

MODULE DIRECTORY

LEVEL 7

ACADEMIC DISCIPLINE OF COMPUTING

WALES INSTITUTE OF SCIENCE & ART

2022-2023

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INTRODUCTION

This Module Directory includes all the modules for Level 7 within the Academic Discipline of Computing in the academic year 2022-2023.

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: ACCA7000
TITLE: Programming and Software Testing
DATED: 16/08/2018

LEVEL: 7
CREDITS: 20

JACS CODE: I200

AIM(S)

To develop a critical understanding of the techniques, principles and concepts of programming and software testing.

LEARNING OUTCOMES

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

- apply the software constructs in the development of programs and demonstrate an ability to solve programming problems;
- reflect on the importance of software testing and have an appreciation of the software test process.

INDICATIVE CONTENT

- Software constructs of a programming language e.g. Java.
- Problem solving techniques e.g. using functions to subdivide a more complex problem.
- Construction of a simple class, attributes, constructors and methods.
- Black box vs white box testing, bounds checking, code coverage, etc.
- Unit tests including unit test frameworks e.g. JUnit.
- Javadoc, self-documented code.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Coursework	Equivalent to 2500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Coursework	Equivalent to 2500 words	50%

Assessment Summary

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

READING LIST

Module Code	ACCA7000	
Module Title	Programming and Software Testing	
Classification	Reading List entry	Electronic*
Essential	Shildt, H. (2017), <i>Java: A Beginner's Guide</i> , Oracle Press	☒
Essential	Cadenhead, R., (2017), <i>Java in 24 Hours</i> , Sams Publishing	☒
Further	Jorgensen. P., (2013), <i>Software Testing: A Craftsman's Approach</i> , CRC Press	☒
Further	Page, A., Johnston, K., (2008), <i>How We Test Software at Microsoft</i> , Microsoft Press	☒
Further	IEEE Xplore	☒
Further	ACM Transactions	☒

MODULE CODE: ACCA7001
TITLE: Agile Software Engineering Principles
DATED: 16/08/2018

LEVEL: 7
CREDITS: 20

JACS CODE: I200

AIM(S)

To provide the student with a systematic theoretical and practical understanding of agile software engineering principles, including the underlying concepts, methods and supporting tools.

LEARNING OUTCOMES

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

- Show a mastery of contemporary agile software engineering principles including software development methods, tools and techniques used in the development of a software artefact.
- Critically evaluate selected agile methods, tools and techniques and their deployment

INDICATIVE CONTENT

- Software Dev Life Cycle
- Requirements Analysis
- User Stories
- Object Orientated Analysis and Design
- UML
- Iterative / incremental development methods
- Unified Process (UP), Agile Methodologies (XP, Scrum etc.)
- Distributed development and tools: Source Code Management (CVS, Git, etc.)
- Test driven development
- Object Doubles (inc. Mock objects, Stubs, Fakes and Dummies) and tools
- GUI Testing (e.g. Twist, Silk Test, Robot Framework etc.)
- Continuous deployment
- Continuous Integration
- Professional Practice (open source licencing)

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Practical in-class test	2 hours	50%

Assessment Summary

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

READING LIST

Module Code	ACCA7001	
Module Title	Agile Software Engineering Principles	
Classification	Reading List entry	Electronic*
Essential	Laster, B (2018) Jenkins 2: Up and Running: Evolve Your Deployment Pipeline for Next Generation Automation, Boston: O'Reilly	☒
Further	Mukherju, J (2018) The Power Of Continuous Delivery In DevOps: Reduce Difficulty By Increasing Frequency Of Your Product Releases (Continuous Everything Book 2), Amazon Media	☒
Further	Laster, B (2016) Professional Git, Wrox	☒
Further	Stephens, M. and Rosenberg, D. (2010) <i>Design Driven Testing: Test Smarter, Not Harder</i> , New York: Apress	☐
Further	Wazlawick, R. S. (2014) <i>Object-Oriented Analysis and Design for Information Systems: Modeling with UML, OCL and IFML</i> , Burlington, Mass: Morgan Kaufmann	☒
Further	Rosenberg, D. and Stephens, M. (2013) <i>Use Case Driven Object Modeling with UML Theory and Practice</i> , New York: Apress	☐
Further	Jorgensen, P. C. (2013) <i>Software Testing: A Craftsman's Approach, 4th Edition</i> , Boca Raton: Auerbach	☒

Further	IEEE Transactions on Software Engineering	☒
Further	Software Engineering Journal	☒
Further	ACM Transactions on Software Engineering and Methodology	☒
Further	IEEE Software, Software Practice and Experience	☒
Further	Journal of Software Maintenance	☒
Further	http://www.agilealliance.org/	☒
Further	http://jenkins-ci.org/	☒
Further	https://www.ieee.org/	☒

Module Code	ACCA7002
Title	Database Systems
Date	16/08/2018
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with a systematic theoretical and practical understanding of the design, implementation and application of database systems. Including more advanced concepts that underpin multi-user database architectures for business applications.

LEARNING OUTCOMES

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

- Apply well-established database analysis and design techniques to critically analyse and implement real-world database application scenarios.
- Critically evaluate selected database methods, tools and techniques and their deployment in a multi-user database environment.

INDICATIVE CONTENT

- Database models (e.g. relational, Object-oriented and Object relational)
- Database design and entity analysis techniques e.g. conceptual, logical and physical database design, entity relationship modelling, normalisation and indexes.
- Structured Query Language (SQL): data definition, data manipulation and data control languages.
- Database security and access control, e.g. database security threats and countermeasures, access control techniques.
- Multi-user database concepts e.g. transaction management, concurrency control and recovery and distributed databases, CAP Theorem.
- Non-SQL database systems and concepts e.g. NoSQL and NewSQL technologies.
- Professional, legal and ethical issues related to data management and data governance.
- Introduction to Big Data Concepts e.g. Hadoop

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7002	
Module Title	Database Systems	
Classification	Reading List entry	Electronic*
Essential	Connolly, T., Begg, C., (2015), <i>Database Systems: A Practical Approach to Design, Implementation and Management</i> , 6 th Edition, Pearson (Int)	☒
Essential	Hernandez, M., (2013), <i>Database Design for Mere Mortals: A Hands-on Guide to Relational Database Design 3rd Edition</i> , Addison Wesley	☐
Essential	Hills, T., (2016), <i>NoSQL and SQL Data Modeling: Bringing Together Data, Semantics, and Software</i> , Technics Publications	☒
Further	Dayley, B., (2014), <i>NoSQL with MongoDB in 24 Hours</i> , Sams Teach Yourself, Sams Publishing	☒
Further	Harrison, G., (2015), <i>Next Generation Databases: NoSQL and Big Data</i> , Apress	☒

Further	Sullivan, D., (2015), <i>NoSQL for Mere Mortals</i> , Addison-Wesley Professional	☐
Further	Ricardo, C. M., Urban, S. D. (2015), <i>Databases Illuminated</i> , 3rd Edition, Jones & Bartlett Learning	☐
Further	IEEE Xplore	☒
Further	ACM Transactions	☒

Module Code	ACCA7003
Title	Object-Oriented Programming
Date	16/08/2018
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To provide the student 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 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
- Design and develop OO applications to solve a given problem scenario.

INDICATIVE CONTENT

- Abstract data types (ADT)
- Simple data structures: stacks, queues
- Static and dynamic memory allocation for implementing data structures
- Files and record structures
- Containers and iterators
- Lists, linked lists, heaps, trees, binary trees, graphs
- sorting and searching algorithms
- Hashing: open addressing, chaining
- Complexity considerations
- Concepts of object orientation including objects, classes, encapsulation composition, inheritance, delegation, polymorphism, interfaces.
- Object oriented design methods
- UML
- Software frameworks, SDK, API programming
- Object oriented programming

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written exam	2 hours	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7003	
Module Title	Object-Oriented Programming	
Classification	Reading List entry	Electronic*
Essential	Thottungal,F.J. (2017) Introduction to Algorithms: Quick & Easy, Amazon Media	☒
Essential	Sedgewick (2014) Algorithms 4 th edition (Deluxe), Amazon Media	☒
Essential	Meyers.S (2014) Effective Modern C++, O'Reilly Media	☒
Further	Stroustrup,B (2014) Programming: Principles and Practice Using C++	☐
Further	Gonnet, G. and Baeza-Yates, R., (1991) <i>Handbook of Algorithms and Data Structures</i> , Addison-Wesley	☐
Further	IEEE Xplore	☐
Further	ACM Transactions	☐

MODULE CODE: ACCA7004
TITLE: Web Development
DATED: 16/08/2018

LEVEL: 7
CREDITS: 20

JACS CODE: I200

AIM(S)

To provide students with a systematic theoretical and practical understanding of the web application languages and techniques.

LEARNING OUTCOMES

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

- Demonstrate a systematic understanding of the web application development process and the architecture of web applications.
- Select and critically evaluate the web development technologies, techniques and tools applied to the implementation of a web application.

INDICATIVE CONTENT

- Client-side development languages and techniques. HTML, CSS, SASS, etc.
- Applications of JavaScript including AJAX and the role of web services in application development. Data exchange using JSON.
- Virtualisation of developer environments e.g. using Docker, etc.
- Server-side development
- Database programming including ORM tools.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Assessment Summary

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

READING LIST

Module Code	ACCA7004	
Module Title	Web Development	
Classification	Reading List entry	Electronic*
Essential	Nixon, R., (2018), <i>Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5, 5th Edition</i> , O'Reilly	☒
Essential	Flanagan, D., (2011), <i>JavaScript: The Definitive Guide: Activate Your Web Pages</i> , O'Reilly	☒
Essential	Freeman, A., (2017), <i>Pro ASP.NET Core MVC 2, 7th Edition</i> , Apress	☒
Further	Welling, L., Thomson, L., (2016), <i>PHP and MySQL Web Development, 5th Edition</i> , Addison-Wesley Professional	☒
Further	Mead, A., (2018), <i>Learning Node.js Development: Learn the fundamentals of Node.js, and deploy and test Node.js applications on the web</i> , Packt Publishing	☒
Further	Meloni, J.C., (2014), <i>HTML, CSS and JavaScript All in One, Sams Teach Yourself: Covering HTML5, CSS3, and jQuery, 2nd Edition</i> , Sams Publishing	☒
Further	Miell, I., Sayers, A. H., (2016), <i>Docker in Practice</i> , Manning Publishing	☐
Further	IEEE Xplore	☒
Further	ACM Transactions	☒

MODULE CODE: ACCA7005
TITLE: Web Services
DATED: 16/08/2018

LEVEL: 7
CREDITS: 20

JACS CODE: I200

AIM(S)

To provide students with a systematic theoretical and practical understanding of the design and implementation of cloud-based applications and services.

LEARNING OUTCOMES

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

- Deploy cloud-based technologies, design principles and patterns to build web services and applications.
- Critically evaluate technologies, tools, patterns and methods for cloud application development.

INDICATIVE CONTENT

- Web services, REST Web Services, etc.
- Cross-Origin Resource Sharing (CORS)
- Serverless applications.
- Cloud computing, ethos of the public cloud, cloud related design patterns e.g. Stability patterns such as the Bulkhead and Circuit Breaker patterns
- Concurrency including race conditions, semaphores, mutexes, async, etc.

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2500 words	50%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Summary

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

READING LIST

Module Code	ACCA7005	
Module Title	Web Services	
Classification	Reading List entry	Electronic*
Essential	Balachandar, B. M., (2017), <i>RESTful Java Web Services: A pragmatic guide to designing and building RESTful APIs using Java, 3rd Edition</i> , Packt Publishing	☒
Essential	Gilbert, J., (2018), <i>Cloud Native Development Patterns and Best Practices: Practical architectural patterns for building modern, distributed cloud-native systems</i> , Packt Publishing	☒
Essential	Stojanovic, S., (2018), <i>Serverless Applications with Node.js: Using AWS Lambda and Claudia.js</i> , Mannings Publications	☐
Further	Wittig, A., Wittig, M., (2018), <i>Amazon Web Services in Action, 2nd Edition</i> , Mannings Publications	☐
Further	Kalin, M., (2013), <i>Java Web Services: Up and Running: A Quick, Practical, and Thorough Introduction, 2nd Edition</i> , O'Reilly	☒
Further	Burns, B., (2018), <i>Designing Distributed Systems: Patterns and Paradigms for Scalable, Reliable Services</i> , O'Reilly	☒
Further	Zambrano, B., (2018), <i>Serverless Design Patterns and Best Practices: Build, secure, and deploy enterprise ready serverless applications with AWS to improve developer productivity</i> , Packt Publishing	☒
Further	Sreeram, P. K., (2017), <i>Azure Serverless Computing Cookbook: Build applications hosted on serverless architecture using Azure Functions</i> , Packt Publishing	☒
Further	IEEE Xplore	☒
Further	ACM Transactions	☒

MODULE CODE: ACCA7006
TITLE: Major Project
DATED: 16/08/2018

LEVEL: 7
CREDITS: 60

JACS CODE: I200

AIM(S)

- To deepen students' critical faculties and powers of expression providing them with practice in the organisational skills necessary to pursue a research project using appropriate research methodologies to investigate and analyse relevant issues.
- To allow the student to advance their knowledge and understanding by undertaking and managing a significant project of their own choice, related to the major themes of their MSc programme.

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

- Research principles and approaches
- Research methodologies - historical, descriptive, correlational, comparative, experimental.
- Developing a proposal - research statement, research outline and design research schedule
- Collation and communication - recording and organising information, analysis of results, communicating the results, referencing, plagiarism.
- Project planning - project time scale control
- Establishing and justifying metrics, analysis of test results, including software benchmarking,
- Contingency planning
- Development of documentation for academic projects
- Presentation of work produced to an academic audience
- Subject-specific content as required
- Intellectual property - copyright, trademarks, patents.

- Social and cultural context, and ethical issues

LEARNING AND TEACHING STRATEGY

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	15	3%*
Independent learning	585	97%
Placement learning	0	0%
TOTAL	600	100%

(*Note: regular contact with project supervisor will also be required, and is included in the hours above)

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Project Proposal	2,000 words	10%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Final Report	11,000 words max	70%

Assessment Component 3

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Final Presentation	20 minutes	20%

The Major Project module deviates from the standard assessment recommendations given in the quality handbook due to its special role within the programme. This module has been developed and perfected over many years and it was found that without several levels of intermediate assessment then students tended to fall behind on this module.

Assessment Summary

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

READING LIST

Module Code	ACCA7006	
Module Title	Major Project	
Classification	Reading List entry	Electronic*
Essential	McCormac, C. and Davis, J. (2015) <i>Research Project Success: The Essential Guide for Science and Engineering Students</i> , Cambridge: Royal Society of Chemistry	☒
Essential	Greenfield, T. (2016) <i>Research Methods for Postgraduates</i> , London: Arnold	☒
Further	O'Leary, Z. (2015) <i>The Essential Guide to Doing Your Research Project</i> , Newcastle upon Tyne: Sage	☒
Further	Kranzler, J. H. (2017) <i>Statistics for the Terrified</i> , Upper Saddle River: Prentice Hall	☒
Further	Maylor H. (2010) <i>Project Management</i> , Boston: Pearson	☐
Further	Avison, D. and Fitzgerald, G. (2007) <i>Information Systems Development: Methodologies, Techniques and Tools, 4th Edition</i> , New York: McGraw-Hill	☐
Further	Highsmith J. (2009) <i>Agile Project Management: Creating Innovative Products, 2nd Edition</i> , Boston: Addison-Wesley	☒
Further	Hughes, B. and Cotterell, M. (2009) <i>5th Software Project Management</i> , New York: McGraw-Hill	☐
Further	Phillips, J. (2010) <i>IT Project Management: On Track from Start to Finish</i> , New York: McGraw-Hill	☐
Further	Yeates, D, Cadle (2008), <i>Project Management for Information Systems (5th Edition)</i> , Upper Saddle River: Prentice Hall	☐
Further	Baase, S. (2012) <i>A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 4th Edition</i> , Boston: Pearson	☐
Further	Collis, J. and Hussey, R. (2009) <i>Business Research: a Practical Guide for Undergraduate and Postgraduate Students</i> , 3rd Edition, London: Palgrave Macmillan	☐
Further	Cottrell, S. (2011) <i>Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides</i> , 2nd Edition, London: Palgrave Macmillan	☐
Further	Davies, M. B. (2007) <i>Doing a Successful Research Project</i> , London: Palgrave Macmillan	☐
Further	Dawson, C. W. (2009) <i>Projects in Computing and Information Systems: a Student's Guide</i> , 2nd Edition, Boston: Addison-Wesley	☐
Further	Denscombe, M. (2010) <i>The Good Research Guide</i> , Oxford: OUP	☐
Further	Few, S. (2012) <i>Show Me the Numbers: Designing Tables and Graphs to Enlighten</i> , Burlingame: Analytics Press	☐
Further	Quinn, M. J. (2010) <i>Ethics for the Information Age: International Edition - 4th Edition</i> , Boston: Pearson	☐
Further	Yin, R. K. (2008) <i>Case Study Research: Design and Methods</i> , 4th Edition, Newcastle upon Tyne: Sage	☐

Further	Journals ACM Transactions on Information Systems Behaviour and Information Technology Communications on the ACM International Journal of Electronic Commerce Journal of Strategic Information Systems Journal of Systems Management	☒
Further	Websites http://www.acm.org http://www.bized.co.uk http://www.managers.org.uk http://www.cbronline.com http://www.eevl.ac.uk http://juno.emeraldinsight.com http://www.ft.chadwyck.co.uk http://www.itwales.com http://www3.gartner.com http://www.silicon.com http://www.mckinseyquarterly.com http://www.zdnetweek.co.uk http://projectmanagement.ittoolbox.com/ http://www.ics.ltsn.ac.uk/resources/projman/index.html http://www.niwotridge.com/Resources/PM-SWEResources/PMResources.htm http://www.tickit.org/international.htm http://www.bcs.org/ http://www.uml.org/ http://www.omg.org/	☒

Module Code	ACCA7015
Title	Data Mining and Visualisation
Date	11/04/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To develop the student's ability to apply suitable statistical and data mining techniques using a variety of supervised and unsupervised data mining methods.

LEARNING OUTCOMES

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

- Apply and justify the application of a range of statistical methods and data mining techniques to the extraction of information from data.
- Critically evaluate the validity of the techniques employed with respect to the relevant data and to their intended use.
- Interpret the intelligence provided by the data mining process within the context of the data set investigated.
- Effectively communicate the data mining process and its results to a decision maker.

INDICATIVE CONTENT

- Data mining methodologies such as CRISP-DM and SEMMA
- Data preparation, visualisation and exploration
- Basic techniques: statistical modelling, decision trees, rulesets, association rules, linear models, regression, instance-based learning, clustering, multi-instance learning, text mining, sentiment analysis
- Credibility of data mining solutions; training and testing, information loss, cost curves; minimum description length principle
- Machine learning; classification, association, perceptrons, numeric prediction, Bayesian networks, semi-supervised and unsupervised learning
- Data transformations; attribute selection, discretisation, projection, sampling, cleansing
- Applications of data mining
- Software tools for data mining

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
Presentation	8 minutes	25%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	4,500 words	75%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7015	
Module Title	Data Mining and Visualisation	
Classification	Reading List entry	Electronic*
Essential	North, M. (2018) <i>Data Mining for the Masses, 3rd Ed.: With Implementations in RapidMiner and R</i> . CreateSpace Independent Publishing	☒
Essential	Witten, I. H., Frank, E., Hall, M. A. and Pal, C. J. (2016) <i>Data Mining: Practical Machine Learning Tools and Techniques, 4th Edition</i> , Burlington: Morgan Kaufmann	☒
Further	Tuffery, S. (2011) <i>Data Mining and Statistics for Decision Making</i> , Hoboken: Wiley	☒
Further	Kranzler, J.H. (2017) <i>Statistics for the Terrified</i> , Pearson	☒
Further	Few, S. (2012), <i>Show Me The Numbers</i> , Analytics Press, Burlingame, CA.	☒
Further	Websites: http://www.kdnuggets.com/	☒

	http://www.kdd.org/	
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Module Code	ACCA7019
Title	Network Security
Date	11/04/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

- Current and emerging security related web-based technologies eg Intranet, ecommerce
- Use of the Security Policy and Security Management in an organisation eg roles and responsibilities, security policies
- Cryptography and Digital Identification: PKI, Signatures, Certificates
- Cyber security
- Web server security
- Operating system security
- Firewalls and their architectures e.g. packet filtering, proxies and stateful-packet inspection
- Virtual Private Networks (VPNs) concepts
- Implementing Defence-in-Depth strategies: eg tools for scanning system weaknesses
- The future of Information Security eg m-commerce, ID theft, biometrics
- Wireless Security

- Intrusion detection
- Honeypots/Honeynets

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	6,000 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7019	
Module Title	Network Security	
Classification	Reading List entry	Electronic*
Essential	Stallings, W. (2017) Cryptography and Network Security: Principles and Practice (7th Edition), Pearson Education Limited	☒
Essential	Stallings, W. (2017), Network Security Essentials (6th Edition), Pearson Education Limited 2017	☒
Essential	Stallings, W. (2018), Computer Security: Principles and Practice, Global Edition 4th Edition	☐
Further	Blunden, W. (2013) The Rootkit Arsenal: Escape and Evasion in the Dark Corners of the System, 2 nd Edition, Burlington: Jones and Bartlett Learning	☒
Further	McClure, S. (2012) Hacking Exposed 7: Network Secrets and Solutions, New York: McGraw-Hill Osborne	☒
Further	Pfleger, C. P. (2012), Analyzing Computer Security: A Threat / Vulnerability / Countermeasure Approach, Pearson Education Ltd	☒

Further	Ferguson, N., Schneier, B. and Kohno, T. (2010) Cryptographic Engineering: Design Principles and Practical Applications, Hoboken: Wiley	☒
Further	Provos, N. and Holz, T. (2008), Virtual Honeypots from Botnet tracking to Intrusion Detection, Boston: Addison-Wesley	☒
Further	Bejtlich, R. (2005) The Tao of Network Security Monitoring: Beyond Intrusion Detection, Boston: Addison-Wesley	☒
Further	Galbreath, N. (2002) Cryptography for Internet and Database Applications: Developing Secret and Public-Key Techniques with Java, Hoboken: Wiley	☒
Online	IEEE Transactions on Security & Privacy	☒
Online	IEEE Transactions on Information Forensics and Security	☒
Online	ACM Digital Library	☒
Online	Science Direct	☒

Module Code	ACCA7022
Title	Advanced Statistical Programming
Date	31/07/2020
Level	7
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
- Perform data exploration using appropriate visualisation tools.

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.
- Interactive data exploration.

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	2,500 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7022	
Module Title	Advanced Statistical Programming	
Classification	Reading List entry	Electronic*
Essential	Matloff, N. (2013) <i>The Art of R Programming</i> , No Starch Press	☒
Essential	Spiegelhalter, D. (2019) <i>The Art of Statistics: Learning From Data</i> . Pelican Books, Penguin Random House.	☒
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	ACCA7023
Title	Agile Development and Software DevOps
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to critically evaluate and deploy agile software development methods, tools, patterns and techniques in the design and implementation of software
- To provide a systematic understanding of the critical role that Software development operations (DevOps) and tool chains play within agile development environments

LEARNING OUTCOMES

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

- Critically evaluate the practices and tools used by agile development teams to efficiently develop reliable software
- Demonstrate a deep understanding of the importance of agile software development and the Software DevOps processes for automation, monitoring, testing and collaboration

INDICATIVE CONTENT

- Agile Software development process and approaches e.g. SCRUM
- Software development methods e.g. Feature Driven Development
- Software design methods e.g. User Stories, User Story Mapping
- Continuous Integration (CI) e.g. automated software building and testing using Jenkins
- Configuration Management for the automation of system changes e.g. Ansible, Puppet etc.
- Continuous Delivery (CD), version control tools e.g. using Git for branching and merging
- Continuous Monitoring and Testing e.g. the automation of testing
- Continuous Deployment e.g. using Ansible or Terraform to deploy a build
- Software design principles e.g. cohesion vs coupling
- Software design patterns e.g. Singleton, Factory 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
Portfolio	5,000 words or equivalent Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Documented application of tools or processes • Software implementation • Demonstration of their work e.g. written or presentation Team based assessment (this would only ever form a part of the assessment)	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7023	
Module Title	Agile Development and Software DevOps	
Classification	Reading List entry	Electronic*
Essential	Sommerville, I. (2015), Software Engineering, Pearson	☒
Essential	Krief, M., (2019) Learning DevOps: The complete guide to accelerate collaboration with Jenkins, Kubernetes, Terraform and Azure DevOps, Packt Publishing	☒

Further	Leszko, R., (2019) Continuous Delivery with Docker and Jenkins: Create secure applications by building complete CI/CD pipelines, 2 nd Edition, Packt Publishing	☒
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	Sutherland, J., (2015) Scrum: The Art of Doing Twice the Work in Half the Time, Random House Business	☒
Further	Laster. B., (2018) Jenkins 2 - Up and Running, O'Reilly	☒
Further	Keeting, J., Freeman, J., (2019) Mastering Ansible: Effectively - automate configuration management and deployment challenges with Ansible 2.7, Packt Publishing	☒

Module Code	ACCA7025
Title	Application of Machine Learning
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To develop in students a systematic understanding of modern machine learning and deep learning principles and practice

LEARNING OUTCOMES

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

- Critically analyse and justify the application of selected machine learning methods and techniques used to solve complex problems.
- Apply and evaluate a range of machine learning methods used to solve given problems
- Analyse given problems and subsequently synthesise and evaluate appropriate solutions using deep learning methods

INDICATIVE CONTENT

- History and Context of ML and Deep Learning
- Machine learning workflows and methodologies
- Datasets, data preparation, feature selection and engineering; training, testing and validation datasets
- Gradient descent, learning rate, loss, stochastic gradient descent
- Generalisation: Underfitting and overfitting, regularisation
- Supervised and unsupervised methods for classification and regression (eg linear regression, polynomial regression, logistic regression, decision trees, SVMs, naïve Bayes, k-means, etc)
- Accuracy, precision and recall, ROC, AUC
- Dimensionality reduction, principle component analysis
- Ensemble Learning
- Neural Networks(NN) and Deep Learning
- Perceptrons, deep neural networks, activation functions
- Training

- Convolutional NN, recurrent NN, autoencoders
- Reinforcement Learning
- Python, virtual environments (eg conda) Scikit-Learn, Pandas, Tensorflow and Keras

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written/programming Assignment	3,000 words equivalent	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Written/programming Assignment	3,000 words equivalent	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7025	
Module Title	Application of Machine Learning	
Classification	Reading List entry	Electronic*

Essential	Geron, A. (2019) Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow (2 nd edition), O'Reilly	☒
Essential	Goodfellow. I, Bengio. Y, Courville. A and Bach. F (2017), Deep Learning, MIT Press	☒
Further	Burkov, A (2019) The Hundred-Page Machine Learning Book, Burkov, A	☒
Further	Chollet, F. (2017) Deep Learning with Python Paperback , Manning Publications	☒
Further	Russell, S. and Norvig, P. (2009) Artificial Intelligence: A Modern Approach (3rd edition), Prentice Hall	☒
Further	Barber, M. (2012) Bayesian Reasoning and Machine Learning, Cambridge University Press	☒
Further	Bishop, C.M. (2007) Pattern Recognition and Machine Learning, Springer	☐

Module Code	ACCA7026
Title	Artificial Intelligence
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To develop the students' ability to solve complex problems using modern AI principles and practice

LEARNING OUTCOMES

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

- Critically analyse, evaluate and justify selected AI methods and techniques used to solve complex problems.
- Analyse given problems and subsequently synthesise and evaluate appropriate solutions using selected AI methods and techniques.

INDICATIVE CONTENT

- Definitions of Strong and Weak AI
- Ethics and Risks of developing AI
- Agent Based Learning
- Problem solving as search: Informed and un-informed search; Global and Local search; Optimisation and constraints
- Population based search: Genetic Algorithms and Particle Swarm Optimisation
- Knowledge representation, reasoning and inference; propositional and predicate logic
- Rule based systems, expert systems, fuzzy logic
- Natural Language Processing
- Perception and Vision: Image processing, object recognition and reconstruction of the 3D world.
- Machine Learning: Supervised, unsupervised methods for classification and regression (eg Decision trees, SVMs, Naïve Bayes, k-means, Neural Networks, etc.)
- Reinforcement Learning

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7026	
Module Title	Artificial Intelligence	
Classification	Reading List entry	Electronic*
Essential	Russell, S. and Norvig, P. (2009) Artificial Intelligence: A Modern Approach (3rd edition), Prentice Hall	☒
Essential	Goodfellow, I; Bengio, Y; Courville, A; Bach, F (2017), Deep Learning, MIT Press	☒
Further	Cormen, T; Leiserson, C; Rivest, R; Stein, C (2009) Introduction to Algorithms (3rd edition), MIT Press	☒
Further	McKinney.W (2017) Python for Data Analysis (2nd edition), O'Reilly	☒
Further	Barber, M. (2012) Bayesian Reasoning and Machine Learning, Cambridge University Press	☒
Further	Bishop, C.M. (2007) Pattern Recognition and Machine Learning, Springer	☐

Module Code	ACCA7027
Title	Cloud Engineering Principles and Practice
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To enable students to critically evaluate cloud related systems, technologies, applications, software development process, administration techniques and principles
- To be able to implement, configure or work within a virtualised environment that can either be deployed to the cloud or implemented within the cloud computing providers platform

LEARNING OUTCOMES

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

- Critically evaluate the cloud computing related technologies and the applications of cloud services
- Implement virtual systems and/or applications that can be deployed to the cloud and demonstrate an understanding of the features of platforms provided by cloud computing providers

INDICATIVE CONTENT

- Containerization using Docker and Kubernetes, building and running images, Docker compose
- Big data. Principles of distributed file systems (Hadoop, AWS EFS), NoSQL e.g. Redis, AWS S3, MongoDB, AWS DynamoDB, Cassandra, CAP Theorem, etc.
- Infrastructure components of cloud computing provider platforms e.g. virtual networks, virtual machines (e.g. EC2 instances), containers (e.g. AWS ECS), gateways, etc.
- Availability and scalability e.g. Load balancing and scaling groups.
- Web service and microservice deployment, message and event queues e.g. RabbitMQ, Kafka, AWS Simple Queue Service
- Security of virtualized systems, authorization, firewalls, security groups, etc.
- Applications e.g. web servers, Node.js web services, IoT, 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		
TOTAL	200	100%

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	5,000 words equivalent Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Documented application of tools or processes • Administration of virtualized systems • Implementation of cloud computing related applications • Discussion or demonstration of cloud computing platform features or functionality • Demonstration of their work e.g. written or presentation	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7027	
Module Title	Cloud Engineering Principles and Practice	
Classification	Reading List entry	Electronic*

Essential	Kane, S.P., Matthias, K., (2018) Docker: Up & Running: Shipping Reliable Containers in Production, O'Reilly Media	☒
Essential	Laszewski, T., Arora, K., Farr, E., Zonooz, P., (2018) Cloud Native Architectures: Design high-availability and cost-effective applications for the cloud. Packt Publishing	☒
Essential	Perkins, L., Redmond, E., Wilson, J., (2018) Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement, Second Edition. Pragmatic Bookshelf	☒
Further	Burns, B., Beda, J., Hightower, K., (2019) Kubernetes: Up and Running: Dive into the Future of Infrastructure, O'Reilly Media	☒
Further	Bradshaw, S., Brazil, E., Chodorow, K., (2019) MongoDB: The Definitive Guide: Powerful and Scalable Data Storage, O'Reilly Media	☒
Further	Sarkar, A., Shah, A., (2018) Learning AWS, Second Edition. Packt Publishing	☒
Further	Ganesan, K., Skaria, R., Vos, F., (2020) Hands-On Linux Administration on Azure: Develop, maintain, and automate applications on the Azure cloud platform. Packt Publishing	☒
Further	Morris, K., (2016) Infrastructure as Code: Managing Servers in the Cloud. O'Reilly Media	☒

Module Code	ACCA7028
Title	Data Security, Governance and Compliance
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	

AIM(S)

- To provide students with sound principles of information systems security, governance and compliance for organisation goals and objectives. They must learn how to support, manage and make effective use of Information Technology (IT) frameworks, models, new regulations and standards of good practice for security management. Student must be able to assess and recognises emerging threats and vulnerability present in existing systems.

LEARNING OUTCOMES

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

- Demonstrate a systematic understanding of a wide range of current research and technological advances in data security, governance and compliance.
- Consistently apply the principles and practices of data security with skills and experiences to administer and manage the more secure information and communications technology environment that organisations need.

INDICATIVE CONTENT

- Introduction to Management of Information Security.
- The need for Security.
- Compliance: Law and Ethics.
- Governance and Strategic Planning for Security.
- Security Management Models.
- Security Management Practices.
- Planning for Contingencies.
- Information Security Policy.
- Developing the Security Program.
- Risk Management: Identifying and Assessing Risk.
- Risk Management: Controlling Risk.
- Security Maintenance and the Management of Digital Forensics.

- Protection Mechanisms.
- Cryptography.
- Physical Security.
- Implementing Information Security.
- Security and Personnel.
- Information Security Maintenance.
- Intrusion Detection, Prevention Systems and Other Security Technology.
- Access Controls, Firewalls and VPNs.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7028	
Module Title	Data Security, Governance and Compliance	
Classification	Reading List entry	Electronic*
Essential	Management of Information Security 6th Ed by Michael E Whitman, Herbert	☒
Essential	Principles of Information Security 6th Ed by Michael E. Whitman	☒
Further	The Management of Network Security, Technology, Design and Management Control, by Houston, H. Carr, Charles A. SNYDER and Bliss N. Bailey	☐
Further	Cryptography and Network Security: Principles and Practice, Global Edition, 7/E William Stallings	☐
Further	Network Security Essentials: Applications and Standards, Global Edition, 6/E William Stallings	☐
Further	Fundamentals of Information Systems Security, by David Kim and Michael G. Solomon	☐
Further	IEEE/ACM, IEEE/ACM Transactions on Networking	☒
Further	IEEE, IEEE Network Magazine	☒
Further	Science Direct	☒

Module Code	ACCA7029
Title	Enterprise Core Networking
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To develop in depth the knowledge and skills needed to configure, troubleshoot, and manage enterprise wired and wireless networks. To have a broader architectural understanding and deep implementation skills required by enterprise networks.

LEARNING OUTCOMES

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

- Demonstrate a comprehensive and detailed theoretical and practical knowledge of IP Switching and Routing within enterprise network environments.
- Analyse and apply advanced technologies to support a secure and scalable enterprise network architecture.

INDICATIVE CONTENT

- The hierarchical network design model and architecture using the access, distribution, and core layers.
- Troubleshoot Layer 2 connectivity using VLANs and trunking
- Implementation of redundant switched networks using Spanning Tree Protocol
- Troubleshooting link aggregation using Etherchannel
- Features, metrics, and path selection concepts of Enhanced Interior Gateway Routing Protocol (EIGRP)
- Implementation and optimization of Open Shortest Path First (OSPF)v2 and OSPFv3, including adjacencies, packet types, and areas, summarization, and route filtering for IPv4 and IPv6.
- Implementing External Border Gateway Protocol (EBGP) interdomain routing, path selection, and single and dual-homed networking
- Implementing network redundancy using protocols including Hot Standby Routing Protocol (HSRP) and Virtual Router Redundancy Protocol (VRRP)
- Implementing internet connectivity within Enterprise using static and dynamic Network Address Translation (NAT)
- virtualization technology of servers, switches, and the various network devices and components

- Implementing overlay technologies such as Virtual Routing and Forwarding (VRF), Generic Routing Encapsulation (GRE), VPN, and Location Identifier Separation Protocol (LISP)
- the components and concepts of wireless networking including Radio Frequency (RF) and antenna characteristics, and define the specific wireless standards
- the various wireless deployment models available, include autonomous Access Point (AP) deployments and cloud-based designs within the centralized Cisco Wireless LAN Controller (WLC) architecture
- Troubleshooting Enterprise networks using services such as Network Time Protocol (NTP), Simple Network Management Protocol (SNMP), Cisco Internetwork Operating System (Cisco IOS®) IP Service Level Agreements (SLAs), NetFlow, and Cisco IOS Embedded Event Manager
- scalable administration using Authentication, Authorization, and Accounting (AAA) and the local database, while exploring the features and benefits
- The concepts and features of Quality of Service (QoS), and describe the need within the enterprise network

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

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

Mode of assessment	Volume	Weighting
Exam	2 hours	50%

Assessment Component 2

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

Mode of assessment	Volume	Weighting
In-class test	3 hours	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7029	
Module Title	Enterprise Core Networking	
Classification	Reading List entry	Electronic*
Essential	B Edgeworth, R G Rios, J Gooley and D Hucaby, (2020) CCNP and CCIE Enterprise Core ENCOR 350-401 Official Cert Guide by Cisco Press	☒
Essential	Cisco Academy Website, www.netacad.com (password access only)	☒
Further	CCNP Routing and Switching ROUTE 300-101 Official Cert Guide (2014), Kevin Wallace by Cisco Press	☒
Further	CCNP Routing and Switching SWITCH 300-115 Official Cert Guide (2014), David Hucaby by Cisco Press	☒

Module Code	ACCA7030
Title	Security Analysis, Techniques and Procedures
Date	31/07/2020
Level	7
Credits	20
Pre-Requisites	

AIM(S)

- To establish concepts relating to essential procedures and corresponding techniques involved in security analysis activities, in correlation to real-world scenarios. Students will gain understanding of security threats, information security procedures and methodologies using up-to-date tools that will allow them to facilitate assessments and technical approaches that are necessary to analyse and mitigate risks, threats, vulnerabilities and attacks relating to cyber incidents which could occur across various industries.

LEARNING OUTCOMES

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

- Provide a systematic understanding of a wide range of current research and technological advances in cyber security incidents and defensive techniques.
- Perform information security assessments, investigate, analyse, and support cyber security activities of an organisation with effective usage of security tools and methodologies.

INDICATIVE CONTENT

- Security Threats, Attack Vectors and Defense Technologies including but not limited to:
 - Elements of Information Security (CIA Triad, Defense in Depth, IDS, etc.)
 - Cryptography
 - Malware Threats
 - Threats to Hosts, Networks and Web Applications
- Security Assessment – Processes and Methodologies including but not limited to:
 - Open-Source Intelligence (OSINT)
 - Social Engineering Campaigns
 - Network Penetration Testing
 - Web Application Penetration Testing
 - Wireless Penetration Testing
- Incident Response and Handling Process including but not limited to:
 - Cyber Kill Chain & Threat Intelligence
 - Security Auditing & Policies
 - Role of SOC in Incident Response
- Forensic Science – Procedures and Methodology
- Information Security and Forensic 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
Report	5,000 words	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA7030	
Module Title	Security Analysis, Techniques and Procedures	
Classification	Reading List entry	Electronic*
Essential	Cybersecurity – Attack and Defense Strategies - 2 nd Edition by Yuri Diogenes and Erdal Ozkaya	☒
Essential	The InfoSec Handbook - An Introduction to Information Security by Umesh Hodeghatta Rao and Umesha Nayak	☒
Essential	Computer Forensics: Computer Crime Scene Investigation by John R. Vacca	☒
Essential	Ethical Hacking and Penetration Testing Guide by Rafay Baloch	☒
Further	Digital Forensics and Incident Response Incident Response Techniques and Procedures to Respond to Modern Cyber Threats, 2 nd Edition By: Gerard Johansen	☒
Further	The Open Web Application Security Project (OWASP): https://owasp.org/ , https://owasp.org/www-project-top-ten/	☒
Further	Blunden, W. (2013) The Rootkit Arsenal: Escape and Evasion in the Dark Corners of the System, 2 nd Edition, Burlington: Jones and Bartlett Learning	☒

Further	McClure, S. (2012) Hacking Exposed 7: Network Secrets and Solutions, New York: McGraw-Hill Osborne	☒
Further	Pfleger, C. P. (2012), Analyzing Computer Security: A Threat / Vulnerability / Countermeasure Approach, Pearson Education Ltd	☒
Further	Ferguson, N., Schneier, B. and Kohno, T. (2010) Cryptographic Engineering: Design Principles and Practical Applications, Hoboken: Wiley	☒
Further	Provos, N. and Holz, T. (2008), Virtual Honeypots from Botnet tracking to Intrusion Detection, Boston: Addison-Wesley	☒
Further	Bejtlich, R. (2005) The Tao of Network Security Monitoring: Beyond Intrusion Detection, Boston: Addison-Wesley	☒
Further	Galbreath, N. (2002) Cryptography for Internet and Database Applications: Developing Secret and Public-Key Techniques with Java, Hoboken: Wiley	☒
Online	IEEE Transactions on Security & Privacy	☒
Online	IEEE Transactions on Information Forensics and Security	☒
Online	ACM Digital Library	☒
Online	Science Direct	☒