New College Durham

Modification to a New College Durham Higher and HN Award

Information for the Modification Panel		
School:	**Tourism, Digital and Creative Industries**	**Date:30/04/2020**
Course Title:	**FdSc Computing with Networking / FdSc Cyber Security**	
Course Leader:	**Jayson Teneur**	
Module/Unit code	**Module/Unit Title**	**Date change to be effective from**
CNS 403	Introduction to Networks (new name - Introduction to Networks)	11/09/2020
CNS 401	Switching, Routing Essentials (new name - Switching, Routing and Wireless Essentials)	11/09/2020
CNS 504	Scaling Networks (New name - Enterprise Networking, Security and Automation)	11/09/2020
CNS 505	Connecting Networks (replaced by – Cyber Operations)	11/09/2020
Precisely state the modification required:	Updating 4 network and security-based modules to bring in line with changes in industry in this rapidly changing field. The updates also take into consideration changes made by the cisco academy to enable students to achieve CCNA certifications which provide them an edge when competing to secure employment in this sector. The changes made, now covers additional topics in each of the modified modules: 1. Introduction to Networks. 2. Switching, Routing and Wireless. 3. Enterprise Networking, Security and Automation. 4. Cyber Security Operations. Items 2, 3 and 4 include Module Title and Learning Outcome updates as detailed in the Proposed New Module specifications included. Item 1 is very similar to the current module so the Module Title remains the same however slight changes have been made to the learning outcomes to reflect the new Cisco content. The assessment methods will continue to be 100% weighted in one assignment for each of these modules.	

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Rationale for proposed modification:	It is essential that we review the content of this highly technical foundation degree regularly and also ensure we provide students with the knowledge and skills that are relevant and current. Cisco have recently released their newest version of the CCNA Routing & Switching (V7) suite of qualifications, with an effective start date of September 2020. This means that the older (V6) qualifications will no longer be available. Cisco have condensed the 4 previous modules into 3 by removing older technologies/standards and protocols. They have also added some additional, up to date, technologies, standards and protocols into the new CCNA V7, namely wireless, virtualisation, security and automation. This provides an opportunity to embed CCNA Cyber Security Operations which is also a highly sought certificate in industry. We believe these proposed modifications will equip our students with the most up to date knowledge and skills relevant to industry.

Checklist for accompanying documentation: *(please place a tick (✓) in the minor or major boxes to show appended evidence)*	**Minor**	**Major**
Minutes of Course Team Meeting(s) at which proposed changes have been agreed. (This should include evidence of consultation with students/student representatives)		✓
Evidence that external examiner has been consulted and informed of the proposed changes and that a documented response has been received		✓
Evidence that where relevant the professional, statutory, or regulatory body has been consulted and has approved the proposed changes		n/a
New Module Descriptor / New Course Specification/ Validation Document (as appropriate)		✓
Old Module Descriptor / Old Course Specification/Validation Document (as appropriate)		✓

To be completed for a common modification to more than one course (batch modification)

School:	**Tourism, Digital and Creative Industries**
Date change to be effective from:	**September 2020**
List the courses to which the modification will apply:	**FdSc Cyber Security**
Precisely state the modification required:	Updating 4 network and security based modules to bring inline with changes in industry in this rapidly changing field. The updates also take into consideration changes made by the cisco academy to enable students to achieve CCNA certifications which provide them an edge when competing to secure employment in this sector.

	The new qualification, now covers additional topics in each of the modified modules: 1. Introduction to Networks. 2. Switching, Routing and Wireless. 3. Enterprise Networking, Security and Automation. 4. Cyber Security Operations. Module codes for the FdSc Cyber Security • Introduction to Networks (CYS401) • Routing and Switching (CYS403) • Scaling Networks (CYS503) • Connecting Networks (CYS505) • Module codes for the FdSc CS new module title should be exactly the new module titles for as the CNET programme.
State the evidence supplied with the application which underpins the modification and give a short rationale of the proposal:	Evidence: • Minutes of course team meetings • Email from EE confirming agreement of the modifications • Proposed module specifications • Current module specifications Rationale: It is essential that we review the content of this highly technical foundation degree regularly and also ensure we provide students with the knowledge and skills that are relevant and current. Cisco have recently released their newest version of the CCNA Routing & Switching (V7) suite of qualifications, with an effective start date of September 2020. This means that the older (V6) qualifications will no longer be available. Cisco have condensed the 4 previous modules into 3 by removing older technologies/standards and protocols. They have also added some additional, up to date, technologies, standards and protocols into the new CCNA V7, namely wireless, virtualisation, security and automation. This provides an opportunity to embed CCNA Cyber Security Operations which is also a highly sought certificate in industry. We believe these proposed modifications will equip our students with the most up to date knowledge and skills relevant to industry.

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Modification Proposers	Signature	Date
Head of School		22/05/2020
Curriculum Manager		22/05/2020
Course Leader		22/05/2020

Approval Signatories	Signature	Date
Head of Higher Education or Nominee		29.06.2020
Higher Education Quality Manager or Nominee		29.06.2020

Date modification(s) approved by the Panel:	29.06.2020
Date Business Information Service (BIS) informed of modification(s):	29.06.2020
Date the new version of the course documents are deposited in the J:Drive Validation Activity Folder and IDOX	01.07.2020

HEQMP 9-5-1

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Module Specification

Module Title: Introduction to Networks (Proposed New Module Specification)					
Module Description: This is the first of **three** modules leading to completion of the Cisco CCNA v7 Routing and Switching course, and prepares students to take the CCNA v7 Routing and Switching 200-301 certification after successfully completing all **three** modules. Students must successfully complete Cisco industry standard online tests to be awarded CCNA Certification.					
Module Code	*CYS 401 / CNS 403*	**Level**	**4**	**Credit Value**	**20**
Module Status	**Core**	**Y**	**Option**	**N**	

Module Aim:

This module introduces the architecture, structure, functions, components, and models of the Internet and computer networks. The principles of IP addressing and fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the continuing curriculum. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.

Module Learning Outcomes:

1. Design and document computer networks;
2. Explain how the OSI model applies to networking;
3. Develop IP addressing Schemes;
4. Plan and implement a network cabling installation.

Module Skills:

The module will develop and assess the basic skills associated with networking of computers. Students will be able to correctly apply the terminology and concepts associated with networking. They will be able to design and build simple networks using software simulations as well as hardware such as routers and switches. They will be able to carry out simple testing on networks they have built.

Students will also develop a range of skills specifically related to the Business and IT Sector and to that of becoming a Higher Education student, including:

- Considering how to improve own learning and performance;
- Managing relationships;
- Flexible attitude;
- Communicating effectively with others;
- Working effectively with others;
- Demonstrating employability skills;
- Ability to perform under pressure;
- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical Skills exam;

• Report.			
Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report & **Cisco online exams**	Professional parameters to be applied	LO1,2,3,4	100%

Module Specific Academic Regulations		
Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	• None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state:	Not Applicable

Module Information		
Indicative Content This module provides the fundamental knowledge required to understand core Local Area Networking concepts. The basic components of a computer will be covered along with the role of computers and other relevant devices in a networking system. The seven layer OSI reference model will be discussed in detail. An introduction to basic LAN devices will describe their evolution and how these networking devices operate at each layer of the OSI model. Ethernet technologies and switching will be covered in detail. The design and documentation of physical and logical topologies used in LANs will include a structured cabling project. Both IPv4 and IPv6 addressing will be covered and assessed. KU4.1 demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to Computing. CS4.1 specify, design and construct reliable, secure and usable computer-based systems.		
	Mode	**Hours**

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Mode of delivery / contact hours	Full Time Part Time	50 Hours 50 Hours

Teaching and Learning Strategy

The module will be taught by a combination of the following:

Lectures to introduce students to the topics and demonstrate techniques; lab-based tutorials giving students the opportunity to put into practice the material and techniques covered in the lectures; a weekly set of exercises for completion during the tutorial and in the students` own time. (These exercises will reinforce the material covered in the lectures.)

Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)*

As well as following explanations and scenarios provided by the Cisco Academy the student will have the opportunity to apply the academy underpinning knowledge to practical exercises in the lab. Lectures and demonstrations will play a key role in the learning experience before the students apply in practice what they have been taught.

There will be the opportunity for both independent and group activities and students will be encouraged to discuss problems and the solutions that they select.

Reading Lists

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html.

http://www.purplemath.com/modules/numbbase.htm

Essential Reading	**Background Reading**
Empson, S., (June 2020), *CCNA 200-301 Portable Command Guide (5th Edition)*, Cisco Press **Sequeira, A. and Tiso, J., (June 2020) *Introduction to Networks v7 Companion Guide and Labs Study Guide*, Cisco Press**	Boney, J, (2009), *CISCO IOS in a nutshell: a desktop quick reference for IOS on IP networks* 2nd ed, O'Reilly Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly Dooley K & Brown I J, (2007), *Cisco IOS Cookbook* 2nd ed, O'Reilly

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

Modification Version Control

Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N	Stand Alone Y/ N

Date of first approval		**Date of last modification**		**Current version number**	

Details of modification made to module	**Date of modification**	**Nature of modification**	**Relevant course leaders informed**

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Module Specification

Module Title: Introduction to Networks (Current Module Specification)					
Module Description: This is the first of four modules leading to completion of the Cisco CCNA Routing and Switching course, and prepares students to take the CCNA Routing and Switching certification after successfully completing all four modules.					
Module Code	*CYS401/CNS403*	**Level**	**4**	**Credit Value**	**20**
Module Status	**Core**	**Y**	**Option**	**N**	
Module Aim: This module introduces the architecture, structure, functions, components, and models of the Internet and computer networks. The principles of IP addressing and fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the continuing curriculum. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes.					
Module Learning Outcomes: LO1: Design and document computer networks; LO2: Explain how the OSI model applies to networking; LO3: Develop IP addressing Schemes; LO4: Plan and implement a network cabling installation.					
Module Skills: The module will develop and assess the basic skills associated with networking of computers. Students will be able to correctly apply the terminology and concepts associated with networking. They will be able to design and build simple networks using software simulations as well as hardware such as routers and switches. They will be able to carry out simple testing on networks they have built. Students will also develop a range of skills specifically related to the Business and IT Sector and to that of becoming a Higher Education student, including: • Considering how to improve own learning and performance; • Managing relationships; • Flexible attitude; • Communicating effectively with others; • Working effectively with others; • Demonstrating employability skills; • Ability to perform under pressure;					

- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical Skills exam;
- Report.

Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report & Cisco online exams	Professional parameters to be applied	LO1, LO2, LO3, LO4	100%

Module Specific Academic Regulations		
Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	• None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state: Students must successfully complete Cisco Academy online tests to be awarded CCNA Certification	Not Applicable

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Module Information		
Indicative Content This module provides the fundamental knowledge required to understand core Local Area Networking concepts. The basic components of a computer will be covered along with the role of computers and other relevant devices in a networking system. The seven layer OSI reference model will be discussed in detail. An introduction to basic LAN devices will describe their evolution and how these networking devices operate at each layer of the OSI model. Ethernet technologies and switching will be covered in detail. The design and documentation of physical and logical topologies used in LANs will include a structured cabling project. Both IPv4 and IPv6 addressing will be covered and assessed. KU4.1 demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to Computing. CS4.1 specify, design and construct reliable, secure and usable computer-based systems		
Mode of delivery / contact hours	**Mode**	**Hours**
	Full Time Part Time	50 Hours 50 Hours
Teaching and Learning Strategy The module will be taught by a combination of the following: Lectures to introduce students to the topics and demonstrate techniques; lab-based tutorials giving students the opportunity to put into practice the material and techniques covered in the lectures; a weekly set of exercises for completion during the tutorial and in the students` own time. (These exercises will reinforce the material covered in the lectures.)		
Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)* As well as following explanations and scenarios provided by the Cisco Academy the student will have the opportunity to apply the academy underpinning knowledge to practical exercises in the		

lab. Lectures and demonstrations will play a key role in the learning experience before the students apply in practice what they have been taught.

There will be the opportunity for both independent and group activities and students will be encouraged to discuss problems and the solutions that they select.

Reading Lists

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html.

http://www.purplemath.com/modules/numbbase.htm

Essential Reading	Background Reading
Empson, S., (2016), *CCNA Routing and Switching Portable Command Guide* 4th Edition, Cisco Press Sequeira, A. and Tiso, J., (2013) *Cisco CCNA Routing and Switching 200-120 Foundation Learning Guide Library*, Cisco Press	Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

Modification Version Control

Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N		Stand Alone Y/ N
Date of first approval		**Date of last modification**		**Current version number**	

Details of modification made to module	Date of modification	Nature of modification	Relevant course leaders informed

New College Durham

Module Title: Switching, Routing and Wireless Essentials (Proposed New Module Specification)

Module Description:

This is the second of **three** modules leading to completion of the Cisco CCNA v7 Routing and Switching course, and prepares students to take the CCNA v7 Routing and Switching 200-301 certification after successfully completing all **three** modules. Students must successfully complete Cisco industry standard online tests to be awarded CCNA Certification.

Module Code	*CYS 403 / CNS 401*	**Level**	**4**	**Credit Value**	**20**
Module Status *(delete Y/N as necessary)*	**Core**	**Y**	**Option**	**N**	

Module Aim:

This module describes the architecture, components, and operations of routers and switches in small to medium sized networks. Students learn how to configure functionality on routers, switches and wireless devices. By the end of this course, students will be able to configure and troubleshoot routers, switches and wireless devices, and be able to resolve common issues with DHCPv4 and v6, Virtual LANs, inter-VLAN routing in both IPv4 and IPv6 networks, STP, VTP, EtherChannel, FHRP's and Wireless LAN's.

Module Learning Outcomes:

1. Explain the need for the routing process, and explain and apply static and default routing;
2. Explain and be able to perform switch configurations;
3. Explain and apply VLANs and inter-VLAN routing;
4. Configure and troubleshoot static, default routing and wireless problems.

Module Skills:

This module builds on the concepts covered in the Introduction to Networks module. Students will be able to correctly apply the terminology and concepts associated with networking. They will be able to configure routing and switching, applying them to a variety of network topologies.

Students will also develop a range of skills specifically related to working in the computing and IT sector including:

- Considering how to improve own learning and performance;
- Managing relationships;
- Flexible attitude;
- Communicating effectively with others;
- Working effectively with others;
- Demonstrating employability skills;
- Ability to perform under pressure;
- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical and Report.

Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report &	Professional parameters to be applied	LO1,2,3,4	100%

Cisco online exams			

Module Specific Academic Regulations		
Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	• None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state:	Not Applicable

Module Information		
Indicative Content Students will develop an understanding of the concepts of routing and switching and their practical application. Students will be expected to develop the skills necessary to configure static and default routing together with basic switching concepts. There will be the expansion of the development of troubleshooting techniques within the given scenarios. This will be done by practical exercises using networking equipment in the lab, by the use of the Packet Tracer network simulation software. KU5.1 use knowledge and understanding in the modelling and design of computer-based systems for the purposes of comprehension, communication, prediction and the understanding of trade-offs. KU5.2 deploy appropriate theory, practices and tools for the specification, design, implementation and evaluation of computer-based systems. CS4.1 specify, design and construct reliable, secure and usable computer-based systems.		
Mode of delivery / contact hours	**Mode**	**Hours**
	Full Time	50 Hours
	Part Time	50 Hours
Teaching and Learning Strategy The module will be taught by a combination of the following: This module will draw on a wide range of learning and teaching methods, including considerable online multimedia content and practical lab activities.		

The specific methods to be used in each instance of delivery will be determined at an annual planning event, and the outcomes recorded on a standard chart to be included in relevant route / award documentation.

Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)*

A range of assessment methods will be used within the module. The aim is to achieve deep learning through which knowledge is developed through both understanding and application. Both the task and the assessment criteria will be clearly explained to students within a module outline, or an assignment brief, or both.

These will be specified at the annual planning event and the outcomes recorded on a standard chart to be included in relevant route / award documentation.

Reading Lists

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html.

http://www.inetdaemon.com/tutorials/internet/ip/routing/routing_vs_routed.shtml.

http://www.techexams.net/technotes/ccna/basic_router_management.shtml.

Essential Reading	Background Reading
Empson, S., (June 2020), *CCNA 200-301 Portable Command Guide (5th Edition)*, Cisco Press **Sequeira, A. and Tiso, J., (July 2020) *Switching, Routing, and Wireless Essentials v7 Companion Guide and Labs Study Guide,* Cisco Press**	Boney, J, (2009), *CISCO IOS in a nutshell: a desktop quick reference for IOS on IP networks* 2nd ed, O'Reilly Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly Dooley K & Brown I J, (2007), *Cisco IOS Cookbook* 2nd ed, O'Reilly

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

Modification Version Control					
Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N		Stand Alone Y/ N
Date of first approval		**Date of last modification**		**Current version number**	

Details of modification made to module	**Date of modification**	**Nature of modification**	**Relevant course leaders informed**

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Module Title: Routing and Switching Essentials **(Current Module Specification)**					
Module Description: This is the second of four modules leading to completion of the Cisco CCNA Routing and Switching course, and prepares students to take the CCNA Routing and Switching certification after successfully completing all four modules.					
Module Code	*CNS401/CYS403*	**Level**	**4**	**Credit Value**	**20**
Module Status *(delete Y/N as necessary)*	**Core**	**Y**	**Option**	**N**	
Module Aim: This module describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, single-area and multi-area OSPF, virtual LANs, and inter-Vlan routing in both IPv4 and IPv6 networks.					
Module Learning Outcomes: LO1: Explain the need for the routing process, and explain and apply static and dynamic routing; LO2: Explain and be able to perform basic switch configurations; LO3: Explain and apply VLANs and inter-Vlan routing; LO4: Configure both distance vector and link-state routing protocols and be able to troubleshoot routing problems.					
Module Skills: This module builds on the concepts covered in the Introduction to Networks module. Students will be able to correctly apply the terminology and concepts associated with networking. They will be able to configure advanced routing protocols and basic switching, applying them to a variety of network topologies. Students will also develop a range of skills specifically related to working in the computing and IT sector including: • Considering how to improve own learning and performance; • Managing relationships; • Flexible attitude; • Communicating effectively with others; • Working effectively with others; • Demonstrating employability skills; • Ability to perform under pressure; • A commitment to quality; • A thorough approach to work;					

- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical and Report.

Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report & Cisco online exams	Professional parameters to be applied	LO1, LO2, LO3, LO4	100%

Module Specific Academic Regulations		
Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	• None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state: Students must successfully complete Cisco Academy online tests to be awarded CCNA Certification	Not Applicable

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Module Information		
Indicative Content Students will develop an understanding of the concept of routing and its practical application. Students will be expected to develop the skills necessary to configure distance vector and link-state routing protocols together with basic switching concepts. There will be the beginning of the development of troubleshooting techniques within the given scenarios. This will be done by practical exercises using networking equipment in the lab, by the use of the Packet Tracer network simulation software. KU4.1 demonstrate knowledge and understanding of essential facts, concepts, principles and theories relating to Computing. CS4.1 specify, design and construct reliable, secure and usable computer-based systems		
Mode of delivery / contact hours	**Mode**	**Hours**
	Full Time	50 Hours
	Part Time	50 Hours
Teaching and Learning Strategy The module will be taught by a combination of the following: This module will draw on a wide range of learning and teaching methods, including considerable online multimedia content and practical lab activities. The specific methods to be used in each instance of delivery will be determined at an annual planning event, and the outcomes recorded on a standard chart to be included in relevant route / award documentation.		
Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)* A range of assessment methods will be used within the module. The aim is to achieve deep learning through which knowledge is developed through both understanding and application. Both the task and the assessment criteria will be clearly explained to students within a module outline, or an assignment brief, or both. These will be specified at the annual planning event and the outcomes recorded on a standard chart to be included in relevant route / award documentation.		
Reading Lists		

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E Learning Resources http://www.cisco.com/web/learning/netacad/index.html. http://www.inetdaemon.com/tutorials/internet/ip/routing/routing_vs_routed.shtml. http://www.techexams.net/technotes/ccna/basic_router_management.shtml.	
Essential Reading	**Background Reading**
Empson, S., (2016), *CCNA Routing and Switching Portable Command Guide* 4th Edition, Cisco Press Sequeira, A. and Tiso, J., (2013) *Cisco CCNA Routing and Switching 200-120 Foundation Learning Guide Library*, Cisco Press	Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly
Other resource needs essential for delivery of this module: Access to Networking equipment in GR130 and Packet Tracer software.	

Modification Version Control					
Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N	Stand Alone Y/ N	
Date of first approval		**Date of last modification**		**Current version number**	
Details of modification made to module		**Date of modification**	**Nature of modification**	**Relevant course leaders informed**	

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Module Title: Enterprise Networking, Security and Automation (Proposed New Module Specification)

Module Description:

This is the third of **three** modules leading to completion of the Cisco CCNA v7 Routing and Switching course, and prepares students to take the CCNA v7 Routing and Switching 200-301 certification after successfully completing all **three** modules. Students must successfully complete Cisco industry standard online tests to be awarded CCNA Certification.

Module Code	*CYS503/CNS504*	**Level**	**5**	**Credit Value**	**20**
Module Status *(delete Y/N as necessary)*	**Core**	**Y**	**Option**	**N**	

Module Aim:

This module describes the architecture, components, and operations of routers and switches in a large and complex network. Students learn how to configure routers and switches for advanced functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with both single area and multi-area OSPF in both IPv4 and IPv6 networks, ACL's and NAT in IPv4 networks, advanced Network Security, IPsec VPN's, QoS, WAN technologies, Network Management and Design, Virtualisation and Automation.

Module Learning Outcomes:

1. Demonstrate knowledge of routing concepts and LAN design including the use of OSPF for IPv4 and IPv6 networks;
2. Configure Access Control Lists, Quality of Service, NAT and Network Management protocols for IPv4 networks;
3. Configure IPsec VPN's for IPv4 networks;
4. Justify the requirement for network Virtualisation and Automation.

Module Skills:

This module builds on the concepts covered in the Introduction to Networks v7 and Switching, Routing and Wireless Essentials v7 modules. Students will be able to correctly apply the terminology and concepts associated with advanced networking. They will be able to configure advanced routing protocols and switching, applying them to a variety of network topologies.

Students will also develop a range of skills specifically related to working in the computing and IT sector including:

- Considering how to improve own learning and performance;
- Managing relationships;
- Flexible attitude;
- Communicating effectively with others;
- Working effectively with others;
- Demonstrating employability skills;
- Ability to perform under pressure;
- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical and Report.

Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark

Practical, Report & **Cisco online exams**	Professional parameters to be applied	LO1,2,3,4	100%

Module Specific Academic Regulations		
Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state:	Not Applicable

Module Information

Indicative Content

Students will develop an understanding of the implementation of advanced LAN and WAN technologies. Students will be expected to develop the skills to configure routers and switches and understand the use of a variety of WAN technologies.

This will be done by practical exercises using networking equipment in the lab, by the use of network simulation software and by multimedia activities linked to study of the curriculum. There will be an emphasis on troubleshooting network problems in a given scenario.

KU5.1 use knowledge and understanding in the modelling and design of computer-based systems for the purposes of comprehension, communication, prediction and the understanding of trade-offs

KU5.2 deploy appropriate theory, practices and tools for the specification, design, implementation and evaluation of computer-based systems.

CS5.2 critically evaluate and analyse complex problems, including those with incomplete information, and devise appropriate solutions.

Mode of delivery / contact hours	**Mode**	**Hours**
	Full Time	50 Hours
	Part Time	50 Hours

Teaching and Learning Strategy

This module will draw on a wide range of learning and teaching methods appropriate to the nature of the student profile. Themed assessment will be utilised whenever feasible to develop a sense of cohesion across modules. Group

work will encourage involvement with a diverse mix of students. The specific methods to be used in each instance of delivery will be determined at an annual planning event, and the outcomes recorded on a standard matrix to be included in relevant programme documentation.

Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)*

A range of assessment methods will be used within the module. The aim is to achieve deep learning through which knowledge is developed through both understanding and application. Both the task and the assessment criteria will be clearly explained to students within a module outline, or an assignment brief, or both.

These will be specified at the annual planning event and the outcomes recorded on a standard chart to be included in relevant route / award documentation.

Reading Lists

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html.

http://www.inetdaemon.com/tutorials/internet/ip/routing/routing_vs_routed.shtml.

http://www.techexams.net/technotes/ccna/basic_router_management.shtml.

Essential Reading	Background Reading
Empson, S., (June 2020), *CCNA 200-301 Portable Command Guide (5th Edition)*, Cisco Press **Sequeira, A. and Tiso, J., (July 2020) *Enterprise Networking, Security and Automation v7 Companion Guide and Labs Study Guide,* Cisco Press**	Boney, J, (2009), *CISCO IOS in a nutshell: a desktop quick reference for IOS on IP networks* 2nd ed, O'Reilly Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly Dooley K & Brown I J, (2007), *Cisco IOS Cookbook* 2nd ed, O'Reilly

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

Modification Version Control

Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N		Stand Alone Y/ N
Date of first approval		**Date of last modification**		**Current version number**	

Details of modification made to module	Date of modification	Nature of modification	Relevant course leaders informed

New College Durham

Module Title: Scaling Networks (Current Module Specification)

Module Description:

This is the third of four modules leading to completion of the Cisco CCNA Routing and Switching course, and prepares students to take the CCNA Routing and Switching certification after successfully completing all four modules.

Module Code	*CYS503/CNS504*	**Level**	**5**	**Credit Value**	**20**
Module Status *(delete Y/N as necessary)*	**Core**	**Y**	**Option**	**N**	

Module Aim:

This module describes the architecture, components, and operations of routers and switches in a large and complex network. Students learn how to configure routers and switches for advanced functionality. By the end of this course, students will be able to configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, STP, and VTP in both IPv4 and IPv6 networks. Students will also develop the knowledge and skills needed to implement DHCP and DNS operations in a network.

Module Learning Outcomes:

LO1: Demonstrate knowledge of switching concepts and LAN design including the use of spanning tree protocols and VLANs;

LO2: Configure switches with STP, VTP, trunking and VLANs and troubleshoot common network problems;

LO3: Evaluate and justify the use of components for a network and be able to configure basic parameters;

LO4: Justify and apply multiple switched configurations for VLAN communication.

Module Skills:

This module builds on the concepts covered in the Introduction to Networks and Routing and Switching Essentials modules. Students will be able to correctly apply the terminology and concepts associated with networking. They will be able to configure advanced routing protocols and basic switching, applying them to a variety of network topologies.

Students will also develop a range of skills specifically related to working in the computing and IT sector including:

- Considering how to improve own learning and performance;
- Managing relationships;
- Flexible attitude;
- Communicating effectively with others;
- Working effectively with others;
- Demonstrating employability skills;

- Ability to perform under pressure;
- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical and Report.

Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report & Cisco online exams	Professional parameters to be applied	LO1, LO2, LO3, LO4	100%

Module Specific Academic Regulations

Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state: Students must successfully complete Cisco Academy online tests to be awarded CCNA Certification	Not Applicable

New College Durham

Module Information		
Indicative Content Students will develop an understanding of the implementation of LAN technologies, both cabled and wireless. Students will be expected to develop the skills to configure switches and understand the use of spanning tree protocols, VLANs and trunking. This will be done by practical exercises using networking equipment in the lab, by the use of network simulation software and by multimedia activities linked to study of the curriculum. There will be an emphasis on troubleshooting network problems in a given scenario. KU5.1 use knowledge and understanding in the modelling and design of computer-based systems for the purposes of comprehension, communication, prediction and the understanding of trade-offs KU5.2 deploy appropriate theory, practices and tools for the specification, design, implementation and evaluation of computer-based systems.		
Mode of delivery / contact hours	**Mode**	**Hours**
	Full Time	50 Hours
	Part Time	50 Hours
Teaching and Learning Strategy This module will draw on a wide range of learning and teaching methods appropriate to the nature of the student profile. Themed assessment will be utilised whenever feasible to develop a sense of cohesion across modules. Group work will encourage involvement with a diverse mix of students. The specific methods to be used in each instance of delivery will be determined at an annual planning event, and the outcomes recorded on a standard matrix to be included in relevant programme documentation.		
Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)* A range of assessment methods will be used within the module. The aim is to achieve deep learning through which knowledge is developed through both understanding and application. Both the task and the assessment criteria will be clearly explained to students within a module outline, or an assignment brief, or both. These will be specified at the annual planning event and the outcomes recorded on a standard chart to be included in relevant route / award documentation.		
Reading Lists		

New College Durham

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html.

http://www.inetdaemon.com/tutorials/internet/ip/routing/routing_vs_routed.shtml.

http://www.techexams.net/technotes/ccna/basic_router_management.shtml.

Essential Reading	Background Reading
Empson, S., (2016), *CCNA Routing and Switching Portable Command Guide* 4th Edition, Cisco Press Sequeira, A. and Tiso, J., (2013) *Cisco CCNA Routing and Switching 200-120 Foundation Learning Guide Library*, Cisco Press	Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

Modification Version Control

Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N	Stand Alone Y/ N	
Date of first approval		**Date of last modification**		**Current version number**	

Details of modification made to module	Date of modification	Nature of modification	Relevant course leaders informed

New College Durham

Module Title: Cybersecurity Operations (Proposed New Module Specification)

Module Description:

This is standalone module which prepares students to take This course aligns with the CCNA Cyber Ops certification with students needing to pass both the 210-250 SECFND exam and the 210-255 SECOPS exam to achieve the CCNA Cyber Ops certification after successful completion. Students must successfully complete Cisco industry online tests to be awarded CCNA Certification

Module Code	*CYS505 / CNS505*	**Level**	**5**	**Credit Value**	**20**
Module Status	**Core**	**Y**	**Option**	**N**	

Module Aim:

The Cisco CCNA® Cybersecurity Operations v1.1 (CyberOps) course provides students with content to develop practical, relevant, and job-ready knowledge and skills required of cybersecurity analysts employed in a Security Operations Centre (SOC). In this course, candidates will learn how to detect and respond to security threats using the latest technology. This course aligns to the CCNA CyberOps certification which demonstrates that the candidate has the skills and knowledge needed to begin a career in cybersecurity operations, addressing cybersecurity threats that enterprises are faced with on a daily basis.

Module Learning Outcomes:

1. Describe the function of the network layers and devices as specified by the OSI and the TCP/IP network models, and apply the principles of the “defence in depth” strategy;
2. Explain the impacts of cryptography on network security monitoring;
3. Explain how to investigate/evaluate endpoint vulnerabilities, attacks;
4. Explain how network security incidents are handled by CSIRTs (Computer Security Incident Response Teams).

Module Skills:

The module will develop and assess the basic skills, and to correctly apply the terminology and concepts associated with securing networks and responding to perceived security threats. They will be able to carry out investigative tasks using Virtual environments simulating real-world cybersecurity threat scenarios which create opportunities for ethical hacking, security monitoring, analysis and resolution.

Students will also develop a range of skills specifically related to the Business and IT Sector and to that of becoming a Higher Education student, including:

- Considering how to improve own learning and performance;
- Managing relationships;
- Flexible attitude;
- Communicating effectively with others;
- Working effectively with others;
- Demonstrating employability skills;
- Ability to perform under pressure;
- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;

• Practical Skills exam; • Report.			
Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report & **Cisco online exams**	Professional parameters to be applied	LO1,2,3,4	100%

Module Specific Academic Regulations		
Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	• None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state:	Not Applicable

Module Information		
Indicative Content This module provides the fundamental knowledge required to understand how to detect and respond to security threats using the latest technology. The OSI and TCP/IP reference models will be discussed in detail together with network devices and how they operate at each layer. Cryptography and Endpoint security/analysis will be covered, together with monitoring, incident response and handling. KU5.3 critically evaluate, recognise and analyse security criteria and specifications appropriate to specific problems, and plan strategies for their solutions. CS5.2 critically evaluate and analyse complex problems, including those with incomplete information, and devise appropriate solutions		
	Mode	**Hours**

New College Durham

Mode of delivery / contact hours	Full Time Part Time	50 Hours 50 Hours

Teaching and Learning Strategy

The module will be taught by a combination of the following:

Lectures to introduce students to the topics and demonstrate techniques; lab-based tutorials giving students the opportunity to put into practice the material and techniques covered in the lectures; a weekly set of exercises for completion during the tutorial and in the students` own time. (These exercises will reinforce the material covered in the lectures.)

Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)*

As well as following explanations and scenarios provided by the Cisco Academy the student will have the opportunity to apply the academy underpinning knowledge to practical exercises in the lab. Lectures and demonstrations will play a key role in the learning experience before the students apply in practice what they have been taught.

There will be the opportunity for both independent and group activities and students will be encouraged to discuss problems and the solutions that they select.

Reading Lists

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html.

Essential Reading	Background Reading
Johnson, A, (June 2018), *CCNA Cybersecurity Operations Companion Guide (1st Edition)*, Cisco Press *CCNA Cybersecurity Operations Lab Manual (Lab Companion),* (March 2018), Cisco Press	Boney, J, (2009), *CISCO IOS in a nutshell: a desktop quick reference for IOS on IP networks* 2nd ed, O'Reilly Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly Dooley K & Brown I J, (2007), *Cisco IOS Cookbook* 2nd ed, O'Reilly Muniz, J; McIntyre, G; AlFardan, Dr N. (October 2015), *Security Operations Center: Building, Operating and Maintaining Your SOC,* 1st ed, Cisco Press

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

Modification Version Control

Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N	Stand Alone Y/ N	
Date of first approval		**Date of last modification**		**Current version number**	

New College Durham

Details of modification made to module	Date of modification	Nature of modification	Relevant course leaders informed

New College Durham

Module Title: Connecting Networks (Current Module Specification)

Module Description:

This is the final of four modules leading to completion of the Cisco CCNA Routing and Switching course, and prepares students to take the CCNA Routing and Switching certification after successfully completing all four modules.

Module Code	*CNS501/CYS505*	**Level**	**5**	**Credit Value**	**20**
Module Status *(delete Y/N as necessary)*	**Core**	**Y**	**Option**	**N**	

Module Aim:

This module discusses the WAN technologies and network services required by converged applications in a complex network. The course enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements. Students learn how to configure and troubleshoot network devices and resolve common issues with data link protocols. Students also develop the knowledge and skills needed to implement IPSec and virtual private network (VPN) operations in a complex network.

Module Learning Outcomes:

LO1: Identify a range of WAN devices and technologies and evaluate suitable uses and limitations;

LO2: Demonstrate knowledge of differing WAN technologies including point to point protocols and frame-relay;

LO3: Demonstrate knowledge of network basic network security;

LO4: Demonstrate knowledge of IPSec and VPN design considerations.

Module Skills:

This module builds on the concepts covered in the Introduction to Networks, Routing and Switching Essentials and Scaling Networks modules. Students will be able to correctly apply the terminology and concepts associated with networking. They will be able to configure advanced routing protocols and basic switching, applying them to a variety of network topologies.

Students will also develop a range of skills specifically related to working in the computing and IT sector including:

- Considering how to improve own learning and performance;
- Managing relationships;
- Flexible attitude;
- Communicating effectively with others;
- Working effectively with others;
- Demonstrating employability skills;
- Ability to perform under pressure;
- A commitment to quality;
- A thorough approach to work;
- Logical thinking and a creative approach to problem solving.

Assessment Methods

Three assessment methods are employed:

- Cisco online exams;
- Practical and Report.

Assessment Type	Specific requirements (e.g. word count)	Learning Outcomes being assessed	Weighting % of final mark
Practical, Report & **Cisco online exams**	Professional parameters to be applied	LO1, LO2, LO3, LO4	100%

Module Specific Academic Regulations

Is this module compensatable?	Yes ✓	No
Modules for which this module is a prerequisite	None	
Identify any Professional, Statutory or Regulatory Body requirements:	If yes, please state: Students must successfully	Not Applicable

	complete Cisco Academy online tests to be awarded CCNA Certification	

Module Information		
Indicative Content Students will develop an understanding of the implementation of WAN technologies. Students will develop the skills to configure Frame Relay and Point to Point Protocol (PPP) including the use of Network Address Translation (NAT) and Port Address Translation (PAT). This will be done by practical exercises using routers and switches in the lab, by the use of network simulation software and by multimedia activities linked to study of the curriculum. There will be an emphasis on problem solving in a given scenario. KU5.2 deploy appropriate theory, practices and tools for the specification, design, implementation and evaluation of computer-based systems CS5.2 critically evaluate and analyse complex problems, including those with incomplete information, and devise appropriate solutions		
Mode of delivery / contact hours	**Mode**	**Hours**
	Full Time Part Time	50 Hours 50 Hours
Teaching and Learning Strategy This module will draw on a wide range of learning and teaching methods appropriate to the nature of the student profile. Themed assessment will be utilised whenever feasible to develop a sense of cohesion across modules. Group work will encourage involvement with a diverse mix of students. The specific methods to be used in each instance of		

delivery will be determined at an annual planning event, and the outcomes recorded on a standard matrix to be included in relevant programme documentation.

Learning Opportunities *(Identify any additional experience or activity not identified as a formal learning outcome that will provide a student with additional knowledge or skill)*

A range of assessment methods will be used within the module. The aim is to achieve deep learning through which knowledge is developed through both understanding and application. Both the task and the assessment criteria will be clearly explained to students within a module outline, or an assignment brief, or both.

These will be specified at the annual planning event and the outcomes recorded on a standard chart to be included in relevant route / award documentation.

Reading Lists

E Learning Resources

http://www.cisco.com/web/learning/netacad/index.html

http://www.techexams.net/.

http://www.techexams.net/technotes/networkplus/wantech.shtml.

Essential Reading	Background Reading
Empson, S., (2016), *CCNA Routing and Switching Portable Command Guide* 4th Edition, Cisco Press Sequeira, A. and Tiso, J., (2013) *Cisco CCNA Routing and Switching 200-120 Foundation Learning Guide Library*, Cisco Press	Donahue G A, (2011), *Network Warrior*, 2nd ed, O'Reilly

Other resource needs essential for delivery of this module:

Access to Networking equipment in GR130 and Packet Tracer software.

New College Durham

Modification Version Control					
Module Type *(delete Y/N as relevant)*	Generic Y / N	Common Y / N	Course Specific Y/ N		Stand Alone Y/ N
Date of first approval		**Date of last modification**		**Current version number**	

Details of modification made to module	**Date of modification**	**Nature of modification**	**Relevant course leaders informed**

From: 10 June 2020 22:22
Sent:
To: Re: FdSc Cyber Security and CNET Mods
Cc:
Subject:

Hi ,

I am happy with those changes.

Thanks

From:
Sent: 10 June 2020 14:45:54
To:
Cc:
Subject: FdSc Cyber Security and CNET Mods

Hi ,

Hope that this email finds you and your family well!

As part of the major modifications I just need a couple of additional confirmations from yourself.

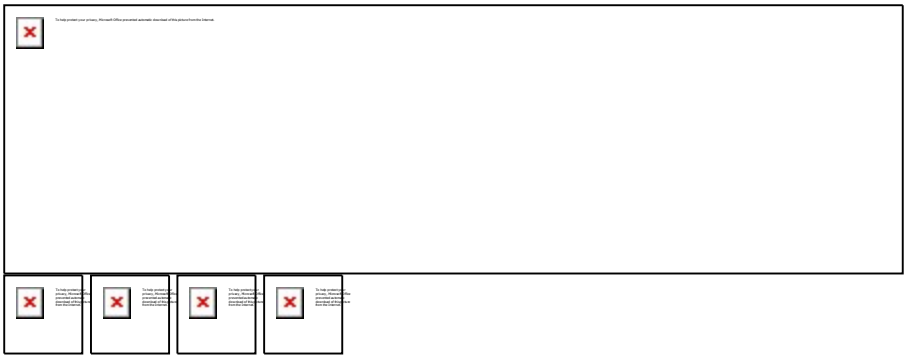
Firstly that you were happy with the learning outcome changes for some of the modules due to the update by Cisco, in the document previously sent and secondly that you are happy we with being added as part of the teaching staff (see attached).

If you could get that back to me as soon as possible that would be much appreciated.

Many thanks,

FdSc Computing with Networking

FdSc Cyber Security
T |
M|
E |



New College Durham, Framwellgate Moor Campus, Durham DH1 5ES
