



Title:	Internet & Network Services APPROVED
Long Title:	Internet & Network Services
Module Code:	COMP7011
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
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Module Description:	This module is focused on the study of advanced system and network administration topics for the Linux/Unix operating systems. Topics explored and implemented will include the setup and maintenance of many of the most popular network services including servers for DNS, LDAP, Web (HTTP, HTTPS), NAS and email (SMTP, POP3, IMAP). Special attention is paid to the concepts needed to implement these services securely and to the troubleshooting skills that will be necessary for real-world administration of these internet and network services.
Learning Outcomes	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Discuss the role of Internet and network services in an Enterprise environment.
LO2	Perform system administration procedures such as OS installation, server side software installation and software updating in a Linux/Unix environment.
LO3	Identify and discuss key sever security principles.
LO4	Produce and evaluate an outline specification for a server to meet the Internet and network service requirements of a particular organisation.
LO5	Design and develop a simple LAN offering Internet and network services.
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 MTU 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>	
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

Introduction to Internet & Network Services

A history of Internet and Network Services, outlining the evolution of services from Web 1.0 to Web 2.0. An overview of the most widely used services (DNS, DHCP, LDAP, Web & HTTP, eMail, NAS & IP-SAN).

System admin procedures for OS & software installation & updating

The steps & corresponding commands required to install & update a Linux OS & required services. Includes an overview of core Linux admin commands & package management tools.

DNS Services

DNS history and theory, The domain name space, Delegation and Zones, Resolving names and reverse lookups, Configuring BIND named.conf, Configuring BIND zones, DNS hierarchies: subdomain delegation, Securing BIND DNS, BIND 9 Views, Restricting queries, Restricting zone transfers, DDNS and nsupdate.

LDAP Directory services

LDAP Schema, Referencing LDAP entries, LDAP security, Implementing OpenLDAP server, Defining global parameters, Restricting access, Database configuration and indexing, Querying LDAP databases.

HTTP & Web 2.0 services

HTTP theory, Apache history and status, Apache architecture, Apache configuration files, Using Apache modules, Apache logs and analysis, Apache virtual hosting, Virtual host security issues, Apache authentication, Intro to cryptography, Using HTTPS with Apache, Dynamic content, Extending Apache with PHP and Tomcat, Dynamic content and security, Implementing FTP services. Read/Write Web, Wikis, Blogs, content management systems, p2p sharing.

Server Security

General server security principles. SSH security; key based authentication, brute force attacks. The role of firewalls in controlling user access to services over the network. Restricting users & services to the minimal set of permissions they need to function. Intrusion detection & incident response.

eMail Services

SMTP theory, Implementing SMTP with Postfix, Postfix configuration, Postfix ESMTP AUTH and encryption, Email services: POP3 and IMAP4, Encrypting client access, Spam and virus filtering, Web mail client access.

Network based storage services

The role of NAS & IP-SAN in the IT infrastructure & the benefits of each. Key NAS protocols; NFS, CIFS & IP-SAN protocols; iSCSI, FCIP. Enable network based file sharing and IP-SAN.

Assessment Breakdown	%
Course Work	100.00%

Course Work				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Install and configure a Linux based OS and a specified network service.	1,2,3	40.0	Week 6
Short Answer Questions	Networking Services assessment exam covering the history of internet and network services, the role of individual services and the key steps to install, configure and secure the services and system.	1,3	20.0	Week 11
Project	Design and implement a LAN offering various network services to meet the requirements of a particular organisation.	2,3,4,5	40.0	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 underpinning learning outcomes defined.	2.0	Every Week	2.00
Lab	Networking Services lab.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Independent Study.	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>
Lecture	Lecture underpinning learning outcomes defined.	2.0	Every Week	2.00
Lab	Networking Services lab.	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Independent Study.	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

- Hunt, Craig 2004, *Linux Network Servers*, Sybex New York [ISBN: 9780782141238]

Supplementary Book Resources

- Burgess, Mark 2003, *Principles of Network and System Administration*, Wiley [ISBN: 9780470868072]
- Flickenger, Robert 2003, *Linux Server Hacks*, 1st Ed., O Reilly [ISBN: 9780596004613]
- Harrison, Peter 2005, *Linux Quick Fix Notebook*, 1st Ed., Prentice Hall [ISBN: 9780131861503]

This module does not have any article/paper resources

Other Resources

- Website: *DNS RFCs*, IETF
<http://www.bind9.net/rfc>
- Website: *Apache Foundation*
<http://www.apache.org>
- Website: *Postfix*
<http://www.postfix.org>

Module Delivered in

Programme Code	Programme	Semester	Delivery
CR_KITMN_8	<u>Bachelor of Science (Honours) in IT Management</u>	4	Elective
CR_KITSP_7	<u>Bachelor of Science in Information Technology</u>	4	Mandatory