduce key ideas and theoretical concepts associated with developing their 3D cinematic goals, sequences and the generation of the film style. Students will be required to immerse themselves in a detailed analysis of the content and filmic techniques in order to translate such values for their own stylistic animated representations.

Students will develop visual approaches in response to intended scene scenarios and the direction to take with their visual development through sequencing and composition. An ongoing review of the practical submissions will continually challenge the narrative outcomes of their specialist form of animated art.

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 of the final piece(s) will be based upon the success of the realised sequence, to include how well it evokes cinematic sensibilities and a captivating style. It is anticipated that students will articulate cinematic notions of animated filmmaking through aesthetic and technical control of the 3D CG tools and techniques

Assessment Component 1 – Coursework (practical) 80%

Exemplar. A single animated sequence (of some 40 seconds) that captures an imaginative, engaging quality with stylistic overtones in the cg material/content.

Assessment Component 2 – Coursework (written) 20%

Exemplar. This component is assessed by a reflective blog (2500 word - 200 words posted over 12 weeks). This could be an online written and visual blog uploaded to a cloud-based interface such as *Tumblr* or *Wordpress*. This blog could comprise weekly written entries accompanied by development of the visual imagery undertaken.

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 is evidenced through the commitment needed to produce a single animated body of work as students will be become aware of short film initiatives and opportunities for collaborations with local, national and international corporations, graduate enterprises and successful entrepreneurial practices. It is expected that the work the students undertake at this level will be of quality that may generate the interest across many industries with direct associations to 'employability', 'enterprise' and 'internationalism'. The students embarking on this route (and their work) could become the starting point for successful future collaborations and links to aid Major Project and extensions for the industry. Additionally: This module seeks to helps the student develop the fundamental skills of research, analysis, project development and written communication. 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, 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

Essential

- GRESS, J. (2014) *Digital Visual Effects and Compositing*. New Riders.
- HURKMAN, A. (2013) *Color Correction Handbook: Professional Techniques for Video and Cinema*. Peachpit Press.

Recommended

- PRINCE, S. (2011) *Digital Visual Effects in Cinema: The Seduction of Reality*. Rutgers University Press.
- SAWICKI, M. (2007) *Filming the Fantastic: A Guide to Visual Effects Cinematography*. Focal Press.
- WRIGHT, S. (2008) *Compositing Visual Effects*. Focal Press
- WRIGHT, S. (2006) *Digital Compositing for Film and Video, 2nd Edition*. Focal Press

Journals

Sight and Sound (monthly), British Film Institute

American Cinematographer (monthly), ASC

Journal of Screenwriting (three times per year), Intellect

Websites

<https://www.avid.com/US/support/training/resources>

<http://www.kenstone.net>

<http://www.creativecow.net>

<http://www.colorgradingcentral.com>

<http://www.colorgradingcentral.com/davinci-resolve-tutorials>