Title:	Scaling and Managing Networks APPROVED
Long Title:	Scaling and Managing Networks

Module Code:	COMP7033	**Duration:**	1 Semester

Credits:	5
NFQ Level:	Intermediate
Field of Study:	Computer Science
Valid From:	Semester 1 - 2017/18 (September 2017)
Module Delivered in	2 programme(s)
Module Coordinator:	Sean McSweeney
Module Author:	Olivia Brickley
Module Description:	This module describes the architecture, components and operations of routers and switches in larger and more complex networks. Students learn how to configure and troubleshoot routers and switches for advanced functionality such as link aggregation, spanning tree, multi-area OSPF, BGP, MPLS. Network management theory, standards and tools are introduced.

Learning Outcomes	
On successful completion of this module the learner will be able to:	
LO1	Describe and implement approaches to add redundancy to campus networks.
LO2	Discuss and apply the techniques to design and implement a scalable network allowing for future growth.
LO3	Design, build and configure complex routed and switched networks.
LO4	Describe uses and implementation of network management protocols and standards in enterprise networks.

Pre-requisite learning
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.*
No requirements listed
Co-requisites
No Co Requisites listed

Module Content & Assessment

Indicative Content
LAN Redundancy and Scalability LAN switching, redundancy concepts, spanning tree protocol. Scalable LAN design, extending the switched LAN using wireless, link aggregation.
Scalable Routing Advanced single-area OSPF configuration and troubleshooting; multi-area OSPF; Areas, Area Border Routers, configuration, verification, troubleshooting. VLSM and summarisation, BGPv4, Path routing, BGP Advertisements and withdrawls, BGP options
Multiprotocol Label Switching (MPLS) MPLS forwarding basics, Flow driven vs Topology driven switching, MPLS vs Carrier Ethernet
Managing Networks Network management protocols and standards; SNMP, NetFlow, Syslog, NetConf, YANG. Organisational model (MIB, agents, proxies), centralised and decentralised architectures. Fault, Configuration,Accounting,Performance and Security (FCAPs).

Assessment Breakdown	%
Course Work	50.00%
End of Module Formal Examination	50.00%

Course Work

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Networking Skills Examination. Assessment of practical skills in the configuration and troubleshooting of OSPF, BGP, MPLS, STP, link aggregation and network management.	1,2,3,4	25.0	Sem End
Written Report	Networking Case Study. Mentoring case-study where learners are asked to design and implement a scalable solution given a set of enterprise network requirements with respect to LAN switching, routing and network management. This will reinforce students understanding of the material being delivered in lectures. Starts Week 3.	1,2,3,4	25.0	Sem End

End of Module Formal Examination

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	End-of-Semester Final Examination	1,2,3,4	50.0	End-of-Semester

Reassessment Requirement
Repeat examination *Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.*

The institute reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Lecture underpinning learning outcomes.	2.0	Every Week	2.00
Lab	Lab based practical work, in weekly 2-hour blocks.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Study, project work, extra reading to support module content.	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Workload: Part Time				
Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Lecture underpinning learning outcomes.	2.0	Every Week	2.00
Lab	Lab based practical work, in weekly 2-hour blocks.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Study, project work, extra reading to support module content.	3.0	Every Week	3.00
			Total Hours	7.00
			Total Weekly Learner Workload	7.00
			Total Weekly Contact Hours	4.00

Module Resources

Recommended Book Resources

- **Cisco Networking Academy 2014, *Scaling Networks Companion Guide*, Cisco Press [ISBN: 978-1-58713-328-2]**
- **Alexander Clemm 2007, *Network management fundamentals*, Cisco Press Indianapolis, Ind. [ISBN: 9781587201370]**
- **Luc De Ghein 2006, *MPLS Fundamentals*, Cisco Press [ISBN: 9781587051975]**

This module does not have any article/paper resources

Other Resources

- **Online Curriculum: *Course material is available on-line for registered students***
  http://netacad.com

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KITMN_8	Bachelor of Science (Honours) in IT Management	4	Mandatory
CR_KITSP_7	Bachelor of Science in Information Technology	4	Mandatory