

**Faculty of Business and Information Technology**

**Bachelor of Information Technology**

***IT5x87 Fundamentals of Networking***

**Course Outline**

Semester 1, 2017

Prepared By

Manu Katene

**IT5x87 Fundamentals of Networking**

**Introduction:**

This course covers the fundamentals of computer hardware and software and advanced concepts such as security, networking, and the responsibilities of an IT professional. Students who complete this course will be able to describe the internal components of a computer, assemble a computer system, install an operating system, and troubleshoot using system tools and diagnostic software. Students will learn how to configure wireless security of home grade wireless interne routers and share resources in a networked environment.

This course is part of the worldwide Cisco Network Academy Program CNAP and content has been created and moderated by CNAP. This course is based on the Introduction to Networking v5.1 curriculum which helps students to prepare for the Cisco CCENT and CCNA certification exams.

**Learning Outcomes:**

By the end of the course, students will be able to complete the following objectives:

1. Understand the basic theoretical models of networking
2. Identify the components of networking technology and data communications
3. Apply networking principles to prepare a PC for networking
4. Apply networking operating system commands
5. Set up and cable a basic network

**Tutor Contact Details:**

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| --- | --- | --- | --- |
| **Name** | **Office** | **Phone** | **Email** |
| **Manu Katene** | **E207** | **2373100 ext. 4148** | **manu.katene@whitireia.ac.nz** |

Your lecturer will be available at the times displayed on his office door; or please phone or email to make an appointment.

**Lectures and Workshops:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Group Light Green** | **Day** | **Time** | **Room** |
| Practical Lab Exercises  Lectures | Tuesday | 9.00am – 12.00pm | E201 |
| Thursday | 9.00am – 11.00am | E201 |

**Learning Hours:**

This is a NZQA level 5 15-credit course and requires 150 student-learning hours. There are approximately 60 hours of class and tutor facing time which means that the student must spend approximately 90 hours (about 7 hours per week) of their own time working on assignments and other tasks related to the class.

**Resources:**

* All course materials will be available online through the Internet on the www.pcsupport.ac.nz and www.moodle.whitireia.ac.nz websites. You will also be given access to the www.netacad.com website where you can read the course content and take quizzes and practice tests for each chapter
* Assignments and PowerPoint presentations and lab activities will be made available on Moodle. You are expected to take your own notes during the lectures
* Materials for this course are also available in book form: Cisco Networking Academy (2013), *Introduction to Networks Companion Guide*, 1st Edition, Cisco Press. ISBN – 10: 1-58713-316-4. ISBN-13: 978-1-58713-316-9

**Assessments:**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Assessments | Percent % | Due Date |
| 1 | Mid-semester Written Exam | 30% | 11 April |
| 2 | Group Practical Assignment | 15% | 25 June |
| 3 | Skills Based Practical Assessment | 15% | 20 – 22 June |
| 4 | Exploration Online Final Exam | 40% | 25 June – 7 July |

**Pass Requirements**:

You **MUST** score at least **40%** on the On-Line test, and an average of **50%** or more overall for the rest of your assignments to pass this paper

**Late Assignments and Failed Exam Rules:**

**Reconsideration of Assessments:**

You are allowed to inspect all marked assessments together with a copy of any marking schedules used. It is the responsibility of the student to inspect assessed work, within three weeks of the result being notified. If you are unhappy with the assessed mark, you can apply for an item of assessed work to be recounted, remarked or you can apply for an Opportunity for Further Assessment

**Return of Marked Work:**

* Because the test is administered online the result is available as soon as the test is complete
* The Mid-semester exam, skills based assessment and group assignment marks will be made available within two weeks of the completion of the assignments and the submission of all documentation associated with the assignments

**Late Assignments:**

You are required to hand in assignments on the date and times specified in the course outline. If an assignment is not handed in by the due date **a mark of zero (0)** will be recorded. See the **Opportunities for Further Assessment** section for the process to apply for a further assessment.

An extension can be granted by the lecturer, by prior arrangement where possible. This will only be granted for a good reason such as:

* Sickness – in which case a medical certificate must be presented to the lecturer.
* Bereavement – in which case the lecturer must be informed as soon as possible.
* Extenuating circumstances – these circumstances must be explained to the lecturer and proof may be required.

**Recount:**

Candidates may apply for a recount within two weeks of the result being notified

**Remark:**

A student who believes that an injustice has been done in respect of the marking of any work submitted for assessment shall be entitled to have the assessment reconsidered. Any application must be on the official form available from the Faculty administration office and be directed to the Programme Manager along with the reconsideration fee.

**Opportunity for further assessment:**

Opportunities for Further Assessment **(OfFA)** may be granted by the Programme Manager, with a limit of one per paper. The maximum grade for a paper with a further assessment is C. The maximum mark for a further assessment is 50%. Any application must be on the official form available from the Faculty administration office and be directed to the Programme Manager along with the **OfFA** fee.

**Assignments:**

If a mark of less than 50% has been awarded for an assignment you may apply for a further assessment. The **OfFA** must be submitted to the faculty office, accompanied by the fee payment within 5 days of the mark being notified.

**Examinations:**

If a mark of less than 50% has been awarded for an examination, you may apply for a further assessment. The **OfFA** must be submitted to the faculty office, accompanied by the fee payment within 4 weeks of the mark being notified.

**Dishonesty During Assessment:**

Dishonesty includes:

* Plagiarism
* Collaboration
* Possession of unauthorised material

**Plagiarism**

Plagiarism is defined as not acknowledging a source of information or using other people’s ideas as your own. This includes work that has been copied or adapted from a printed or internet source. When using another person’s work or ideas, you must correctly cite or quote the source using the APA V5 referencing style.

**Collaboration**

Collaboration includes working with another student for or during an assessment without prior approval from the lecturer. It may also include sharing your work or files with others.

**Possession of Unauthorized Material**

It is regarded as dishonesty if a student is found in possession of any unauthorized material such as books, printed or written paper, electronic material or any other devices (translators, mobile phones, MP3 players etc) that are not permitted during an assessment.

Cases of dishonesty will be regarded as academic misconduct and will have serious consequences, which may include failure of the course, suspension or expulsion from the course or cancellation of enrolment as a student at Whitireia New Zealand.

The student handbook provides information on policies and procedures that will be followed should dishonesty during assessment occur.

**Online Learning Resources**

An online version of the Cisco reading materials is located on the pcsupport.ac.nz website. This is an overall summary of the topics covered in these chapters.

**Chapter 1: Explore the Network**

* Explain how multiple networks are used in everyday life
* Explain how topologies and devices are connected in a small to medium-sized business network
* Explain the basic characteristics of a network that supports communication in a small to medium-sized business.
* Explain trends in networking that will affect the use of networks in small to medium-sized businesses

**Chapter 2: Configure a Network Operating System**

* Explain the features and functions of the Cisco IOS Software
* Configure initial settings on a network device using the Cisco IOS Software
* Given an IP addressing scheme, configure IP address parameters on devices to provide end-to-end connectivity in a small to medium-sized business network.

**Chapter 3: Network Protocols and Communications**

* Explain how rules facilitate communication
* Explain the role of protocols and standards organizations in facilitating interoperability in network communications
* Explain how devices on a LAN access resources in a small to medium-sized business network

**Chapter 4: Network Access**

* Explain how physical layer protocols and services support communications across data networks
* Build a simple network using the appropriate media
* Explain the role of the data link layer in supporting communications across data networks
* Compare media access control techniques and logical topologies used in networks

**Chapter 5: Ethernet Networks**

* Explain the operation of Ethernet
* Explain how a switch operates
* Explain how the address resolution protocol enables communication on a network

**Chapter 6: Network Layer**

* Explain how network layer protocols and services support communications across data networks
* Explain how routers enable end-to-end connectivity in a small to medium-sized business network
* Explain how devices route traffic in a small to medium-sized business network
* Configure a router with basic configurations

**Chapter 7: IP Addressing**

* Explain the use of IPv4 addresses to provide connectivity in small to medium-sized business networks
* Configure IPv6 addresses to provide connectivity in small to medium-sized business networks.
* Use common testing utilities to verify and test network connectivity.

**Chapter 8: Subnetting IP Networks**

* Implement an IPv4 addressing scheme to enable end-to-end connectivity in a small to medium-sized business network
* Given a set of requirements, implement a VLSM addressing scheme to provide connectivity to end users in a small to medium sized network.
* Explain design considerations for implementing IPv6 in a business network

**Chapter 9: Transport Layer**

* Explain how transport layer protocols and services support communications across data networks.
* Compare the operations of transport layer protocols in supporting end-to-end communication

**Chapter 10: Application Layer**

* Explain the operation of the application layer in providing support to end-user applications
* Explain how well-known TCP/IP application layer protocols operate

**Chapter 11: Build a Small Network**

* Explain how a small network of directly connected segments is created, configured and verified.
* Configure switches and routers with device hardening features to enhance security
* Use common show commands and utilities to establish a relative performance baseline for the network.

## Delivery Timetable

*Note: this is a guide only and may be changed as the course proceeds.*

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| **Week** | **Date** | **Lesson Topics** |
| **1** | 20 February | Orientation Week |
| **2** | 27 February | **Overview of course**  Overview of Cisco Networking Academy Program  Navigating the moodle.whitireia.ac.nz and pcsupport.ac.nz and netacad.com websites.  **1 Introduction to Networking**  Overview of networking components – media, devices, addressing schemes, network protocols and services and network topologies  Overview of Network types - LANs, WANs, Internet, intranet and extranets, internet connection methods  Overview of network architecture goals to ensure reliability – fault tolerance, scalability, quality of service and security |
| **3** | 06 March | **2 Configure a Network Operating System**  Introduction to Cisco switches  Overview of Cisco IOS command structure  Accessing the Cisco IOS  Overview of basic switch configuration syntax  Build a simple switch based network and configure basic switch |
| **4** | 13 March | **3 Network Protocols and Communications**  Introduction to network protocols and standards  Data communication fundamentals  Data Communication Models - OSI v TCP/IP  Data encapsulation process  Data communication between local and remote hosts |
| **5** | 20 March | **4 Network Access**  Purpose of Physical layer protocols  Introduction to network media types – fibre, copper, wireless  Purpose of data link layer  Introduction to Media Access Control methods  Introduction to network frames and addresses |
| **6** | 27 March | **5 Ethernet Networks**  Overview of Ethernet networks  Introduction to Ethernet Frames and frame address format  The role of LAN switches  Introduction to the Address Resolution Protocol (ARP) |
| **7** | 03 April | **6 Network Layer**  Overview of the Network layer  Introduction to network IP Packets  Introduction to the network routing process  Purpose of routers in communication  Overview of the router boot up process and configuration tasks  Build a simple router based network |
| **8** | 10 April | **Mid-semester Exam 11 April** |
| **9** | 17 April | **Study Week**  **Study Week** |
| **10** | 24 April |
| **11** | 01 May | **7 IP Addressing**  Overview of IP addressing  Introduction to public and private IP addresses  IP address binary conversion  IPv4 versus IPv6 addressing |
| **12** | 08 May | **8 Subnetting IP Networks**  IP address binary conversion  IPv4 versus IPv6 addressing  Overview of IP address Subnetting, basic Subnetting, VLSM Subnetting and IPv6 subneting processes |
| **13** | 15 May | **9 Transport Layer**  Transport layer protocols  TCP and UDP  Guaranteed delivery |
| **14** | 22 May | **10 Application Layer**  Application layer protocols  Well-known application layer protocols and services  Application Port number |
| **15** | 29 May | **11 - Building and Troubleshooting Networks**  **Online CNAP Chapter Test Revision** |
| **16** | 05 June | **Study Week**  **– Individual Practical Assessments**  **– Group Project Assignment Due** |
| **17** | 12 June | **Exams** |
| **18** | 19 June | **Exams** |