



UNIVERSITY OF WALES: TRINITY SAINT DAVID
PRIFYSGOL CYMRU: Y DRINDOD DEWI SANT

School of Applied Computing

Network Operating Systems and Security
ACCC5003

MODULE CODE:	ACCC5003
TITLE:	Network Operating Systems and Security
LEVEL:	5
CREDITS:	20
JACS CODE:	I112

AIM(S)

- To provide students with a sound understanding of the concepts, principles, skills and techniques required to manage/deploy network resources in a Network Operating System (NOS) environment e.g. Windows, Unix Novell.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

1. Apply a systematic understanding of network operating system environments to Deploy, Manage and Maintain critical network services (DNS/DHCP) and resources.
2. Analyse a given network to produce suitable security audit/disaster recovery strategy.

INDICATIVE CONTENT

- Internetworking addressing systems
- Overview of Directory Services
- Principles of Network logins
- Modifying user and computer account properties; account templates
- Group membership; default groups, strategies for using groups
- Investigate, deploy and configure Dynamic Host Configuration Protocol (DHCP)
- The Name Resolution process
- Deploy, configure and test Domain Name Services (DNS) and structure of DNS protocol.
- Controlling access to resources; shared folders, NTFS permissions
- The organisational unit (OU) structure; modifying permissions to directory objects, delegating control of OUs, use of Group Policy
- The role of DNS in the network infrastructure and its configuration
- The role of DHCP in the network infrastructure and its configuration
- Identify the nature of network security in terms of integrity, reliability, accuracy of data
- Overview of core services towards facilitating network security models (e.g. Confidentiality, Integrity and Availability of Data)
- Identify the nature of threats to the security of data (Passive/Active attacks)
- Risk assessment and Security policies
- Intrusion detection systems
- Disaster prevention and recovery methods e.g. RAID 0, 1, 5 and 10, High Availability Failover Clusters
- Virtual Private Networking.
- Authentication and encryption
- Remote administration of servers and services (RDP, Terminal Services).
- Virus checkers and violations, service pack upgrades and hardware failures
- Monitoring programs: use of Network Monitoring and Management tools/protocols.

- Monitoring event logs: monitor events to identify and track security events, resource usage, system and application errors, limiting the size of event logs to preserve disc space, archiving event logs to track trends over time
- Legal, social and ethical issues

LEARNING AND TEACHING STRATEGY

Formal lectures together with accompanying handouts/slide presentations will be used to convey key concepts and paradigms. Laboratory work will focus on practical activities which will provide students with enhanced network configuration and management skills. In order to emulate 'accurate' network organisational contexts, a collaborative environment for practical components of work will be implemented.

Network security skills will be developed via practical lab sessions that focus on implementing a range of services, simulating passive and active attacks and implementing apposite controls/countermeasures.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	
TOTAL	200	100%

ASSESSMENT

Description of each assessment component and its weighting, together with an example for new forms of assessment:

Assessment Component 1 – Coursework - 50%

Software development portfolio. Demonstrate professional practice and sound understanding of the skills and knowledge required to deploy manage and maintain Computer Networks, Operating systems and the intrinsic/core services they provide. Students will be required to complete a number of worksheets.

Students will be required to develop a systematic understanding of the principle stages of configuring/deploying 'network services' in local and remote 'virtualised' network platforms.

Students will typically be required to complete a number of worksheets, (*approximately 5 in total*). Example worksheets could be: WS1: Build a Virtualised Network, WS2: Manage network resources, WS3: Enforcing user security policies, WS4: Implement Service architecture WS5: Intrinsic/Extrinsic Operating System security principles

Exemplar: 'A simulated network infrastructure for secure local/remote management of intrinsic network based services.'

Assessment Component 2 – Coursework - 50%

Assessment is a written report (in the form of a security plan) which evaluates security principles and practices, which are demonstrated via deployment of security protocols tools, techniques and practices in tutorials (e.g. Configuring Layer 2/3/4 IP Tables for Firewalling, Armouring the Operating System services against Port scanners NMAP, Vulnerability Assessment and Patching (Nessus,

Update Services), Ethical hacking techniques: Kali Linux, Network node Performance benchmarking/vulnerability assessment.

Exemplar: ‘An applied network security audit/plan for a case study scenario.’

Assessment Summary

Activity type	Percentage
Written	0%
Coursework	100%
Practical	0%
TOTAL	100%

BIBLIOGRAPHY

Essential

Minas, M. et al (2014) *Mastering Windows Server 2012*, Sybex International

Cole E (2009) *Network Security Bible 2nd Edition*, John Wiley and Sons

Background

Minas, M. et al (2010) *Mastering Windows Server 2008 R2*, Sybex International

Hallberg B (2013) *Networking A Beginners Guide*, 6th edition, McGraw-Hill Osborne

Desmond B. et al (2013) *Active Directory: Designing, Deploying, and Running Active Directory 5th edition*, O'Reilly Media

Stallings W(2013) *Network Security Essentials, Applications and Standards 5th edition*, Pearson

Kurose J (2013) *Computer Networking: A top down approach*, 6th edition, Pearson

Negus C (2012), *Linux Bible*, 8th edition

De Laet D. et al (2008) *Network Security Fundamentals 1st edition*, John Wiley and Sons

Journals

ACM Transactions

IEEE (*available from Apollo*)

Computer Networking

Data Communications

Websites

<http://www.visualwin.com/>

http://www.windownetworking.com/articles_tutorials/

<http://www.networkworld.com>

<http://www.serverwatch.com/tutorials>

<http://www.techtutorials.info/windows.html>

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