

## PROG C7020: Advanced Networking

Module Details	
Module Code:	PROG C7020
Full Title:	Advanced Networking <b>APPROVED</b>
Valid From:	Semester 1 - 2019/20 ( June 2019 )
Language of Instruction:	English
Duration:	1 Semester
Credits:	5
Module Owner::	Martin McCourt
Departments:	Unknown
Module Description:	This module will provide students with an in depth understanding of networking concepts and protocols in the context of enterprise networks. This module will also provide a sound basis for Data Centre and Cloud Networking.

Module Learning Outcome	
On successful completion of this module the learner will be able to:	
#	Module Learning Outcome Description
MLO1	Classify different enterprise networking protocols in terms of performance and redundancy.
MLO2	Examine multicast protocols and technologies.
MLO3	Design a fault tolerant and load balanced network.
MLO4	Configure an enterprise network in a simulated environment.
MLO5	Troubleshoot networking technologies in the context of enterprise networks.
Pre-requisite learning	
<p><b>Module Recommendations</b>  <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 DkIT 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></p>	
No recommendations listed	

<b>Module Indicative Content</b>
<b>Layer 2 Resiliency</b> Spanning Tree Protocol; Rapid Spanning Tree Protocol; Per VLAN Spanning Tree.
<b>Virtual Routing &amp; Forwarding</b> VRF requirements and application.
<b>Equal Cost Multipath Routing</b> CLNP; IS-IS routing protocol.
<b>Load Balancing</b> Port Channels; Multichassis Link Aggregation.
<b>Multicast</b> Pruning; IGMP.
<b>SAN Transport Protocols</b> Fibre Channel; Fibre Channel over Ethernet.

## Module Assessment

Assessment Breakdown	%
Course Work	10.00%
Practical	30.00%
Final Examination	60.00%

<b>Module Special Regulation</b>

### Assessments

#### Full Time

<b>Course Work</b>			
<b>Assessment Type</b>	Class Test	<b>% of Total Mark</b>	10
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	Week 10	<b>Learning Outcome</b>	1,2
<b>Duration in minutes</b>	90		
<b>Assessment Description</b> Class test covering all topics covered to date			

No Project
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<b>Practical</b>			
<b>Assessment Type</b>	Practical/Skills Evaluation	<b>% of Total Mark</b>	30
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	Every Second Week	<b>Learning Outcome</b>	3,4,5
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> Lab based exercises on configuring enterprise networks			

<b>Final Examination</b>			
<b>Assessment Type</b>	Formal Exam	<b>% of Total Mark</b>	60
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	End-of-Semester	<b>Learning Outcome</b>	1,2,3
<b>Duration in minutes</b>	120		
<b>Assessment Description</b> End of semester exam			

#### Part Time

Course Work			
<b>Assessment Type</b>	Class Test	<b>% of Total Mark</b>	10
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	Week 10	<b>Learning Outcome</b>	1,2
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> Class test covering all topics covered to date			
No Project			
Practical			
<b>Assessment Type</b>	Practical/Skills Evaluation	<b>% of Total Mark</b>	30
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	Every Second Week	<b>Learning Outcome</b>	3,4,5
<b>Duration in minutes</b>	0		
<b>Assessment Description</b> Lab based exercises on configuring enterprise networks			
Final Examination			
<b>Assessment Type</b>	Formal Exam	<b>% of Total Mark</b>	60
<b>Marks Out Of</b>	0	<b>Pass Mark</b>	0
<b>Timing</b>	End-of-Semester	<b>Learning Outcome</b>	1,2,3
<b>Duration in minutes</b>	100		
<b>Assessment Description</b> End of semester exam			
Reassessment Requirement			
<b>A repeat examination</b> <i>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.</i>			

**Module Workload**

<b>Workload: Full Time</b>					
<i>Workload Type</i>	<i>Contact Type</i>	<i>Workload Description</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>	<i>Hours</i>
Lecture	Contact	Formal classroom lecture	Every Week	2.00	2
Practical	Contact	The lab will be used to provide students with hands-on experience in configuring and testing enterprise networks. The lab will also be used to consolidate the theory by way of practical example, observation and exercises.	Every Week	2.00	2
Directed Reading	Non Contact	Reading that covers details included in the reference material but not explicitly covered in class time	Every Week	2.00	2
Independent Study	Non Contact	Preparing for practical exercises and writing up reports	Every Week	2.00	2
Total Weekly Learner Workload					8.00
Total Weekly Contact Hours					4.00

<b>Workload: Part Time</b>					
<i>Workload Type</i>	<i>Contact Type</i>	<i>Workload Description</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>	<i>Hours</i>
Lecture	Contact	Formal classroom lecture	Every Week	2.00	2
Practical	Contact	The lab will be used to provide students with hands-on experience in configuring and testing enterprise networks. The lab will also be used to consolidate the theory by way of practical example, observation and exercises.	Every Week	2.00	2
Directed Reading	Non Contact	Reading that covers details included in the reference material but not explicitly covered in class time	Every Week	2.00	2
Independent Study	Non Contact	Preparing for practical exercises and writing up reports	Every Week	2.00	2
Total Weekly Learner Workload					8.00
Total Weekly Contact Hours					4.00

## Module Resources

### Supplementary Book Resources

Diane Teare, Bob Vachon. (2015), CCNP Routing and Switching Foundation Learning Guide Library CCNP Routing and Switching Foundation Learning Guide Library, Cisco Press, [ISBN: 9781587144394].

James Kurose; Keith Ross. (2016), Computer Networking: A Top-Down Approach (7th Edition), 7th. Pearson, [ISBN: 9780133594140].

*This module does not have any article/paper resources*

### Other Resources

[Website], Juniper Networks. (2018), Understanding Virtual Routing and Forwarding Tables, Juniper, [https://www.juniper.net/documentation/en\\_US/junos/topics/concept/vpn-routing-tables-vpn-forwarding-tables.html](https://www.juniper.net/documentation/en_US/junos/topics/concept/vpn-routing-tables-vpn-forwarding-tables.html)

[Website], Cisco. (2018), IPv4 Multicast IGMP Snooping, Cisco, [https://www.cisco.com/c/en/us/td/docs/sw\\_itsches/lan/catalyst6500/ios/12-2SY/configuration/guide/sy\\_swcg/ipv4\\_igmp\\_snooping.html](https://www.cisco.com/c/en/us/td/docs/sw_itsches/lan/catalyst6500/ios/12-2SY/configuration/guide/sy_swcg/ipv4_igmp_snooping.html)

[Website], Cisco. (2018), Catalyst 3750-X and 3560-X Switch Software Configuration Guide, Release 12.2(55)SE, [https://www.cisco.com/c/en/us/td/docs/sw\\_itsches/lan/catalyst3750x\\_3560x/software\\_release/12-2\\_55\\_se/configuration/guide/3750xscg/swethch.html](https://www.cisco.com/c/en/us/td/docs/sw_itsches/lan/catalyst3750x_3560x/software_release/12-2_55_se/configuration/guide/3750xscg/swethch.html)

[Website], Cisco. (2017), IP Routing:ISIS Configuration, [https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/proute\\_isis/configuration/xs-16/irs-xe-16-book.html](https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/proute_isis/configuration/xs-16/irs-xe-16-book.html)

[Website], Cisco. (2016), Catalyst 4500 Series Switch Software Configuration Guide, 15.0(2)SG Configuration Guide, [https://www.cisco.com/c/en/us/td/docs/sw\\_itsches/lan/catalyst4500/12-2/15-02SG/configuration/guide/config/spantree.html](https://www.cisco.com/c/en/us/td/docs/sw_itsches/lan/catalyst4500/12-2/15-02SG/configuration/guide/config/spantree.html)

[Website], Cisco. (2017), Understanding Rapid Spanning Tree Protocol (802.1w), <https://www.cisco.com/c/en/us/support/docs/lan-switching/spanning-tree-protocol/24062-146.html>