# **TCS 329 (NETWORKING II)**

# **PROPOSAL TO DESIGN A NETWORK FOR FACULTY OF COMMUNICATION AND INFORMATION SCIENCE, UNIVERSITY OF ILORIN, ILORIN, KWARA STATE, NIGERIA.**



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# **Introduction**

# This proposal is put forward for the comprehensive implementation of a complete network infrastructure within the Faculty of Communication and Information Science. Recognizing the pivotal role that technology plays in both academic and administrative functions, it is imperative to establish a well-designed and reliable network within the faculty. This deployment aims to enhance communication and productivity, fostering an environment conducive to academic excellence and efficient administrative operations.

# **STRUCTURE OF FACULTY OF COMMUNICATION AND INFORMATION SCIENCE NETWORK (FCIS).**

**GROUND FLOOR:**

# The Faculty of Communication and Information Science Building stands proudly as a three-story architectural marvel. The ground floor boasts a dynamic working environment with a total of 44 offices and a boardroom. In response to the unique layout of these ground floor offices, we propose the installation of **two crucial switches, accompanied by Ethernet cables and a router**, to establish a reliable wired network. This network design involves the placement of faceplates in each office. This setup ensures that staff members within the same department are assigned to the same VLAN, promoting streamlined connectivity and collaboration.

# Given the intricacies of the office arrangement, the adoption of a wired network is considered essential. A wireless alternative would fall short in providing accurate coverage for the diverse spaces and functions within this dynamic floor. This comprehensive approach aims to create an efficient and responsive network infrastructure, catering to the specific needs of the Faculty of Communication and Information Science Building's ground floor.

The pavilion at the entrance of the faculty will serve as a dedicated guest network area. To ensure optimal coverage and effective internet speed**, two strategically placed access points** will be installed opposite each other. This setup is designed to prevent network congestion and provide a seamless and efficient experience for guests accessing the internet in the pavilion.

**1st Floor Network Configuration:**

The first floor of the Faculty of Communication and Information Science Building encompasses vital administrative spaces, including the Dean's office, Sub-dean's office, Head of Department (HOD) offices for each department, Faculty Officer office, and Faculty Accountant office. In alignment with the specific requirements of these administrative functions, the network on the first floor will be designed to optimize connectivity and efficiency.

*Network Infrastructure:*

In order to ensure seamless connectivity, a wired network configuration will be implemented on the first floor. **Two switches** **and a router will** dedicated to the 1st floor will be strategically placed to meet the connectivity needs of the administrative offices. Each office on this floor will be equipped with a single faceplate, offering reliable and high-speed Ethernet connections.

*Wireless Connectivity:*

In addition to the wired network, **a wireless router** will be installed in each office on the first floor. This dual-network approach ensures flexibility for users who may require both wired and wireless connections based on their specific tasks and devices.

This integrated setup is designed to meet the demands of administrative tasks, providing a stable and efficient network infrastructure for the Dean's office, Sub-dean's office, HOD offices, Faculty Officer office, and Faculty Accountant office. The combination of wired and wireless connectivity options offers a versatile and user-friendly network environment tailored to the diverse needs of the first floor's administrative functions.

**2nd Floor Network Configuration:**

The second floor of the Faculty of Communication and Information Science Building serves as another crucial administrative network, housing the offices of senior lecturers. To meet the specific needs of this floor, the network configuration will be carefully designed for optimal connectivity and efficiency.

**Network Infrastructure:**

To ensure a robust network, **two switches** will be assigned to the second floor. Additionally, **a router** will be deployed to interconnect these switches, facilitating seamless communication and data transfer across the administrative offices. This setup is aimed at providing a stable and high-performance network infrastructure for the senior lecturer offices.

**Connectivity in Individual Offices:**

In each office on the second floor, **a faceplate** will be installed to offer reliable and high-speed Ethernet connections. This wired network configuration ensures a dependable and consistent connectivity experience for senior lecturers who rely on efficient data access and communication.

**3rd Floor Network Configuration:**

On the third floor, we have 6 lecture rooms and 4 laboratories. The network design for this floor involves the deployment of a switch to cater to the connectivity needs of both the lecture rooms and laboratories. Each laboratory and lecture room will be assigned to distinct VLANs to optimize network segmentation.

In the laboratories, a meticulous approach will be taken to provide comprehensive connectivity. Each laboratory will be equipped with its own dedicated access point, ensuring robust network coverage and performance. Furthermore, in the laboratories, two faceplates will be installed—one for the lab technician and another for administrative members—facilitating efficient and secure network access.

For the lecture rooms, a thoughtful arrangement includes the deployment of three distinct access points. This strategic placement ensures reliable and seamless connectivity for academic activities taking place in these spaces. Additionally, to promote a secure and controlled network environment, the access points in the lecture rooms will be configured as a guest network.

This network configuration for the third floor is designed to address the specific needs of both the laboratories and lecture rooms, offering a versatile and tailored solution for diverse activities and users within this academic space.

**Top of Form**

**Communication and Information Science Lecture Theater (CISLT) Network Configuration:**

The Communication and Information Science Lecture Theater (CISLT) is a significant space with a capacity of 500 seats, emphasizing the need for an efficient and reliable network infrastructure. Given the nature of this area, the network requirements will be primarily wireless.

**Wireless Network Configuration:**

To facilitate connectivity within the lecture theater, a wireless network will be implemented. A switch will be dedicated to this space, ensuring the provision of a stable and high-capacity network. **Five strategically placed access points** will be deployed to achieve total coverage, guaranteeing a seamless and robust wireless connection for all occupants of the theater.

**Administrative VLAN Configuration:**

On the switch assigned to the lecture theater, a faceplate will be installed. This faceplate will be configured to operate on a dedicated VLAN, exclusively assigned to administrative members. This VLAN segmentation ensures secure and controlled access for administrative staff, promoting efficient communication and network management within the lecture theater.

The wireless network configuration, complemented by VLAN assignment, is designed to meet the specific needs of the Communication and Information Science Lecture Theater. This approach aims to provide not only comprehensive wireless coverage for the entire area but also a secure and tailored network environment for administrative members utilizing the lecture theater**.**

**QUOTATION**

In the main faculty building there are 95 offices, 6 lecture rooms and 4 laboratory. The following equipment will be required:

1. 103 faceplates.
2. 7 Cisco Catalyst WS-C2960X-24PS-L 24 Port Ethernet Switch with 370 Watt PoE.
3. 27 wireless router.
4. 3 packs of RJ45 Connectors (Cat 6 Ends / Cat6 Connector / RJ45 Modular Plugs/Ethernet Plugs/Network Connector) for Solid or Stranded UTP Ethernet Cable.
5. 750 feet of Cat6 Ethernet cable.
6. 3 Cisco CISCO1921-SEC/K9 1921 Series Router.
7. 1 Cisco Meraki Z3-HW firewall.
8. 9 Ubiquiti Networks Access Point Wi-Fi 6 Pro.

The primary lecture theater of the faculty, situated adjacent to the main building, boasts a seating capacity of 500. Below this theater, there are four offices, a postgraduate lecture room, and a library. To ensure seamless connectivity and functionality in this space, the following network equipment is required for optimal performance:

1. 1 NETGEAR 16-Port Gigabit Ethernet Unmanaged PoE+ Switch.
2. 5 faceplates.
3. 5 Ubiquiti Networks Access Point Wi-Fi 6 Pro.
4. 150 feet of Cat6 Ethernet cable.

**PRICE LIST FOR EACH MATERIAL REQUIRED**

1. **Faceplate:**
   * $4 per faceplate

Quantity = 108

* 4 X 108 = $432

1. **Cisco Catalyst WS-C2960X-24PS-L 24 Port Ethernet Switch with 370 Watt PoE:**
   * $490 per switch

Quantity = 7

* 7 X 490 = $3430

1. **Wireless Router:**
   * $35 per wireless router

Quantity = 27

* 27 X 35 = $945

1. **RJ45 Connectors:**
   * $15 per pack

Quantity = 3

* 3 x 15 = $45

1. **Cat6 Ethernet Cable:**
   * $6 per foot

Quantity = 900 feet

* 6 x 900 = $5400

1. **Cisco CISCO1921-SEC/K9 1921 Series Router:**
   * $600 per router

Quantity = 3

* 3 x 600 = $1800

1. **Cisco Meraki Z3-HW Firewall:**
   * $300 per firewall

Quantity = 1

* 1 x 1 = $300

1. **Ubiquiti Networks Access Point Wi-Fi 6 Pro:**
   * $170 per access point

Quantity = 14

* 14 x 170 = $2380

1. **NETGEAR 16-Port Gigabit Ethernet Unmanaged PoE+ Switch:**
   * $160 per 16-port switch

Quantity = 1

* 1 x 1 = $160

1. **Labor and Maintenance:**

* Labor Cost: $1000
* Maintenance Contract: $750 per month

The aggregated cost for the required equipment is the sum of the individual items, totaling $14,892.

**Timeline**

The successful implementation of the project is anticipated to take approximately 6 weeks to reach full actualization.

**Conclusion**

In conclusion, the proposed deployment of a comprehensive network infrastructure within the Faculty of Communication and Information Science is aimed at fostering enhanced connectivity, communication, and efficiency across various departments and facilities. The detailed budget and timeline presented reflect.