Department of Electrical and Electronic Engineering
FACULTY OF ENGINEERING
UNIVERSITY OF JAFFNA
Assignment
EC 7091: COMMUNICATION NETWORK DESIGN

Requirement

You have been assigned to re-design a network for Faculty of Engineering, University of Jaffna. It aims to provide student labs for each department (4 departments), provide computers for its education and administrative staff, and set up a web server and a file server. The Faculty has just purchased one T1 connection providing 1.5Mbps for upload and download. It has also purchased the 193.188.34.128/26 network from its ISP.

Faculty has the following plans:

- It wants to set up one web server to host the faculty website and one file server on which students can access course materials from home. Each of these will be allocated a different DNS name.
- The Faculty wants to set up four computer labs in each department, each containing 25 PCs with internet connectivity.
- Additionally, it wants to allocate 7 PCs in each department, each of which will be placed in different lecture rooms and used by the lecturer. These PCs also require internet connectivity.
- 2 PCS will be given to the system administrator, with the facility to provide any type of Internet services on them. Other than that, 5 PCs will be made available for the administration building. However, management has decided that these 5 PCs should not have internet connectivity but should still be able to access the web and file server.

Task

Your task is to design a complete network for the Faculty. You are asked to have at least one separate network for each department. Include the following:

- IP addressing scheme (IP address, Subnet Mask, Default Gateway), Infrastructure cabling (Considering current department locations), Routing protocols, VLANs, NAT, Firewall, Internet Access solutions. Include any other item that would be relevant to the "network design" for the Faculty.
- Simulate the network in any of the simulation tool and attach the report

The Faculty has allowed an adequate budget to purchase any switches and routers that may be required, yet obviously does not want to spend more than necessary. Your task is to provide a scalable and efficient network design.

Deliverable

1. Network design diagram indicating all necessary details (PC, IP, Network, GW, Router, Switches). It can be drawn using any software like Microsoft Visio. Diagram should be very clear and should be submitted as a softcopy. 30 Marks
2. A Report must be submitted, including the following.
    a. Justification for your choices of IP allocation, NAT, VLAN, Network, Router placement, Routing protocol selection, Switches, etc. 20 Marks
    b. Routing table for each and every router you use 10 Marks
    c. Results screenshot with explanation 30 Marks
    d. Explain how this network can be efficiently implemented using Software Defined Networking (SDN). 10 Marks

Deadline

1. Submit the Network diagram and report in the assignment link on or before October 3, 2025 4.00 pm.
2. This is a group assignment with a maximum of four members per group, and only one submission is required per group.