THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

BUSINESS SCHOOL

Course Outline 2017

INFOSYS 339: LANs, WANs and Wireless Infrastructure (15 POINTS)

Semester 1 (1173)

Course Prescription

Studies the design, implementation and management of reliable and scalable networks. Topics covered: Local Area Network (LAN), switching and Virtual LANs, Internet routing protocols, wireless switching, congestion control and quality of service (QoS). Introduces students to network performance analysis using network simulation software. Provides a pathway to complete the industry recognised CCNA (Cisco Certified Network Associate) certificate by including CCNA's (Cisco Certified Network Associate) certificate by including CCNA's Routing Protocols and Concepts' and 'LANSwitching and Wireless'.

Programme and Course Advice

Prerequisite: INFOSYS 224 or 322

Goals of the Course

- To introduce routing as a network layer function and routing protocols as the implementation of such function
- To familiarise students with basic router components and router configuration
- To review and discuss the main design issues associated with LAN design, switching and switch configuration.
- To introduce new Wide Area Network technologies such as Metro Ethernet.
- To present and discuss wireless LAN technologies from medium access techniques to transmission protocols to basic wireless network architectures
- To introduce the issues that surround quality of service (QoS) and congestion control in data networks
- To introduce students to network performance analysis using network simulation software.
- To understand management implications of network design and implementation phases and the testing of the proposed design through the use of a network performance simulator.

Learning Outcomes

By the end of this course it is expected that the student will be able to:

1. understand the main issues associated routing, routers and routing protocols;
2. understand the main issues associated with virtual local area networks, switching, and LAN internetworking;
3. understand recent developments in WAN technologies; in particular Metro Ethernet, with a knowledge of architecture, implementation, and benefits and disadvantages;
4. understand how IEEE-802-based wireless local networks operate.
5. discuss and understand issues related to congestion control and quality of service, and,
6. understand and learn the use of a network performance simulation software tool.

Content Outline (Tentative)

Week	Class Schedule	Lab Schedule
1	Intro to Infosys 339 Introduction to Network Performance Simulation (I)	Introduction to Network Performance Simulation
2	LAN Design	Session 1: CCNA Administration Session 2: Chapter 1 - LAN Design and the Switched Environment
3	Switching VLAN	Final CCNA1 Exam (5%) Session 1: Chapter 2 - Basic Switch Configuration and Basic Switch Security Session 2: Prepare Lab Skill Assessment 1 on Port Security and Secure Shell
4	Submit Assignment 1 VLAN Network Performance Simulation (II)	Session 1: Lab Skill Assessment 1* (5%) Session 2: Chapter 3 - VLAN segmentation, implementation and security
5	STP Routing (network layer)	Session 1: Chapter 5 - Inter-VLAN routing on Packet Tracer Session 2: Inter-VLAN routing (on physical devices)
6	Routing (network layer) Mid-term test	Session 1: Chapter 6 - Static routing Session 2: Chapter 7 - Introduction to dynamic routing
Mid-term Break		
7	Routing	Session 1: Chapter 8 - Dynamic routing with OSPF Lab Skill Assessment 2* (5%)
8	TCP Congestion Control	Session 1: Chapter 9 - Introduction to access lists
9	Wireless networks – WiFi	Lab Skill Assessment 3* (5%) Packet Tracer assessment: inter-VLAN routing
10	Network Performance Simulation (III)	Session 1: Chapter 10 - DHCP Session 2: Chapter 11 - NAT
11	Wide Area Network Technologies	Lab Skill Assessment 4* (5%) – RSE Integrated Skill Challenge
12	Conclusion	Final CCNA 2 Exam (10%)

(*) Lab Skills (best 3 out of 4)

Learning and Teaching

The course is delivered within the following components:

Lectures: 1x2-hour lecture per week + 1x1-hour lecture per week

Laboratories: 1x2-hour laboratory (mandatory) per week based on hands-on tasks in the context of data networks

Online Curriculum: Weekly Cisco on-line module exams to test students on the content covered during mandatory lab sessions. Complete Cisco module contents will be assessed through a specific multi-choice, multi-answer test.

Mid Term test: Written test

Final Exam: Written test

Case Study: Group project

Self-Study: Students are expected to learn any online curriculum content that is not covered in the prescribed textbook, or discussed in lectures based on self-study

Teaching Staff

Course Director and Lecturer
Associate Professor **Fernando Beltrán**
Room 472, OGG Building
f.beltran@auckland.ac.nz
Extn: 87850
Office Hours: TBA

Learning Resources

Prescribed Textbook

Business Data Communications and Networking (12th Ed), J. Fitzgerald, A. Dennis, A. Durcikova, John Wiley & Sons, 2015. ISBN: 978-1118-89168-1.

The Network Simulation Case Book. Fernando Beltrán. University of Auckland. (Available on Canvas)

Online Curriculum – Weekly posted class presentations (PDFed Power Point files) on Canvas

1. Weekly posted lab practices
2. Cisco on-line material http://cisco.netacad.net

Other references

Data Communications and Networking (5th Ed), Forouzan, B. A., McGraw-Hill, 2013, ISBN-978-0-07-337622-6. Website: http://www.mhhe.com/forouzan

Graziani, R – Cabrillo College, http://www.cabrillo.edu/~rgraziani/

Workstations/Hubs/Switches/Routers/Cables - Provided in lab

Assessment

Assignments	5%
Mid Semester Test	20%
Network Design Case (Final Project)	15%
Cisco Tests and Exams	15%
Lab Skills (best 3 out of 4)	15%
Final Exam	30%
Total	100%

Learning Outcome	Mid Semester Test	Case Study	Cisco Modules and Exam	Final Exam
1	X		X	X
2	X		X	X
3	X		X	X
4	X		X	X
5			X	X
6		X		X
7		X		X

Requirements to pass INFOSYS 339

All students MUST PASS the Final Examination component in order to PASS the paper. Students are NOT required to pass each individual coursework component, but MUST achieve a passing mark when the respective marks are aggregated (i.e. 50 or more out of 100).