INTERNATIONAL SCHOOL OF MANAGEMENT AND TECHNOLOGY

NEPAL

FACULTY OF COMPUTING

UNIT TITLE	Unit 2: Networking		
UNIT CODE	M/618/7393	LEVEL	4 (Core)
STUDENT NAME		CREDIT VALUE	15
ASSESSMENT TITLE	Cutting Edge IT Solution Network System	WORD COUNT	
ASSESSOR	Roshan Chapagain	I.V.	
ASSIGNMENT ISSUE DATE	15/05/2023	ASSIGNMENT SUBMISSION DATE	14/07/2023
ORIGINAL SUBMISSION		ASSIGNMENT NO.	1

ASSESSMENT CRITERIA TO BE ASSESSED IN THIS ASSIGNMENT
(Identify all criteria to be assessed in this assignment)

Assignment Criteria	P1	P2	P3	P4	P5	P6	P7	P8
Achieved								
	Merit Criteria				**Distinction Criteria**			
Assignment Criteria	M1	M2	M3	M3	D1	D2		
Achieved								

Important:

- **Read the plagiarism notice and requirements at Page 7**
- **Word-limit- 8000 words** *(excludes cover page, table of content, figures, graphs, reference list, appendix and logbook)*
- **Accepted Sources: Research Papers** *(Journal Articles, Conference Proceedings, Thesis), Text Books, Governmental Data, Websites (only a registered organization, an educational institution, government agency)*
- **Information taken from unreliable sources will not be accepted**
- **Must follow Harvard Reference Style**
- **Assignment must be submitted through the Plagiarism Detection Tool**

Assignment submission format

Each student has to submit their assignment as guided in the assignment brief. The students are guided on what sort of information is to produce to meet the criteria targeted. You are required to make use of headings, paragraphs, and subsections as appropriate, and all work must be supported with research and referenced using the **Harvard referencing system**.

Learning outcomes covered

- LO1 Examine networking principles and their protocols
- LO2 Explain networking devices and operations.
- LO3 Design efficient networked systems
- LO4 Implement and diagnose networked systems.

Purpose of this Assignment

Computer networks have become the essence of our daily lives. Computer networks are the driving force behind the evolution of computer systems allowing users to access data, hardware, and services regardless of their location. The major purpose of this assignment is to provide the students an opportunity to exhibit their knowledge in the field of computer networking, how the network operates, protocols, standards, security considerations, and the prototypes associated with a range of networking technologies.

The assignment will help the students to check their knowledge of configuring and installing networking systems exploring the range of technologies and troubleshooting the network. The students will be able to demonstrate their skills and understandings of the operation of IP data networks, routers, switching technologies, IP routing technologies, IP services, and troubleshooting through the completion of this assignment.

Besides technical stuff, the students will be demonstrating skills such as communication literacy, critical thinking, analysis, reasoning, and interpretation, which are crucial for gaining employment and developing academic competence.
The completion of this assignment will illustrate that the student has been able to:

- Examine networking principles and their protocols.
- Examine networking devices and operations.
- Design efficient networked systems.
- Implement and diagnose networked system.

Each student has to submit their assignment as guided in the assignment brief. The students are guided on what sort of information is to be produced to meet the targeted criteria. All the tasks need to be done individually and the student has to produce an individual assignment.

ASSIGNMENT SCENARIO

Scenario

Cutting Edge IT Solution is a reputed and well-managed IT Service Provider Company which is located in Kathmandu. The organization has recently decided of opening a new branch in Butwal in order to facilitate the general public with its new technological devices and applications. For the given branch, the central office has decided on the following structure of the office.

There are four departments with the following responsibilities and infrastructure:

- **IT Team (7 Computers) – Top Floor**
- **Finance Team (5 Computers) – Second Floor**
- **HR Team (4 Computers) – Second Floor**
- **Sales Team (6 Computers) – First Floor**

Each team has their own secured area on the network. Each team member has access to their own content only, as well as any shared team documentation, but they do not have access to any other documentation. However, the Respective team leader can access all material for that team. There is an area for company documentation that anyone can view.

All documentation and office software are located on a file server. Also there are 2 network administrators who have full admin access to the network.

The network requirements are that:

All offices have a mixture of wired and wireless connectivity

1. All Teams are isolated from each other
2. There is proper consideration given to network security to minimize a data breach
3. A firewall will need to be installed and configured to allow inbound and outbound traffic
4. There is no lag of data traffic between floors and no connectivity 'dead spots'

You have been hired as an IT officer in the IT Department and your major roles and responsibilities are to Plan, Manage, design, implement and optimize the network system for the organization considering IP addressing, Server systems, various other services, Network

devices, Security devices, etc.

In order to prepare a report, you will demonstrate that you understand the principles of network infrastructure management and are able to design, implement and test complex network systems suitable for an organization like **Cutting Edge IT Solution.**

ASSIGNMENT TASKS

Assignment Tasks

Activity 1

Your manager has given you the task of preparing a formal presentation (10-12 Slides) with a presentation notes as a separate document for the CEO and Senior Network Administrator of Cutting Edge IT Solution that explains the concepts related to networking principles and topology, devices and their operating principles and proposing a topology that will be suitable for the scenario.

Your presentation should include:

- A discussion of the benefits and constraints of different network types, e.g. wired, wireless, hybrid
- A discussion of the benefits and constraints of different network standards, e.g. OSI, TCP/IP, 802.x
- An explanation of the impact of network topology, communication and bandwidth requirements, identifying the advantages and disadvantages of each to a network design
- An assessment of common networking principles and how network protocols, e.g. IPv4, IPv6, HTTPS, can enable an effective networked system
- A discussion of the operating principles of networking devices and network server types, e.g. routers, switches, firewalls, repeaters, bridges, IoT gateways, domain, web, file and database servers, access permissions
- A discussion of how workstation hardware and the relevant networking software depend on each other.

Activity 2

Further, you are required to design a networked solution for the requirements specified by Cutting Edge IT Solution. You should make use of whichever design tools and techniques are most appropriate for your network and for the nature of the networked solution. You should produce your evidence as an implementation plan.

Your implementation plan should include the following:

- The design of the network, including any networking hardware, software, network

addresses and devices and users, including any network sub domains as well as the physical location of these devices within the organisation
- Any device configuration and security considerations should be included
- The design of a maintenance schedule to support the networked system
- A test plan covering all areas of the networked system requirements, indicating the test action, test data and expected results
- Feedback from a range of users on the effectiveness of the solution design
- An analysis of the user feedback with the aim of optimising the design and improving the efficiency of the networked solution
- A clear explanation of how the network designs have been optimised and improved
- An explanation of the range of network server types available required by the Cutting Edge IT Solution and a recommended selection
- A justification of the recommended server selection, with specific focus on cost and performance optimisation

Activity 3

You are required to implement a virtual networked solution for the requirements specified by the Cutting Edge IT Solution. You should make use of whichever virtual network simulator is most appropriate for your optimised network design and for the nature of the networked solution. You should produce your evidence as a technical report.

Your report should include:

- clear evidence for the implementation of the optimised design, for example screenshots, configuration files, annotated and verified demonstration evidence, network monitoring reports
- a test plan implementation, using the test plan designed in Activity 2, clearly documenting the test results against the expected results
- an analysis of the results of the test plan and, based on this, recommendations of potential enhancements for the networked system

Activity 4

Write an evaluative report for the CEO and Senior Network Administrator of Cutting Edge IT Solution that provides a reflective overview of the selected topology as well as the network design and implementation.

Your report should include:

- an evaluation of network topology and any protocols selected
- an evaluation of how the topology and protocols demonstrate the efficient use of a networking system
- critical reflection on the final implemented network and design
- a critical reflection of the decisions made to enhance the network design and the implemented solution

LEARNING OUTCOMES AND ASSESSMENT CRITERIA

Pass	Merit	Distinction
LO1 Examine networking principles and their protocols		
P1 Discuss the benefits and constraints of different network types and standards. **P2** Explain the impact network topologies have on communication and bandwidth requirements.	**M1** Assess common networking principles and how protocols enable the effectiveness of networked systems.	**D1** Evaluate the topology and protocol suite selected for a given scenario and how it demonstrates the efficient utilisation of a networking system.
LO2 Explain networking devices and operations		
P3 Discuss the operating principles of networking devices and server types. **P4** Discuss the inter-dependence of workstation hardware and relevant networking software.	**M2** Explore a range of server types and justify the selection of a server for a given scenario, regarding cost and performance optimisation.	
LO3 Design efficient networked systems		
P5 Design a networked system to meet a given specification. **P6** Design a maintenance schedule to support the networked system.	**M3** Analyse user feedback on your designs with the aim of optimising your design and improving efficiency.	**D2** Critically reflect on the implemented network, including the design and decisions made to enhance the system.
LO4 Implement and diagnose networked systems		
P7 Implement a networked system based on a prepared design. **P8** Document and analyse test results against expected results.	**M4** Recommend potential enhancements for the networked systems.	

Plagiarism Notice

You are reminded that there exist **Academic Misconduct Policy and Regulation** concerning **Cheating and Plagiarism**.

Extracts from the Policy:

Section 3.4.1: Allowing others to do assignments / Copying others assignment is an offence

Section 3.4.2: Plagiarism, using the views, opinion or insights / paraphrasing of another person's original phraseology without acknowledgement

Requirements

- It should be the student's own work – **Plagiarism is unacceptable**.
- Clarity of expression and structure are important features.
- Your work should be submitted as a **well presented**, word-processed document with headers and footers, and headings and subheadings, **both in hard and soft copies**.
- You are expected to undertake research on this subject using books from the Library, and resources available on the Internet.
- Any sources of information should be **listed as references** at the end of your document and these sources should be referenced within the text of your document using **Harvard Referencing** style
- Your report should be illustrated with screen-prints, images, tables, charts and/or graphics.
- All assignments must be typed in **Times New Roman**, **font size** 12, 1.5 **spacing**.

The center policy is that you must submit your work within the due date to achieve "Merit" and "Distinction". Late submission automatically eliminates your chance of achieving "Merit and Distinction". Also, 80% attendance is required to validate this assignment.

I declare that all the work submitted for this assignment is my own work and I understand that if any part of the work submitted for this assignment is found to be plagiarised, none of the work submitted will be allowed to count towards the assessment of the assignment.

Assignment Prepared By	Signature	Date
Siddhant Bhattarai		11/01/2023
Brief Checked By	**Signature**	**Date**
Dhruba Babu Joshi		13/01/2023