



Title:	Routing and Switching Concepts	APPROVED
Long Title:	Routing and Switching Concepts	
Module Code:	COMP7032	Duration: 1 Semester
Credits:	5	
NFQ Level:	Intermediate	
Field of Study:	Computer Science	
Valid From:	Semester 1 - 2017/18 (September 2017)	
Module Delivered in	3 programme(s)	
Module Coordinator:	Sean McSweeney	
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Module Description:	This module describes the architecture, components and operation of routers and switches in a small network. Students learn to configure and troubleshoot routers and switches, and resolve common issues with virtual LANs and inter-VLAN routing in IPv4 networks.	
Learning Outcomes		
<i>On successful completion of this module the learner will be able to:</i>		
LO1	Discuss the operation of VLANs in a switched network and the method of forwarding frames based on different VLAN configurations.	
LO2	Configure VLANs and trunking and apply basic switch security in a small network.	
LO3	Classify dynamic and static routing protocols according to their purpose, operation and behaviour, and describe the methods for enabling inter-VLAN routing.	
LO4	Establish network connectivity by configuring a network consisting of routers using static and dynamic routing approaches, and inter-VLAN routing.	
LO5	Describe the purpose and operations of DHCP and NAT, and configure DHCP and NAT as appropriate for an Internet-connected small network.	
Pre-requisite learning		
Module Recommendations		
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>		
12702	COMP6027	Networking Fundamentals
12787	COMP7032	Routing and Switching Concepts
Incompatible Modules		
<i>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.</i>		
No incompatible modules listed		
Co-requisite Modules		
No Co-requisite modules listed		
Requirements		
<i>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.</i>		
No requirements listed		

Module Content & Assessment

Indicative Content

Switching Basics

Switched LAN Design, frame forwarding, switching domains; switch configuration and security.

VLANs

VLAN segmentation (VLAN types, trunking & tagging), implementation (VLAN assignment, trunks), security and design.

Routing Basics and Inter-VLAN Routing

Initial configuration; routing process; router operation (routing table, types of routes); static routing (static, static default, floating static, static host); inter-VLAN routing (router-on-a-stick, layer-3 switching).

Dynamic Routing

Dynamic Routing protocols (overview, comparison with static routing, distance vector vs. link state); RIP; single-area OSPF; dynamic routes in the routing table, and the routing lookup process.

Classless Routing Protocols, VLSM and CIDR

IPv4 enhancements, Variable-Length Subnet Masking (VLSM), Classless Interdomain Routing (CIDR).

DHCP and NAT

DHCP operation, configuration and troubleshooting; benefits and drawbacks of NAT, static vs. dynamic, PAT, port-forwarding.

Assessment Breakdown

	%
Course Work	100.00%

Course Work

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Multiple Choice Questions	Mid-term assessment for early feedback on learner engagement with the theory of switching in a LAN environment, including forwarding methods and VLAN operation.	1	15.0	Week 5
Practical/Skills Evaluation	Mid-term assessment of switch configuration skills, including basic switch configuration, VLAN configuration, and/or switch security configuration.	2	25.0	Week 6
Short Answer Questions	In-class written assessment of students' understanding of routing protocols and approaches, the requirements for inter-VLAN routing, and/or the purpose and operations of DHCP and NAT.	3,5	35.0	Week 12
Practical/Skills Evaluation	Assessment of router configuration skills, including initial configuration, static route configuration, dynamic routing protocol configuration, inter-VLAN routing configuration, and/or DHCP and NAT configuration.	4,5	25.0	Sem End

No End of Module Formal Examination

Reassessment Requirement

Coursework Only

This module is reassessed solely on the basis of re-submitted coursework. There is no repeat written examination.

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

Module Workload

Workload: Full Time				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Lecture delivering content underpinning learning outcomes.	2.0	Every Week	2.00
Lab	Networking lab to support learning outcomes.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Directed study to support labs/lectures.	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				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lab	Networking lab to support learning outcomes.	2.0	Every Week	2.00
Lecture	Lecture delivering content underpinning learning outcomes.	1.0	Every Week	1.00
Independent & Directed Learning (Non-contact)	Directed study to support labs/lectures.	4.0	Every Week	4.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				3.00

Module Resources

Recommended Book Resources

- Cisco Networking Academy 2016, *Routing and Switching Essentials Companion Guide*, Cisco Press [ISBN: 9781587134289]
- Andrew S Tanenbaum, David J. Wetherall 2013, *Computer Networks*, Pearson [ISBN: 9781292024226]
- Behrouz A. Forouzan 2012, *Data Communications and Networking*, McGraw Hill Higher Education [ISBN: 9789814577519]

Supplementary Book Resources

- Cisco Networking Academy 2016, *Routing and Switching Essentials Labs & Study Guid*, Cisco Press [ISBN: 9781587134265]

This module does not have any article/paper resources

Other Resources

- Online Curriculum: *All course material is available on-line for registered students*
<http://www.netacad.com>

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KDNET_8	<u>Bachelor of Science (Honours) in Computer Systems</u>	3	Mandatory
CR_KITMN_8	<u>Bachelor of Science (Honours) in IT Management</u>	3	Mandatory
CR_KITSP_7	<u>Bachelor of Science in Information Technology</u>	3	Mandatory