



Prifysgol Cymru
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University of Wales
Trinity Saint David

MODULE DIRECTORY

BSC CLOUD COMPUTING

INSTITUTE OF INNERCITY LEARNING LONDON

LEVEL 4 ,5 & 6

2022-23

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Introduction

This Module Directory includes all the modules for level 4, 5 and 6 within the Academic Discipline of Applied 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 London Student Services at londonstudentservices@uwtsd.ac.uk.

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.

Cloud Computing Modules

Module Code	Module Title	Module type (Core, Compulsory, Optional)	Credits
Year 1	Level 4	Semester 1/2	Sept. to May
ACCA4022	Computer Architecture and Operating Systems	Compulsory	20
ACCB4002	Data Analysis and Visualisation	Compulsory	20
ACCA4023	Introduction to Web and Database Concepts	Compulsory	20
ACCA4025	Learning in the Digital Era	Compulsory	20
ACCA4024	Networks and Cyber Security Essentials	Compulsory	20
ACCB4017	Software Development	Compulsory	20
Year 2	Level 5	Semester 1/2	Sept. to May
ACCA5024	Advanced Networking	Compulsory	20
ACCA5033	Changemakers: Creativity and Value Creation	Compulsory	20
ACCA5025	Cloud Computing Architecture	Compulsory	20
ACCA5034	Data Security and Compliance	Compulsory	20
ACCA5023	Network Operating Systems and Services	Compulsory	20
ACCA5029	Network Programmability	Compulsory	20
Year 3	Level 6	Semester 1/2	Sept. to May
ACCB6000	Advanced Cyber Security	Compulsory	20
ACCA6025	Cloud Computing Administration	Compulsory	20
ACCA6019	Emerging Trends	Compulsory	20
ACCA6020	Independent Project	Compulsory	40
ACCA6022	Switching, Routing and Wireless	Compulsory	20

BSC Level 4 module details

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

- Frequency distributions, descriptive statistics, the normal curve, percentiles and standard scores, hypothesis development, confidence limits
- Correlation coefficients, the t test, chi-square test
- Software for statistical analysis and data visualisation
- Different types of data; nominal, ordinal, categorical, network data; univariate, bivariate, trivariate, hypervariate data
- Appropriate display methods for differing data types; graphs, tables, icons.

- Histograms, boxplots, scatterplots, barcharts, parallel coordinate plots, maps
- Rearranging data to extract meaning from it; introducing distortion to provide clarity
- Identifying problems with visualisations

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Report	2000 words	50%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB4002	
Module Title	Data Analysis and Visualisation	
Classification	Reading List entry	Electronic*
Essential	Kranzler, J.H. (2017) <i>Statistics for the Terrified</i> , Rowman & Littlefield.	☒
Essential	Few, S. (2012), <i>Show Me The Numbers</i> , Analytics Press, Burlingame, CA.	☒

Further	Schmuller, J. (2016), <i>Statistical Analysis With Excel For Dummies (4th Ed.)</i> , John Wiley and Sons	☒
Further	MacInnes, J. (2018), <i>Little Quick Fix: Know Your Numbers</i> , Sage,	☒
Further	Spiegel, M.R (2014) <i>Shaum's Outline of Statistics, fifth ed.</i> , McGraw Hill Education Limited	☒
Further	Gonick, L & Smith, W. (2000) <i>Cartoon Guide to Statistics</i> , William Morrow Paperbacks	☒
Further	Spence, R. (2014), <i>Information Visualization: An Introduction</i> Prentice Hall	☐
Further	Tufte, E. (2001) <i>The Visual Display of Quantitative Information (2nd Ed.)</i> Graphics Press USA	☐
Further	Tufte, E. (1997), <i>Visual Explanations, Images and Quantities, Evidence and Narrative</i> . Graphics Press	☐
Further	Tufte, E. (1990) <i>Envisioning Information</i> , Graphics Press USA	☐

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

- Team working.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
E-portfolio	Equivalent to 2,000 words	50%

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

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

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

Further	Hopkins, D. and Reid, T., 2018. <i>The Academic Skills Handbook: Your Guide to Success in Writing, Thinking and Communicating at University</i> . London: Sage	☐
Further	Osmond, A., 2016. <i>Academic Writing and Grammar for Students</i> 2 nd edn. London: SAGE.	☐
Further	Singh, K. (2011) <i>Engineering Mathematics through applications</i> , Palgrave	☐

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	2000 words equivalent	50%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam (or in-class test)	2 hrs	50%

Assessment Summary

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

INDICATIVE READING LIST

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

Further	IEEE/ACM, IEEE/ACM Transactions on Networking	☒
Further	IEEE, IEEE Network Magazine	☒
Further	Science Direct	☒
Further	Scopus	☒

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

☐ Written exam ☐ Coursework ☒ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

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

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam or In class test	2 hours	50%

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Assignment	2500 words	50%

Assessment Summary

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

INDICATIVE READING LIST

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

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Component 2

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

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

Level 5 modules

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 exam	1 hour	25%

Assessment Summary

Activity type	Percentage
Written exam	25%
Coursework	0%
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	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 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	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	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	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	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	☒

Level 6 modules

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

- Fundamentals of Computer Security.
- Networking Concepts.
- Cryptography.
- Internet Security Technologies.
- Security of Computer Communications.
- Wireless Security.
- Windows Security.
- Linux Security.
- Web Applications and Security.
- Defensive Network Infrastructure – Intrusion Detection/Firewalls.
- Malware, Virus and Worms.

- Network Traffic Analysis and Forensics using Wireshark.
- Data Loss Prevention.
- Penetration Testing.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Implementation	5000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCB6000	
Module Title	Advanced Cyber Security	
Classification	Reading List entry	Electronic*
Essential	The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws, 2ed. Author: D. Stuttard.	☒
Essential	Cracking the Coding Interview: 189 Programming Questions and Solutions 6th Edition. Author: Gayle Laakmann.	☒
Essential	Basic Security, Penetration Testing and How to Hack. Author: Isaac Sharpe.	☐
Essential	Cyber Insecurity: Navigating the Perils of the Next Information Age. Author: Richard Harrison.	☒
Essential	Counter Hack Reloaded: A Step-by-Step Guide to Computer Attacks and Effective Defenses (2nd Edition) 2nd Edition. Authors: Edward Skoudis, and Tom Liston.	☒
Further	Applied Cryptography: Protocols, Algorithms and Source Code in C. Author: Bruce Schneir. (2015)	☒
Further	The Art of Exploitation, 2nd Edition. Author: Jon Erickson.	☐

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

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	6000 words equivalent Students will produce a portfolio of work appropriate to the nature of their area of study. Portfolio elements may include a selection of the following: • Written Report • Presentation slides • Software/hardware implementation • Demonstration of work	100%

Assessment Summary

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

INDICATIVE READING LIST

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

Further	Scopus	☒
Further	ACM Transactions on Internet Technology (TOIT) Systems	☒

Module Code	ACCA6019
Title	Emerging Trends
Date	07/07/2020
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Portfolio	May take the form of an essay, a presentation and/or an implementation 4000 words equivalent	100%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6019	
Module Title	Emerging Trends	
Classification	Reading List entry	Electronic*
Essential	The nature of this module requires up to date sources. These will be provided to the students during the module. Essential texts will change during the course of the module.	
Further	Bejtlich, R. (2015) The Tao of Network Security Monitoring: Beyond Intrusion Detection, Boston: Addison-Wesley	☒
Further	Stallings, W. (2017) Cryptography and Network Security: Principles and Practice (7th Edition), Pearson Education Limited	☒
Further	Sommerville, I. (2015), Software Engineering, , Pearson	☒

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

- Research paradigms, methods, and techniques of research and enquiry.
- Conducting and writing literature reviews.
- Ethical concerns and the research process.
- Resource, project, and skills management processes and techniques.
- Presenting and illustrating data and information.
- Communication of general, specialist, technical ideas and results.

- Problem solving, creative, entrepreneurial thinking and approaches.
- Collaboration, adaptability and reflection.

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☒ Coursework ☐ Practical

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

Assessment Summary

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

INDICATIVE READING LIST

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

Module Code	ACCA6020	
Module Title	Independent Project	
Classification	Reading List entry	Electronic*
Essential	Cottrell S, (2015) <i>Skills for Success Personal Development and Employability</i> , 3 rd edition, Palgrave. London.	☒
Essential	ASET, 2013 <i>Good Practice Guide for Workbased Learning and Placement Learning in Higher Education</i>	☒
Essential	Gray, D.E. (2018) <i>Doing Real World Research</i> , London: SAGE.	☐
Further	Gallagher K, (2016) <i>Essential Study and Employment Skills For Business and Management Students</i> , Oxford	☐
Further	Gottschall, Jonathan (2013), <i>The Storytelling Animal: How Stories Make Us Human</i> , Houghton Mifflin	☐
Further	Storr, Will (2020), <i>The Science of Storytelling</i> , William Collins	☐

Further	Cohen, L. Manion, L. and Morrison, K. (2017) <i>Research Methods in Education, 8th edition</i> London: Routledge.	☒
Further	Flick, U. (2014) <i>An Introduction to Qualitative Research</i> , London: SAGE.	☐
Further	Aubrey, K. & Riley, A. (2017) <i>Understanding and Using Challenging Education Theories</i> , London: SAGE.	☒
Further	Brinkmann, S. and Kvale, S. (2018) <i>Doing Interviews (Qualitative Research Kit)</i> . Sage	☐
Further	Gibbs, G. (2018) <i>Analysing Qualitative Data (Qualitative Research Kit)</i> . Sage	☒
Further	Creswell, J. W. (2012). <i>Qualitative inquiry and research design: Choosing among five approaches</i> . Sage	☐
Further	Obschonka, M., Hakkarainen, K., Lonka, K. <i>et al.</i> Entrepreneurship as a twenty-first century skill: entrepreneurial alertness and intention in the transition to adulthood. <i>Small Bus Econ</i> 48 , 487–501 (2017). https://doi.org/10.1007/s11187-016-9798-6	☒
Further	https://ec.europa.eu/jrc/en/entrecomp	☒

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

AIM(S)

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

LEARNING OUTCOMES

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

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

INDICATIVE CONTENT

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

Study Time Allocation

The study time for the module is divided as follows:

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

ASSESSMENT

Assessment Component 1

☐ Written exam ☐ Coursework ☒ Practical

Mode of assessment	Volume	Weighting
Practical portfolio	Students will complete practical works as an in-class tests or as a workshop journal	75%

Assessment Component 2

☒ Written exam ☐ Coursework ☐ Practical

Mode of assessment	Volume	Weighting
Exam (eg online)	1 hours	25%

Assessment Summary

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

INDICATIVE READING LIST

Module Code	ACCA6022	
Module Title	Switching, Routing and Wireless	
Classification	Reading List entry	Electronic*
Essential	www.netacad.com username and password is required	☒
Essential	Connecting Networks v6 Companion Guide by Cisco Networking Academy, Cisco Press. Published Sep 11 2017	☒
Essential	Scaling Networks Essentials v6 Companion Guide by Cisco Networking Academy, Cisco Press. Published Aug 3, 2017	☒
Further	W Odom (2019) CCNA 200-301 Official Cert Guide Library, Cisco Press part of the Official Cert Guide series	☐

