

<b>Module Code:</b>	COM449
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<b>Module Title:</b>	CCNA Routing & Switching - Scaling Networks
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<b>Level:</b>	4	<b>Credit Value:</b>	20
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<b>Cost Centre(s):</b>	GACP	<b>JACS3 code:</b>	I120
		<b>HECoS code:</b>	100365

<b>Faculty:</b>	Arts, Science and Technology	<b>Module Leader:</b>	Dr. Paul Comerford
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Scheduled learning and teaching hours	36 hrs
Guided independent study	164 hrs
Placement	0 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

<b>Programme(s) in which to be offered (not including exit awards)</b>	Core	Option
BSc (Hons) Computer Science	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Computing	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Computer Networks and Security	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Cyber Security	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Computer Science (with Industrial Placement)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Computing (with Industrial Placement)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Computer Networks and Security (with Industrial Placement)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BSc (Hons) Cyber Security (with Industrial Placement)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Delivery as standalone or part of CPD package	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<b>Pre-requisites</b>
None

**Office use only**

Initial approval: 28/11/2018  
 With effect from: 01/09/2019  
 Date and details of revision:

Version no:1

Version no:

**Module Aims**

This module covers the architecture, components, and operations of routers and switches in larger and more complex networks. Students learn how to configure routers and switches for advanced functionality. The content of the module enables students to be able to configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, and STP in both IPv4 and IPv6 networks. Students will also develop the knowledge and skills needed to implement a WLAN in a small-to-medium network.

**Intended Learning Outcomes**

## Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to

Key Skills

At the end of this module, students will be able to		Key Skills	
1	Compare & contrast the use of enhanced switching technologies such as VLANs, Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Plus Protocol (PVST+), and Ether-Channel.	KS1	KS2
		KS3	KS4
		KS5	
2	Analyse first hop redundancy protocols (HSRP) in a switched network.	KS1	KS2
		KS3	KS4
		KS5	
3	Explore the implementation of wireless routers and wireless clients.	KS1	KS2
		KS3	KS4
		KS5	
4	Design, plan, implement and troubleshoot routers in a complex routed IPv4 or IPv6 network using single-area OSPF, multi-area OSPF, and Enhanced Interior Gateway Routing Protocol (EIGRP).	KS1	KS2
		KS3	KS4
		KS5	
5	Select appropriate Cisco IOS Software licensing and configuration files.	KS1	KS2
		KS3	KS4
		KS5	

**Transferable skills and other attributes**

**Derogations**

None

**Assessment:**

## Indicative Assessment Tasks:

Students undertaking this module are registered for the Cisco Networking Academy system and use is made of this material for the assessment. Assessment 1 is the Cisco on-line test set by the Academy but administered by Glyndwr University.

Assessment 2 - Practical exercise that takes place in the Glyndwr networking laboratory. This typically requires students to work in groups of 2 where they investigate the effect of routing and switching protocols. They would be expected to build a network on real equipment, troubleshoot and demonstrate the operation to the supervisor. The exercise is based on the material studied as part of the CCNA Routing and Switching: Scaling Networks.

Assessment 3 – Individually students produce a report based on the material studied applied to a specific scenario which may well be the basis of the practical exercise or an example taken from a typical business environment.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1-3	In-class test	40	1.25 hours	
2	4	Practical	40	2 hours	
3	5	Coursework	20		1000
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**Learning and Teaching Strategies:**

The module is taught using a structured programme of online learning, mini-seminars, tutorials, practical exercises and student-centred learning specifically:

Self-directed learning using on-line material and lectures to supplement on-line material  
 On-line multiple choice tests to give formative feedback  
 Lab sessions to gain practical networking experience and re-enforce theory  
 Individual assignment work as part lab work and skills test  
 Web based research

**Syllabus outline:**

LAN Design  
 Scaling VLANs  
 STP  
 Etherchannel and HSRP  
 Dynamic Routing  
 EIGRP  
 EIGRP Tuning and Troubleshooting  
 Single-Area OSPF  
 Multiarea OSPF  
 OSPF Tuning and Troubleshooting

<b>Indicative Bibliography:</b>
<b>Essential reading</b>
CCNA Routing and Switching 200-125 Official Cert Guide Library Hardcover –2016: Ciscopress
<b>Other indicative reading</b>