Annex I

BID FORM
(TECHNICAL SPECIFICATIONS)

UPGRADING OF IT NETWORK (PHASE II)

BID NO :

DATE :

REQUIRED SPECIFICATIONS	OFFERED SPECIFICATIONS (please write down detailed offered specifications) Note: Specify "comply" if the row entry refer to the TOR provisions instead of the technical specifications	REFERENCES (include supporting documents) (attached brochure / technical data/ website, etc.)
Term of Reference **Upgrading of IT Network (Phase II)**	brand and model:	
I. BACKGROUND The project shall cover the upgrading of ICT network including network designs, supply, installation, configuration and testing of various ICT equipment and structured cabling for UP Mindanao, but shall not be limited to the following: 1. Design and configuration of the University Network for Two (2) Tier Spine-Leaf Architecture 2. Supply, installation, and configuration of multi-wan load balancer, fiber core switches, POE edge switches, WIFI access points, network cabinets, uninterruptible power supply (UPS); and 3. Installation and configuration of existing ICT Equipments: firewalls(Palo Alto PA 820 and PA 500),Wifi controller and access points (Aruba 7205 and it's access points), VOIP Server (YEASTAR S300 and it's IP Phones) and existing switches; and 4. Design, supply, installation and testing of structured cable system at the College of Science and Mathematics building, College of Humanities and Social Sciences building, EBL Dorm and ILC/LRC Building, CARIM, Faculty and Staff Housing and CHSS Cultural Center Building and other new buildings 5. Design, supply, installation and testing of Structured Cable System for the Access Points for the entire university Assessment and Installation of Electrical Provisions for all the mentioned equipment in this Term of Reference that should meet the Industry Standards.		

II. OBJECTIVE

In line with the government's focus on "advancing science, technology, and innovation" and the UP mandate to become a "research university" and "regional and global university," UP Mindanao aims to provide world-class facilities for the conduct and dissemination of research in order to increase research productivity of scientists in Mindanao and encourage collaboration with international scholars. The implementation of the Upgrading of IT Networks (Phase 2) will support the University in delivering research, instruction and extension to its stakeholders.

III. APPROVED BUDGET FOR THE CONTRACT

The Approved Budget for the Contract (ABC) is Fifty Million Pesos (P 50,000,000.00) through the General Appropriations Act of 2019 Capital Outlay inclusive of all government taxes and charges.

IV. BIDDER'S QUALIFICATIONS

1. The Bidder must have an employed Certified Project Management Professional (PMP) or its equivalent. Must attach valid certification certified true copy by the issuing entity.
2. The Contractor must have at least one Licensed Electrical Engineer, at least one Licensed Electronic Communication Engineer and at least One Certified Data Center Professional (CDCP) during the project and warranty duration that are trained and certified in the design and installation of cabling systems.
3. Additional post qualification requirements:
    - Letter from the Cabling System Manufacturer that it manufactures end-to-end structured cabling system copper and fiber optic cables and their associated connecting hardware.
    - Certification from Manufacturer's main/regional office stating that the contractor is an Authorized Business Partner and Certified Installer of the Brand being offered (Switches and cabling).

V. SCOPE OF WORK AND DELIVERABLES OTHER REQUIREMENTS

The bidder should conduct an actual site visit, they should submit a time-line (Gantt chart) of activities as part of technical proposal and submit original brochure for items no. 1 to 9 of the deliverables.

VI. DELIVERABLES

No.	Particulars	Quantity	Unit
1	Fiber Core Switch	2	units
	1GbE SFP Transceivers for Single Mode Fiber (SMF)	24	units
	25GbE SFP28 Transceivers for Single Mode Fiber (SMF)	46	units
	10GBASE-T Transceivers	20	units
	QSFP+/QSFP28 Transceivers (support 100GbE) for Single Mode Fiber (SMF)	2	units
	6m SC-LC Fiber Patch cord compatible with the 1GbE SFP Transceivers for Single Mode Fiber (SMF)	24	units
	6m SC-LC Fiber Patch cord compatible with the 25GbE SFP28 Transceivers for Single Mode Fiber (SMF)	46	units
	6m LC-LC Fiber Patch cord compatible with the 1GbE SFP Transceivers for Single Mode Fiber (SMF)	12	units
	6m LC-LC Fiber Patch cord compatible with the 25GbE SFP28 Transceivers for Single Mode Fiber (SMF	12	units
	6m SC- LC Fiber Patch cord compatible with the 100G QSFP+/QSFP28 Transceivers for SMF	2	units
	JD362B HPE X361 150W AC Power Supply for the existing defective HP A5500 switch	2	units
2	Edge Switch POE 24 ports	11	units
3	Edge Switch POE 48 ports	12	units
4	42RU Network Cabinet	2	units
	Monitored & Switched per Outlet PDUs (48 outlets)	2	units
5	24RU Network Cabinet	14	units
	Monitored & Switched per Outlet PDUs (24 outlets)	14	units
6	Uninterruptible Power Supply (UPS)	18	units

	2000VA				
7	Multi-WAN Internet Load Balancer	1	unit		
8	Wireless Access Point	90	units		
9	Structured Cable System	1	lot		
	Roughing Ins	1	lot		
	Consumables	1	lot		
	Labor, Design and Engineering and Project Management	1	lot		

VII. TECHNICAL SPECIFICATIONS

NETWORK EQUIPMENT

1. Fiber Core Switch (2 units)
Location: 1 for Admin Building Data Center and 1 for the Proposed New Data Center

The core switch should have the minimum or better specifications at listed below

a. Performance:
   - High-speed fully distributed architecture
   - At least Provides 6.4Tbps for switching and 2,000 Mpps for forwarding. All switching and routing are wire-speed to meet the demands of bandwidth-intensive applications today and in the future.

b. Physical Interfaces:
   - Compact 1U switch
   - At least Model with 48 ports of 1GbE/10GbE/25GbE (SFP/SFP+/SFP28) and 8 ports of 40GbE/100GbE (QSFP+/QSFP28)
   - SFP+ ports support an optional 10GBASE-T Transceiver.
   - At least 48p 25G SFP/+/28 and 8p 100G QSFP+/28
   - At least 6 Back-to-Front Fans
   - At least 2 Power Supply Units included (650W 100-240VAC Front-to-Back Power Supply)

c. Management:
   - SNMP
   - RJ45 for Serial Console
   - USB-Type A for file management only
   - RJ45 Ethernet for OOBM

d. Three (3) Years Warranty

e. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

f. Includes at least 24 units of compatible SFP Transceivers (support 1GbE/10GbE/25GbE), at least 46 units of compatible SFP28

Transceivers (support 1GbE/10GbE/25GbE). They must be compatible with the new EDGE Switch POE specified in this Term of Reference for the 2 units of fiber core switch. Also must be compatible with the existing equipment. Note: The current University's equipment: firewall - Palo Alto PA 820, Palo Alto PA 500 Yeastar S300, Aruba Controller (7205,)HP A5500 Switch and existing switches and servers

g. Includes at least 20 units of compatible 10GBASE-T Transceivers for the 2 units of fiber core switch
h. Includes compatible 2 units 100G QSFP+/QSFP28 Transceivers for Single Mode Fiber and must be compatible with HP A5500 Switch and the new EDGE Switches POE specified in this Term of Reference for the 2 units of fiber core switch
i. At least 24 units of 6m SC-LC Fiber Patch cord compatible with the 1Gbe SFP Transceivers, and at least 46 units of 6m SC-LC Fibe Patch cord compatible with the 25Gbe SFP28 Transceivers. At leas 12 units of LC-LC 6m Fiber Patch cord compatible with the 1Gbe SFP Transceivers, and at least 12 units of 6m LC-LC Fiber Patch cord compatible with the 25Gbe SFP28 Transceivers.The Fiber patch should be compatible with the EDGE Switches POE and core switches for the 2 units of fiber core switch
j. At least 2 units 6m SC-LC Fiber Patch cord compatible with the 100G QSFP+/QSFP28 Transceivers, EDGE Switches POE and core switches for the 2 units of fiber core switch
k. supplier must able to configure the the two fiber core switches (in two separate building) in a two (2) tier spine-leaf architecture network with the new POE Edge Switches and existing switches
l. Supplier shall propose, create, configure and deploy a new university network design and topology that maximize the capabilities of the new core switches, the EDGE Switches POE, Multi-WAN Internet Load Balancer with the existing firewalls (Palo Alto PA820,Palo Alto PA500 and switches and the existing centralized controller (Aruba 7205). This is also subject to the approval of the end users.
m. Supplier shall configure the existing existing centralized controller (Aruba 7205), switches and firewalls (Palo Alto PA820,Palo Alto PA500) and the new EDGE Switches POE, Core Switches and the new Multi-WAN Internet Load Balancer specified in this Term of Reference with the approval of the end users
n. Includes 2 units of JD362B HPE X361 150W AC Power Supply for the existing defective HP A5500 switch and supplier shall install and troubleshoot the parts in order for the device to work.
o. power plugs must be compatible with the PDUs in this Term of Reference
p. The bidder must have at least:
    i. one (1) Palo Alto Networks Certified Network Security Engineer to handle the implementation, support and training

and

ii. one (1) Palo Alto Networks Certified Network Security Consultant for the design and security posture assessment.
iii. one (1) Aruba Certified Switching Professional and
iv. one (1) Certified Mobility Professional for the design, implementation and training

2. Edge Switch POE 24 ports (at least 11 units)

The edge switch POE should have the minimum or better specifications at listed below

a. Performance:
   - At least System Switching Capacity: 880 Gbps
   - At least System Throughput Capacity: 660 Mpps
   - At least Stack Size: 10 member
   - At least t Max. Stacking Distance: Up to 10 kms with long range transceivers
   - At least Stacking Bandwidth: 200 Gbps

b. Physical Interfaces:
   - At least 24x ports Smart Rate 100M/1G/2.5G/5GBaseT Class 6 PoE ports supporting up to 60W per port
   - At least 4x 1/10/25/50G SFP ports
     At least 2 field-replaceable, hot-swappable power supply slots. 2 power supply must be installed
   - At least Delivers up to 1440W of Class 6 PoE Power
   - At least Two field-replaceable, hot-swappable fan trays (included)

c. Management:
   - SNMP
   - RJ45 for Serial Console
   - USB-Type A for file management only
   - RJ45 Ethernet for OOBM

d. Three (3)) Years Warranty
e. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand
f. power plugs must be compatible with the PDUs in this Term of

Reference

3. Edge Switch POE 48 ports (at least 12 units)

The edge switch POE should have the minimum or better specifications at listed below

a. Performance:
   - At least System Switching Capacity: 880 Gbps
   - At least System Throughput Capacity: 660 Mpps
   - At least Stack Size: 10 member
   - At least Max. Stacking Distance: Up to 10 kms with long range transceivers
   - At least Stacking Bandwidth: 200 Gbps

b. Physical Interfaces:
   - At least 48x ports Smart Rate 100M/1G/2.5G/5GBaseT Class 6 PoE ports supporting up to 60W per port
   - At least 4x 1/10/25/50G SFP ports
   - At least 2 field-replaceable, hot-swappable power supply slots. 2 power supply must be installed
   - At least Delivers up to 2880W of Class 6 PoE Power
   - At least Two field-replaceable, hot-swappable fan trays (included)

3. Management:
   - SNMP
   - RJ45 for Serial Console
   - USB-Type A for file management only
   - RJ45 Ethernet for OOBM

d. Three (3) Years Warranty
e. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand
f. power plugs must be compatible with the PDUs in this Term of Reference

4. 42RU Network Cabinet (at least 2 units)

The 42RU Network Cabinet should have the minimum or better specifications at listed below

- 42 RU
  - Width: 800mm Depth: 1200mm
  - Welded and assembled steel frame construction
  - Easy maintenance powder coat finish
  - Adjustable rear equipment rails with continuous positioning, fixed front rails
  - Large cable entry/cable access
  - Doors include keyed swing handles
  - Side panels
  - Dual hinge door for maximum accessibility between adjacent cabinets
  - Cabinet supplied with 2 sets of high density cable management fingers
  - Cable entry holes are equipped with plastic sealingplugs
  - UL 2416 standard compliant and have been static load tested to at least 1,360kg (3,000 lb.)
  - Support Optical distribution frame or tray
  - EIA-310-E compliant
  - Rolling Load of at least 1,136kg (2,500 lb.)
  - Cabinet ships assembled, one per pallet
  - Cabinets include hardware kit: #12-24 screws, or M6 screws and cage nuts
  - Casters
  - At least 2 units of PDUs for each rack are included. Installation and configuration of PDUs to the different power sources are included.

- Each PDU should have a 48 number of outlets(**(36)C13 (12)C19**) and should be the same brand with a 24ru cabinet and 42ru cabinet in this Term of Reference. Input Plug o the PDU should be compatible with the new and existing UPS.
- Support Angled Patch Panel
- Clip nuts included
- Inclusion of 35 units PDU Power Cord (C14 to C13) rated for core switches, switches, servers

5. 24RU Network Cabinet (at least 14 units)

The 24RU Network Cabinet should have the minimum or better specifications at listed below

a. Enterprise cabinet, 24 RU, single hinge perforated front and rear doors with keyed swing handles, (2) solid single piece side panels with ┬┘ turn locks, and casters. Fully assembled.
   Dimensions: 46.7H x 23.5W x 42.0D (1187mm x 600mm x 1070mm).
   Color: Black
b. Rear Door Type: Single Hinge Perforated
c. Material: Steel
d. Front Door Type: Single Hinge Perforated
e. Number of Rack Units: 24
f. Casters: Yes
g. Static Load Capacity (kg): at least 567
h. Rolling Load Capacity (kg): at least 227
i. Finish/Coating: Powder-Coated
j. Standards Meet: EIA-310-D, TIA/EIA-942, RoHS Compliant, UL 2416
k. Cooling Architecture: Containment
l. Support Angled Patch Panel
m. Support Optical distribution frame or tray
n. at least 1 Units PDU for each 24RU rack. For the total of 14 units of PDUs for at least 14 units of 24RU Network Cabinet Installation and configuration of PDUs to the different power sources are included

p. Each PDU should have a 24 number of outlets (**(12)C13, (12)C19**) (the same brand with 24ru cabinet and 42ru cabinet in this Term of Reference). Input Plug of the PDU should be compatible with the new and existing UPS.

6. Uninterruptible Power Supply (UPS) 2000VA (at least 18 units)

The Uninterruptible Power Supply (UPS) 2000VA should have the minimum or better specifications at listed below

a. Backup time of at least 9 minutes at full load Load capacity of 2000VA 1800Watts
b. Auto self testing system
c. Communication: USB/SNMP
d. On-Line UPS System

- Input and Output Voltage at 230 VAC with 60Hz
- No Load Shutdown
- Related cables and accessories
- Comes complete with sealed free-maintenance batteries
- UPS battery must have at least Three (3)years warranty

e. User Interface: LCD with audible alarm
f. Outlet Receptacle: 8 IEC C13 Outlets
g. power plugs must be compatible with the PDUs in this Term of Reference

7. Multi-WAN Internet Load Balancer

The Multi-WAN Internet Load Balancer should have the minimum or better specifications at listed below

Minimum specifications:

- Ethernet WAN Ports: 13 (GE)
- LAN Ports: 3 (GE)
- USB WAN Modem Port: 1
- Recommended Users :1000-5000
- Stateful Firewall Throughput: 5Gbps
- 802.1q VLANs Supported: 1024
- Port-Based VLAN
- Load Balancing & Failover
- Load Balancing Algorithms: atleast 8
- Drop-In Mode
- Inbound Load Balancing
- Cloud Management
- VPN
- Hot Failover
- WAN Smoothing
- Bandwidth Bonding
- VPN Throughput (256-bit AES)/(No Encryption) : atleast 800Mbps
- IPsec VPN (Network-to-Network)
- Number of IPsec Tunnels: atleast 400
- Remote User Access
- L2TP VPN Server
- OpenVPN Server
- PPTP VPN Server
- Recommended PPTP/L2TP/OpenVPN Users: atleast500
- GRE (Network-to-Network): atleast 5
- Bandwidth Usage Monitor
- QoS for VoIP and E-Commerce
- User Groups BandwidthControl
- Web Blocking
- Full Web Filtering Blacklist
- LACP (802.3ad) NIC Bonding
- High Availability
- LAN Bypass
- FCC, CE, RoHS
- Warranty: Three (3) Years

power plugs must be compatible with the PDUs in this Term of Reference

8. Wireless Access Point (at least 90 units)

The Wireless Access Point should have the minimum or better specifications at listed below

Technical Specifications:

- AP type: Indoor, dual/tri-radio, 5GHz and 2.4GHz 802.11ax 4x4 MIMO
- 5GHz radio (dual-radio operation): Eight spatial stream Single User (SU) MIMO for up to 4.8Gbps wireless data rate with individual 8SS HE80 (or 4SS HE160) 802.11ax client devices, or with eight 1SS or four 2SS HE80 802.11ax MU-MIMO capable client devices simultaneously
- 5GHz radio (tri-radio operation*): Four spatial stream Single User (SU) MIMO for up to 2.4Gbps wireless data rate with individual 4SS HE80 (or 2SS HE160) 802.11ax client devices, or with four 1SS or two 2SS HE80 802.11ax MU-MIMO capable client devices simultaneously
- 2.4GHz radio: Four spatial stream Single User (SU) MIMO for up to 1,150Mbps wireless data rate with individual 4SS HE40 802.11ax client devices or with two 2SS HE40
- 802.11ax MU-MIMO capable client devices simultaneously
- Support for up to 1,024 associated client devices per radio* (typical recommended limit for active clients is 200), and up to 16 BSSIDs per radio
- Supported frequency bands (country-specific restrictions apply):

  2.400 to 2.4835GHz (radio 1)
  5.150 to 5.250GHz (radio 0 and0L)
  5.250 to 5.350GHz (radio 0 and0L)
  5.470 to 5.725GHz (radio 0 and0U)
  5.725 to 5.850GHz (radio 0 and0U)

- Available channels: Dependent on configured regulatory domain
- Dynamic frequency selection (DFS) optimizes the use of available RF spectrum
- Supported radio technologies:

  802.11b: Direct-sequence spread-spectrum (DSSS)
  802.11a/g/n/ac: Orthogonal frequency-division multiplexing (OFDM)
  802.11ax: Orthogonal frequency-division multiple access (OFDMA) with up to 37 resource units (for an 80MHz channel)*

- Supported modulation types:

  802.11b: BPSK, QPSK, CCK
  802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM (proprietary extension)

802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM (proprietary extension)
802.11ax: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM

- 802.11n high-throughput (HT) support: HT20/40
- 802.11ac very high throughput (VHT) support: VHT20/40/80/160
- 802.11ax high efficiency (HE) support: HE20/40/80/160
- Supported data rates (Mbps)

802.11b: 1, 2, 5.5, 11
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54
802.11n: 6.5 to 600 (MCS0 to MCS31, HT20 to HT40), 800 with 256-QAM
802.11ac: 6.5 to 1,733 (MCS0 to MCS9, NSS = 1 to 4, VHT20 to VHT160), 2,166 with 1024-QAM
802.11ax (2.4GHz): 3.6 to 1,147 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE40)
802.11ax (5GHz): 3.6 to 4,804 (MCS0 to MCS11, NSS = 1 to 8, HE20 to HE160)

- 802.11n/ac packet aggregation: A-MPDU, A-MSDU
- Transmit power: Configurable in increments of 0.5dBm
- Maximum (aggregate, conducted total) transmit power (limited by local regulatory requirements):

2.4GHz band: +24dBm (18dBm per chain)

5GHz band: +27dBm in dual-radio mode, +24dBm in tri- radio mode (18dBm per chain)

Note: conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain.

- Advanced Cellular Coexistence (ACC) minimizes the impact of interference from cellular networks
- Maximum ratio combining (MRC) for improved receiver performance
- Cyclic delay/shift diversity (CDD/CSD) for improved downlink RF performance
- Space-time block coding (STBC) for increased range and improved reception
- Low-density parity check (LDPC) for high-efficiency error correction and increased throughput
- Transmit beam-forming (TxBF) for increased signal reliabilityand

range*

802.11ax Target Wait Time (TWT) to support low-power client devices*

a. Locations of Wireless Access Points (WAPs) in all buildings and offices must be optimal to achieve total performance desired throughput.

b. WAPs have to be small, lightweight and can be securely deployed in a variety of locations such as on walls, cubicles, desktops, and in the ceiling.

c. The WAP antenna diversity should allow for the best possible signal processing using dual, Omni-directional antennas and directional antennas and other type of antennas that will assure signal strength in all areas.

d. WAPs should work with the existing centralized wireless controllers(ARUBA Controller 7205) to provide a high performance, centrally managed, wireless mobility solution for UPMin network. WAPs should have an extended lifespan and can be configured manually or automatically across any L2/L3 network allowing easy upgrades when new features, capabilities, or standards emerge.

e. WAPs should function as “thin” WAPs which would provide 802.11n with backward compatibility to a/b/g user access. Functions should also include but not limited to wireless user authentication, link layer encryption, VPN termination. Support roaming and low-latency handoffs between APs, ideal for handling delay-sensitive applications such as voice over wireless.

f. WAP 802.11 services must be controllable

g. WAPs must supports operation in the radio frequency bands that will take advantage of higher density AP deployment, better overlapping coverage and reduced interference from other technologies (medical equipment, microwave ovens, cordless phones, Bluetooth devices)

h. WAPs activity must be coordinated by an existing wireless centralized controller (Aruba 7205). Supplier shall propose, create, configure and deploy a new university network design and topology that maximize the capabilities of the core switches, the EDGE Switches POE, Multi-WAN Internet Load Balancer with the existing firewalls (Palo Alto PA820,Palo Alto PA500) and switches and the existing centralized controller (Aruba 7205). This is also subject to the approval of the end users.

i. RF Management software must be available to automatically support channel selection, power levels, load balancing and failover

j. WAPs must support Power-over-Ethernet standard beyond 802.3af

k. WAPs may supports 802.11e and Quality of Service (QoS)

l. WAPs must support access via Ethernet

m. Necessary licenses of each WAPS must be included and installed by the supplier in the centralized controller (Aruba 7205)

n. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

9. Structured Cable System (at least 500 nodes)

GENERAL SPECIFICATIONS

a. Cat 6a Unshielded Twisted Pair (UTP) Cable shall be primarily used for distribution that will run through from IDF to Switches and Routers.
b. All cable trays for horizontal home runs shall be sized accordingly based on the number of nodes per floor with at least thirty percent (30%) provision for expansion. Minimum size of cable tray should be at least 300mm width and 100mm depth (W x D);
c. All cable trays/ladder shall be powder coated or hot dip galvanized and all conduits for horizontal home runs shall be PVC with connector coupling;
d. Deployment and installation of network racks are related to structure cabling technical implementation.
e. The length of each individual run of horizontal cable from the TR to the TO shall not exceed 90m
f. The Contractor shall observe the bending radius and pulling strength requirements of the horizontal cable during handling and installation
g. Each run of cable between the TR and the TO shall be continuous without any joints or splices, except where consolidation points are required
h. Installation practice shall comply to manufacture best practices
i. The cable manufacturer shall be ISO 9001 and 12001 registered
j. The contractor shall install/mount the new access points and the existing access points provided by the end user
k. The Locations of at least 500 nodes will be finalized once the project is awarded to the winning bidder since new buildings may be finished during the duration of the bidding. The end-user has the right to re allocate the nodes depending on the availability of the new building.

ELECTRICAL WORKS

a. Electrical works shall comprise the supply and installation of power outlets and electrical provisions for the cabinets if no existing electrical provisions.
b. The installation of all electrical works shall be done in accordance with the provisions of the latest edition of the Philippine Electrical Code, the laws and ordinances of the local code enforcing authorities
c. The wiring to be used shall be 3.5mm sq. or better THWN or THHN concealed on modular panel base plate and use of aluminum threshold for connection to other workstations. Use of Mica Tubing shall be limited to a length of six inches (6") on outlet termination and there shall be no open wiring, no exposed or dangling wires seen at the work stations.

PASSIVE COMPONENT

1. Category 6a Cables

The Category 6a Cables should have the minimum or better specifications at listed below

a. Category 6A/Class EA cable shall be constructed of 23 AWG copper conductors with FEP Plenum (CMP) insulation. The copper conductors shall be twisted in pairs and separated by a cross-divider. All four pairs shall be surrounded by MaTriX tape(or its equivalent or better) and a flame retardant jacket. The advanced MaTriX tape shall suppress the effect of alien crosstalk allowing 10Gb/s transmission while minimizing cable diameter. The innovative cable design shall provide installation flexibility as cables can be routed in tight bundles through pathways and spaces
b. Horizontal cabling shall be 23 AWG, 100-Ohm, 4-pair UTP; UL/NEC CMP rated, round design, round solid filler, non-bonded pairs, in white PVC jacket.
c. Cable jacketing shall be lead-free.
d. Cable performance characterized up to 600MHz.
e. Cables must not exceed 100 meter distance from the IDF/MDF
f. All cables must have fluke test result
g. Cable shall meet or exceed the performance requirements of ANSI/TIA/EIA-568B.2-1. Must be confirmed by an independent testing laboratory.
h. Must be Gigabit Ethernet Zero-bit Error Rate tested and confirmed by

independent testing facility.

i. Cable shall be UL listed.

2. Category 6a Patch Panels

The Category 6a Patch Panels should have the minimum or better specifications at listed below

a. Loaded 24 ports CAT-6a Angled All Metal Shielded Modular Patch Panels loaded with Shielded Jack Modules that support 10GBASE-T certified performance with the needed accessories
b. Category 6A/Class EA, 8-position, UTP jack module shall terminate 4 pair, 22 – 26 AWG, 100 ohm unshielded twisted pair cable and sha not require use of a punchdown tool. The termination cap shall be color-coded blue to designate Category 6A performance and sha include a universal label coded for T568A and T568B wiring schemes The Mini- Com® TX6A™ 10Gig UTP Jack Module must be installed as part of the TX6A™ 10Gig UTP Copper Cabling System to achieve IEEE 10GBASE-T certified performance.
c. Patch panels shall be 1RU and provide 24 modular jack ports, with universal wiring that maybe terminated to T568A or T568B.
d. Patch panel modular jacks shall be configured as 6-port, replaceable modules.
e. The front of each module shall be capable of accepting 9mm to 12mm labels. Each port shall be capable of accepting an icon to indicate its function.
f. Patch panel shall terminate the building cabling on 110-style insulation displacement connectors.
g. Patch panel shall meet or exceed the performance requirements of ANSI/TIA/EIA-568B.2-1.
h. Must have sensor strip conductive pads within the panel.
i. Must include a rear clip that secures and protects the mated connection of the sensor strip and analyzer I/O cable assembly.
j. Patch panel must be UL Listed.
k. High density 1RU 48-port or 2RU 72-port configuration might be used if rack space is limited

3. Category 6a Data Outlet/Modular Jacks

The Category 6a Data Outlet/Modular Jacks should have the minimum or better specifications at listed below

a. Category 6A/Class EA, 8-position, UTP jack module shall terminate 4 pair, 22 – 26 AWG, 100 ohm unshielded twisted pair cable and sha not require use of a punch down tool. The termination cap shall be color-coded blue to designate Category 6A performance and sha include a universal label coded for T568A and T568B wiring schemes The Mini- Com® TX6A™ 10Gig UTP Jack Module must be installed as part of the TX6A™ 10Gig UTP Copper Cabling System to achieve IEEE 10GBASE-T certified performance.
b. Modular jacks shall be terminated using an 110-style pc board connector, color-coded for both T568A andT568B wiring.
c. Category 6a modular jacks shall meet the performance requirements listed in ANSI/TIA/EIA-568B.2-1.
d. Flexibility to support 180º or 90º cable termination with bend-limiting strain relief.
e. Modular jack shall be UL Listed

4. Faceplates

The Faceplates should have the minimum or better specifications at listed below

a. Must be surface-mounted, 2-port single-gang.
b. Each port shall be provided with an icon to indicate itsfunction.

c. Faceplates shall accommodate two labels and provide a clear polycarbonate cover for each. Faceplates shall be **PVC Faceplate**.
d. Should be compatible with the Category 6a Data Outlet/Modular Jacks in this Term of reference
e. Should be the same brand with cat6a cable, Category 6a Patch Panels,
Category 6a Data Outlet/Modular Jacks

5. Category 6a Patch Cords

The Category 6a Patch Cords should have the minimum or better specifications at listed below

a. Category 6A/Class EA, UTP patch cords shall be constructed of 24 AWG stranded copper cable with an enhanced performance modular plug on each end. Copper conductors in patch cable shall be twisted in pairs and separated by a quadrant separator. All four pairs shall be surrounded by matrix tape and a flame retardant jacket. The patent pending matrix tape shall suppress alien crosstalk and allow 10 Gb/s transmission. Patch cord cable shall be offered in multiple colors and lengths for design flexibility with a strain relief boot on each modular plug. All patch cords shall be compatible with both T568A and T568B wiring schemes.
b. Patch cable assemblies must be factory-manufactured with stranded CMR UTP cable and color-matched snag less rubber boots.
c. Work area at least patch cords (**500 units**) shall be at least 10 meters while equipment patch cords at least (**500 units**) shall be 3 meters in length.
d. Must contain a 9th conductor that is external to the original copper cable assembly.
e. External probes must contact with a conductive pad on the sensor strip.
f. One patch cord per user outlet and equipment connectivity must be provided.
g. All Cat6a patch cords shall be factoryterminated
h. All patch cord shall have Labels on it to provide identification of performance level, length and quality control number
i. All patch cord shall be compatible with optional RJ45 plug lock-in device to prevent unauthorized removal of cable, IP phone, other networking equipment, or critical connection

6. Cable Organizer

The Cable Organizer should have the minimum or better specifications at listed below

a. Vertical cable management hardware must be compatible and the same brand with the cabinet in the Term of Reference.
b. Must have black-coated finish.

Labeling

All jacks, panels and frames shall be clearly labeled. Labels should be tamper resistant and made with a label maker at the station end. Data frames should be created with a label maker. Label color shall be black on white and a CD/DVD copy of the labeling software including label sheets/package shall be provided to UPMin. Label sheets shall be both laser and inkjet compatible.

CAT 6a UTP Cable Installations

Tester:

Shall pass the following end-to-end Testing Parameters using Level III Cable

- Attenuation
- Attenuation to Crosstalk Ratio (ACR)
- PowerSum Attenuation to Crosstalk Ratio (PSACR)
- Near End Crosstalk (NEXT)
- PowerSum Near-End Crosstalk (PSNEXT)
- Equal Level Far-End Crosstalk (ELFEXT)
- PowerSum Equal Level Far-End Crosstalk (PSELFEXT)
- Return Loss
- Propagation Delay
- Delay Skew
- Transfer Impedance
- Fluke test

Distribution of Nodes

Location	Nodes
CHSS BUILDING 1ST FLOOR	82
CHSS BUILDING 2ND FLOOR	90
CHSS BUILDING 3RD FLOOR	8
CSM BUILDING 1ST FLOOR	90
CSM BUILDING 2ND FLOOR	90
Aruba Access Points	90
CARIM / OR, Staff Housing and other new Buildings Structured Cabling	50

VIII. DELIVERY AND IMPLEMENTATION

1. The winning bidder shall submit Project Management Plan Fifteen (15) calendar days upon receipt of Notice to Proceed for the implementation of the proposed solution that is subject for review and approval of the UPMin. The project Management Plan Shall include but not be limited to the following:
   - Scope of Work
   - Project Organization
   - Implementation Methodology
   - Project Timeline
   - Communication and Deployment Strategy
   - Capacity Building Program Strategy

   The Project Management Plan should also include the deployment of project personnel to be assigned in UP Mindanao in the duration of the project.

2. Supply, Delivery, Installation, Testing and Commissioning shall be within Sixty (270) calendar days from the approval of the Project Management Plan.

3. The winning bidder shall submit manufacturer's certification as the distributor or dealer/reseller of the offered product as a requirement for issuance of Certificate of Acceptance.

IX. OTHER REQUIREMENTS

A. MAINTENANCE, SUPPORT AND WARRANTY

1. Provide Three (3) years maintenance support and services to include
   - 12 Hours per day (Monday-Friday) Technical Support (should be physically Davao Based)
   - Next Business Day Response Time
   - Business Planning and Review
   - Provide Comprehensive Disaster Recovery Procedure
   - Project focal person where the UP Mindanao ITO personnel can directly communicate with to address concerns
2. The Bidder shall provide technical support via telephone/fax, on-site assistance to resolve technical and other related problems. Resolution can be delivered in the form of telephone, electronic and/or on-site resolution. It shall refer to a condition wherein the reported problem is resolved by the proponent to the satisfaction of the end-user. However, the end-users have the right to insist for on site resolution if the end-user wants it.
3. The proponent shall resolve a problem within twenty-four (24) hours after it was reported by UPMin in any available and fastest means of communications.
4. Provide Four (4) hours response time for hardware and related problems and issues.
5. Established procedure on support and problem escalation
6. Provide on-call and on-site (if requested by the end user) support personnel for three years after the acceptance of the project.
7. Within the warranty period, equipment that cannot be repaired within twenty- four (24) hours shall be immediately replaced with a service unit of similar specifications or better.
8. The Contractor shall guarantee that the entire structured cabling and networks are free from all defective workmanship and materials, and will remain so for the period of:
   - 20-25 Years of Product Warranty from the Cabling Manufacturer of the Product Offered.
   - Minimum Three (3) Years Warranty on Workmanship
9. Inspection and cleaning of data cabinets, switches, and routers shall be done by the bidder on a quarterly basis.
10. To provide monthly maintenance for the duration of the warranty period, adequate supply of parts must be readily available.

B. RISK MANAGEMENT PLAN

The winning bidder shall submit a Risk Management Plan prior to UPMin's acceptance. Risk Management Plan shall include the following among others:

- Step by step procedures to be undertaken during disaster must be clearly identified to avoid loss of data.
- Retrieval and restoration procedure that includes troubleshooting flowchart shall be incorporated in the plan.
- Personnel responsible to undertake the plan and procedures shall be identified and drawn up in the Risk Management Plan Organizational Chart.

C. PROVISION OF DOCUMENTATION

1. The solution provider shall provide a complete documentation for every deliverable and at every end of each development stage and milestone which must be submitted to the Information Technology Office for the approval. UPMin shall own any and all documents and shall reserve the right to reproduce at no additional cost.
2. The documentation must be written in English of durable construction with concise and high quality presentation to include but not limited to the following:

Technical Manuals

- As built documents
- Infrastructure Diagrams and Topology
- Troubleshooting and Installation Guides
- Single Line Diagram
- System/Operation Manual
- Documentation and Tagging Summary

Operational Manuals

- User Manuals (for Operations)
- Disaster recovery Plan

D. TRAINING AND TECHNOLOGY TRANSFER

1. The contractor must provide advance training for at least four (4) IT Personnel for the new and existing ICT Network Equipment, basic troubleshooting for the Structured Cabling and Management of the Data Center for at least five (5) days.
2. To ensure that proper maintenance and sustainment an appropriate training shall be conducted by the proponent as Essential part of Technology Transfer to prepare and equipped UPMin and its personnel in the overall operations and maintenance of its new Network Infrastructure and architecture.
3. The proponent shall submit Program of Instruction (POI) detailing all the training activities to be conducted for review, evaluation and approval of UPMin. Hands-on training shall form part of the training program.
4. Operation and Training manuals shall be provided to each participant.
5. The Training shall be conducted and completed prior the formal turnover and acceptance.
6. All expenses related to training (e.g. venue, meals, equipment, certificate..) shall be borne by the proponent.
7. Venue of Training shall be determined by the proponents unless UPMin opted to conduct said training inside UPMin premises.
8. Certificate of Participations/Attendance to Training/s shall be given to all participants.

E. REMOVAL OF DEFECTIVE UNAUTHORIZED WORK

Any defective work, whether the result of poor workmanship, defective materials, damaged through carelessness or any other cause, found to exist prior to acceptance, shall be removed immediately and replaced by work and material which shall conform to the approved specifications, or shall be otherwise remedied in an acceptable manner. This clause shall have full effect regardless of the fact that the work may have been done with the approval of UPMin or its representative.

X. INSPECTION, TESTING, ACCEPTANCE AND PAYMENT

A. PRE-BID SITE INSPECTION

The providers may conduct a pre-bid site inspection so they could assess the needs of the end users **Actual Site Inspection Details:** Date and Time: April 5-13, 2021 from 9AM-4PM (except on Holidays and Weekends) Contact Person: Prof. Vicente B. Calag, ITO Director Contact Number: 092-57596645 Email: vbcalag@up.edu.ph Meet-up location: ITO, G/F Administration Building, UP Mindanao, Mintal, Davao City Safety Protocols: must wear face mask and face shield. Site Inspection Certificate will be issued by the ITO. ***Note:*** 1. Those who will conduct site inspection should inform the ITO via email ahead of time. **B.INSPECTION AND TESTING** 1. All ICT Equipments, cables and termination hardware shall be 100% inspected and tested for defects in installation and to verify ICT Equipments and cable performance under installed conditions. Any defect in the ICT Equipments and cabling system installation including but not limited to cable, connectors, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% usable conductors in all cables installed. 2. Submit the corresponding reports of the testing conducted. **C. ACCEPTANCE** A certificate of acceptance for any of the bid items shall be issued by UPMin only after completion of the scope of work and compliance to all the requirements. **C. PAYMENT** The source of funds for this project is the University of the Philippines System and payment shall be made after the completion and		

acceptance of the project. **ADDENDUM to the Term of Reference** 1. Setup and Configuration of new local and public DNS (opensource) for the entire network is included in the scope of work. The DNS should be configured with the firewall (PALO ALTO) and the new Fiber core switches and POE Switches. The servers or hardware equipment for the DNS shall be provided by the end user. 2. Renewal, updating and upgrading of the existing Aruba Controller (7205) firmware, software, licenses and OS to support the new 90 units of WIFI 6 access points and existing 90 units of access points is included in the scope of work. Setup and configuration of a third party wifi captive portal server(opensource) for the integration and configuration to the existing Aruba Controller (7205).The servers or hardware equipment for the third party wifi captive portal server shall be provided by the end user. 3. Setup and configuration of the Multi-WAN load balancer with the Firewall(PA820 and PA500) is included in the scope of work. 4. Setup and configuration of the Firewall(PA820 and PA500) for firewall redundancy and failover in the network is included in the scope of work.		

Prepared by:

Bob Mitzel S. Navarrete
UP Mindanao IT office

Signature of Representative

Name of Representative

Position

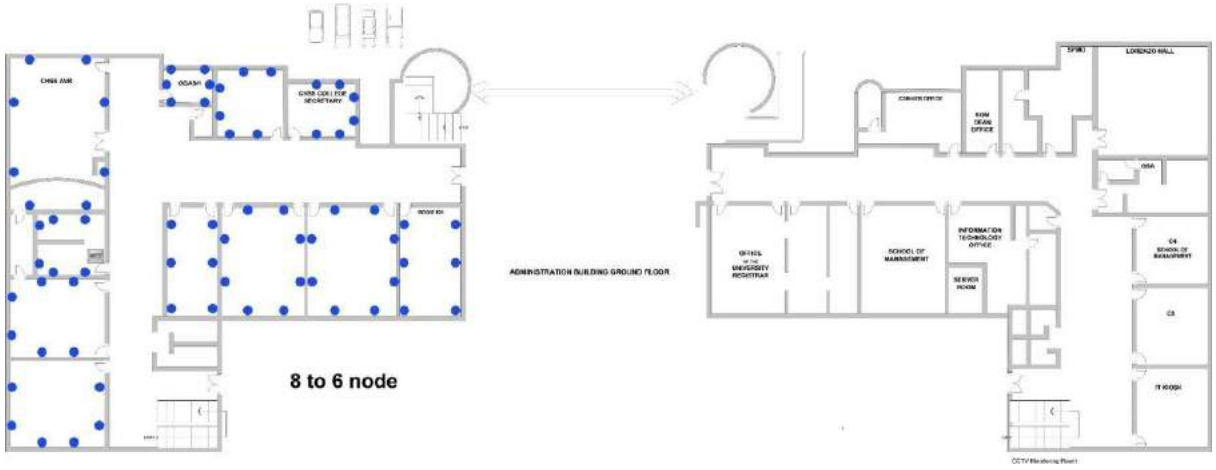
Company

Address

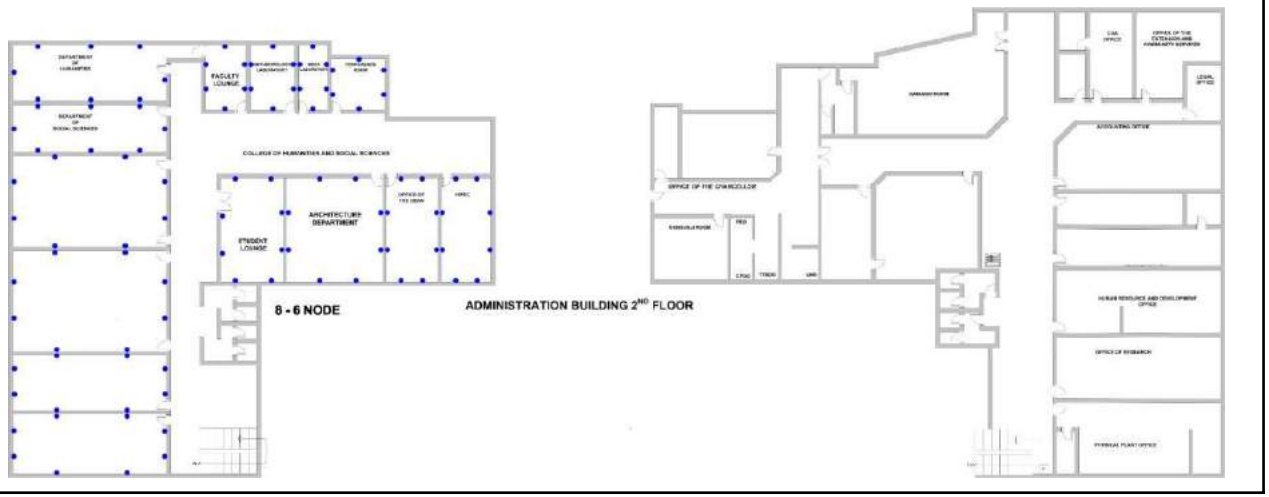
Telephone/Fax/Email

Layout

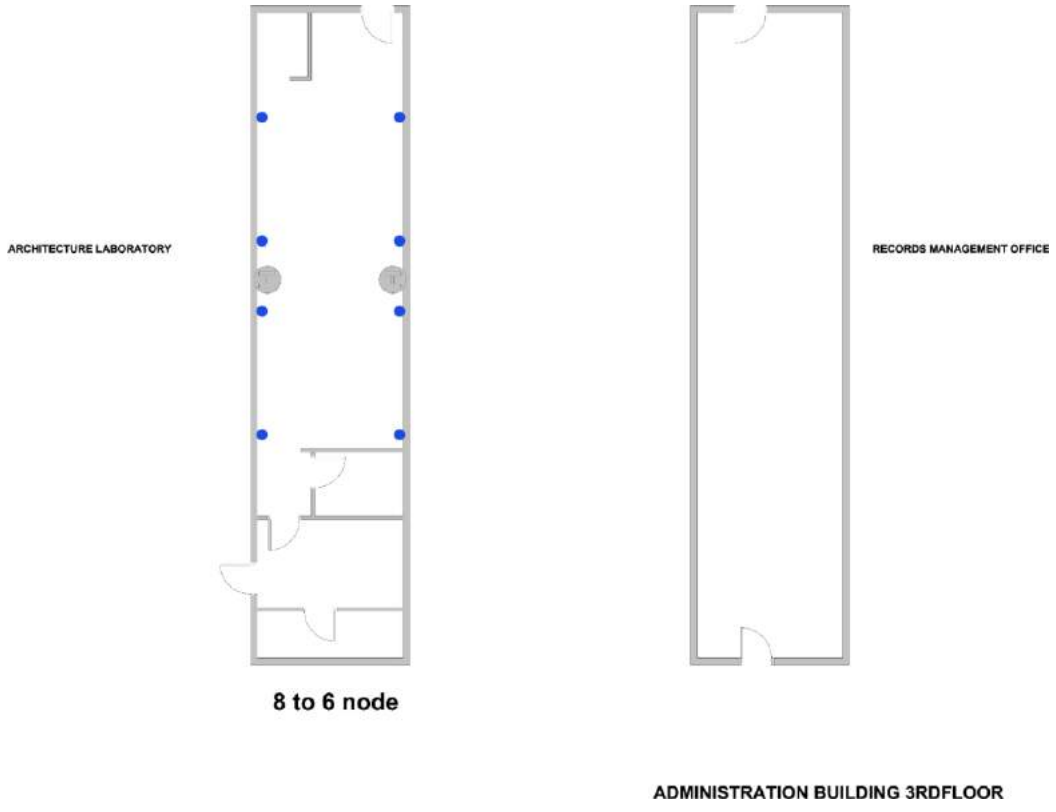
CHSS Building Ground Floor



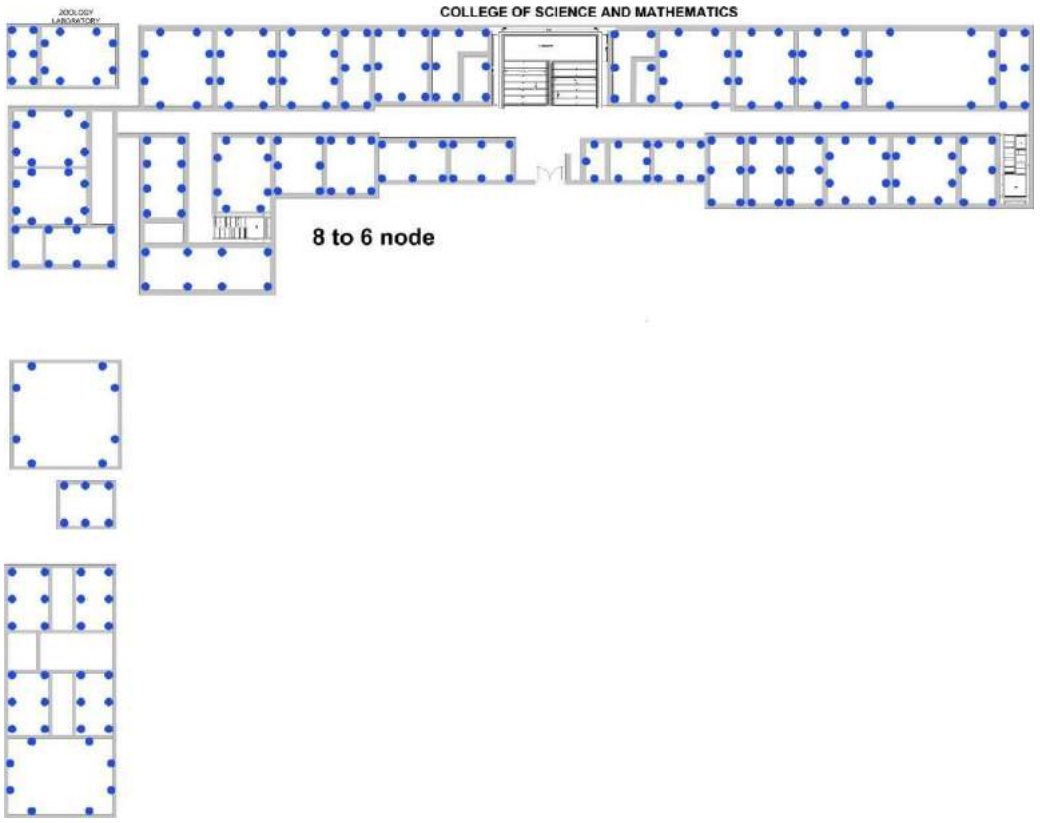
CHSS Building 2nd Floor



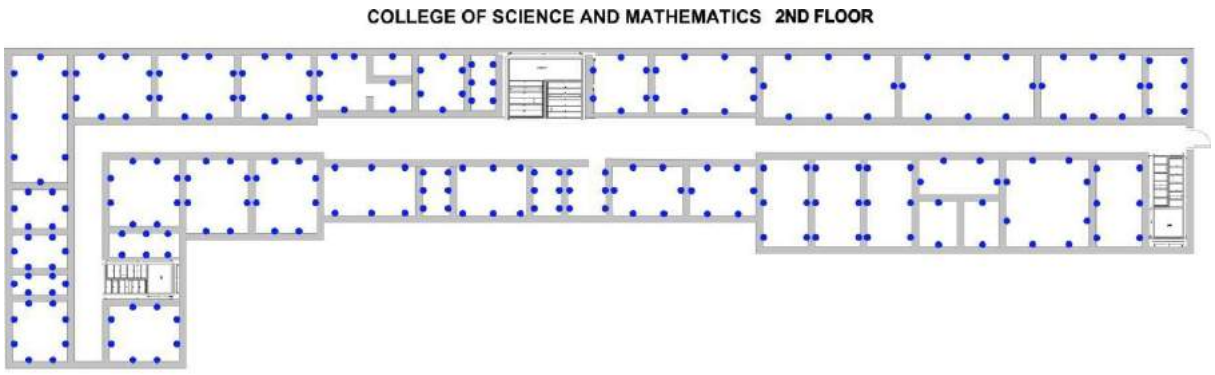
CHSS Building 3rd Floor



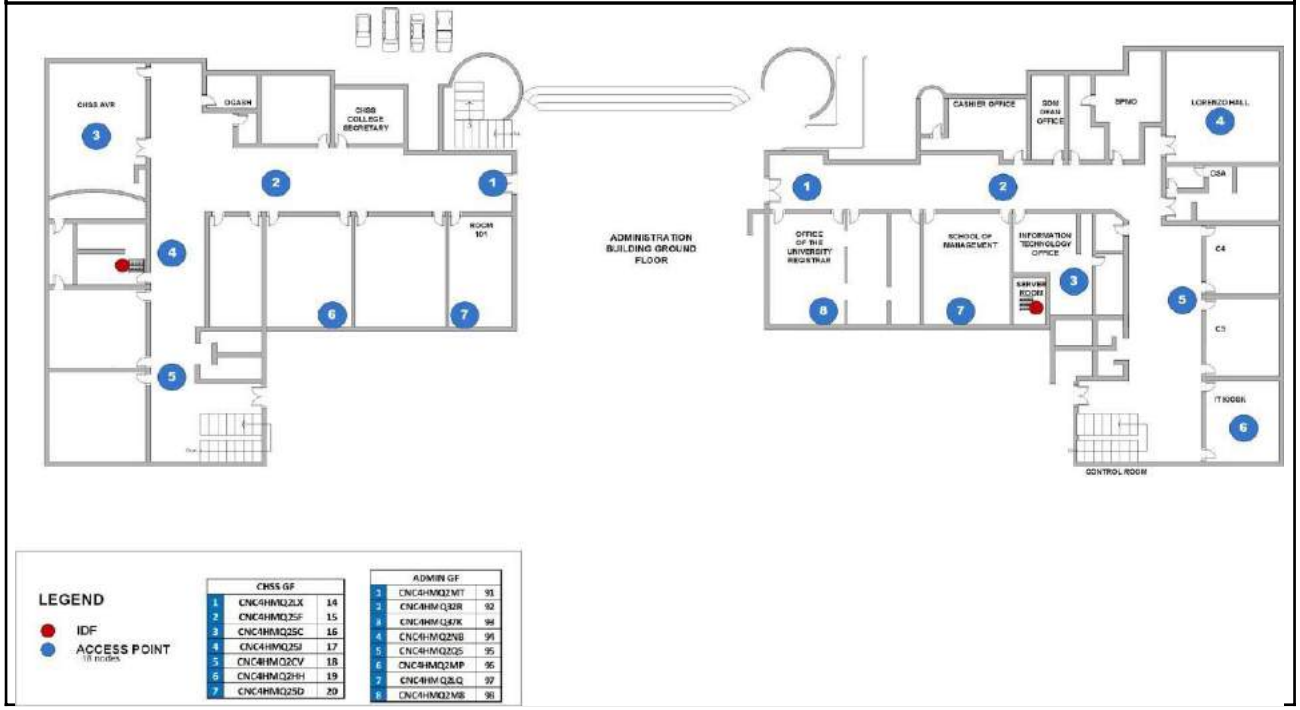
CSM Building Ground Floor



CSM Building 2nd Floor



Admin Building Access Points Layout Ground Floor



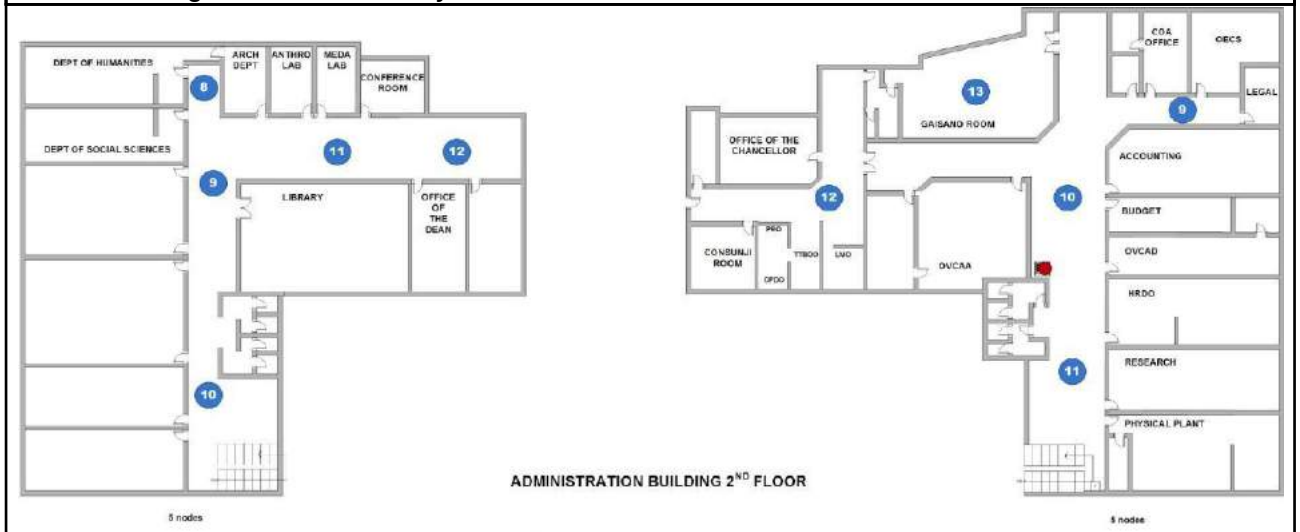
LEGEND

- IDF
- ACCESS POINT (18 nodes)

CHSS GF		
1	CNC4HMQ2LX	14
2	CNC4HMQ25F	15
3	CNC4HMQ25C	16
4	CNC4HMQ25J	17
5	CNC4HMQ2CV	18
6	CNC4HMQ2HH	19
7	CNC4HMQ25D	20

ADMIN GF		
1	CNC4HMQ2MT	91
2	CNC4HMQ32R	92
3	CNC4HMQ67K	94
4	CNC4HMQ2N8	94
5	CNC4HMQ2Q5	95
6	CNC4HMQ2MP	96
7	CNC4HMQ2LQ	97
8	CNC4HMQ2M8	98

Admin Building Access Points Layout 2nd Floor



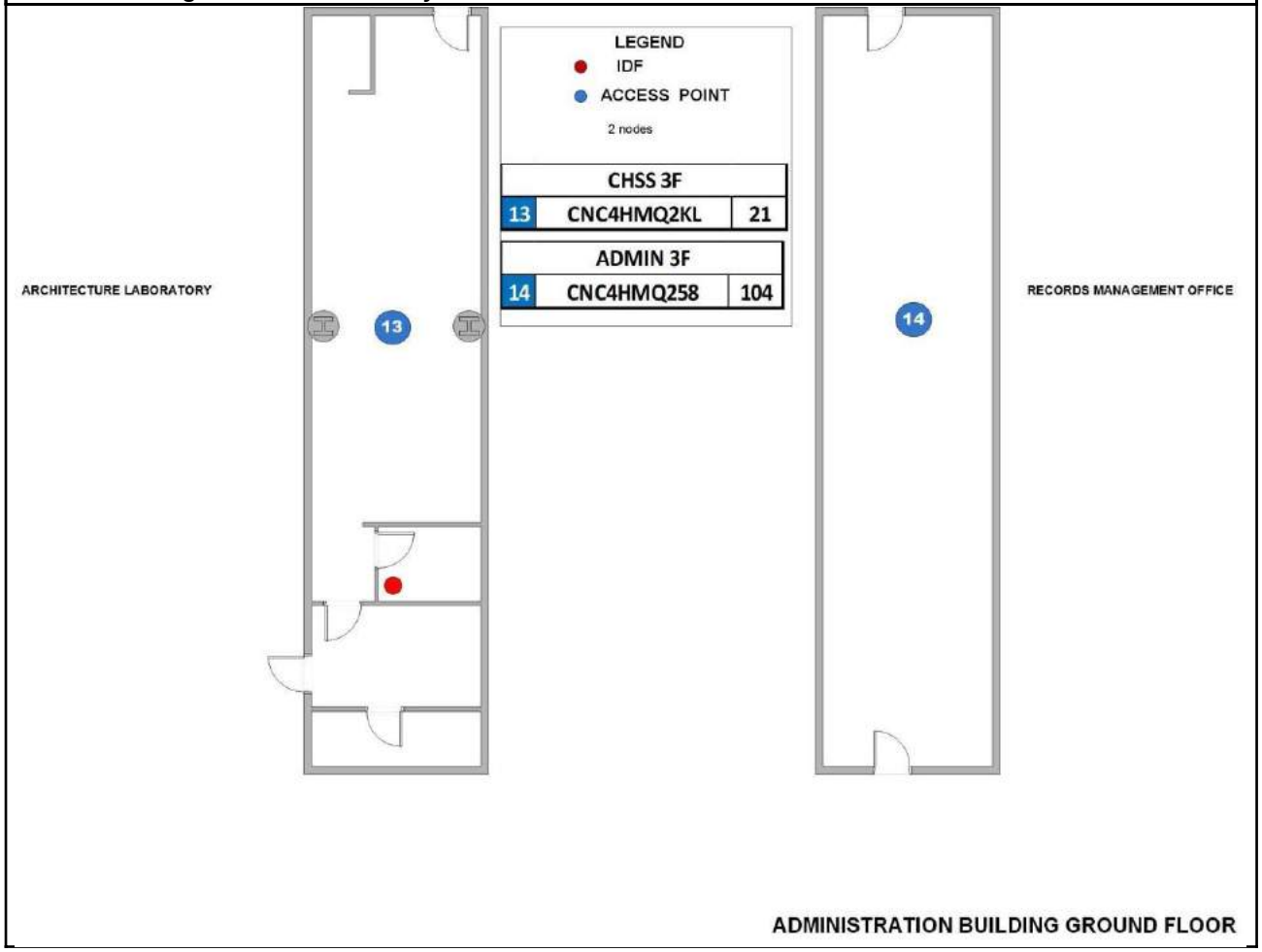
LEGEND

- IDF
- ACCESS POINT (10 nodes)

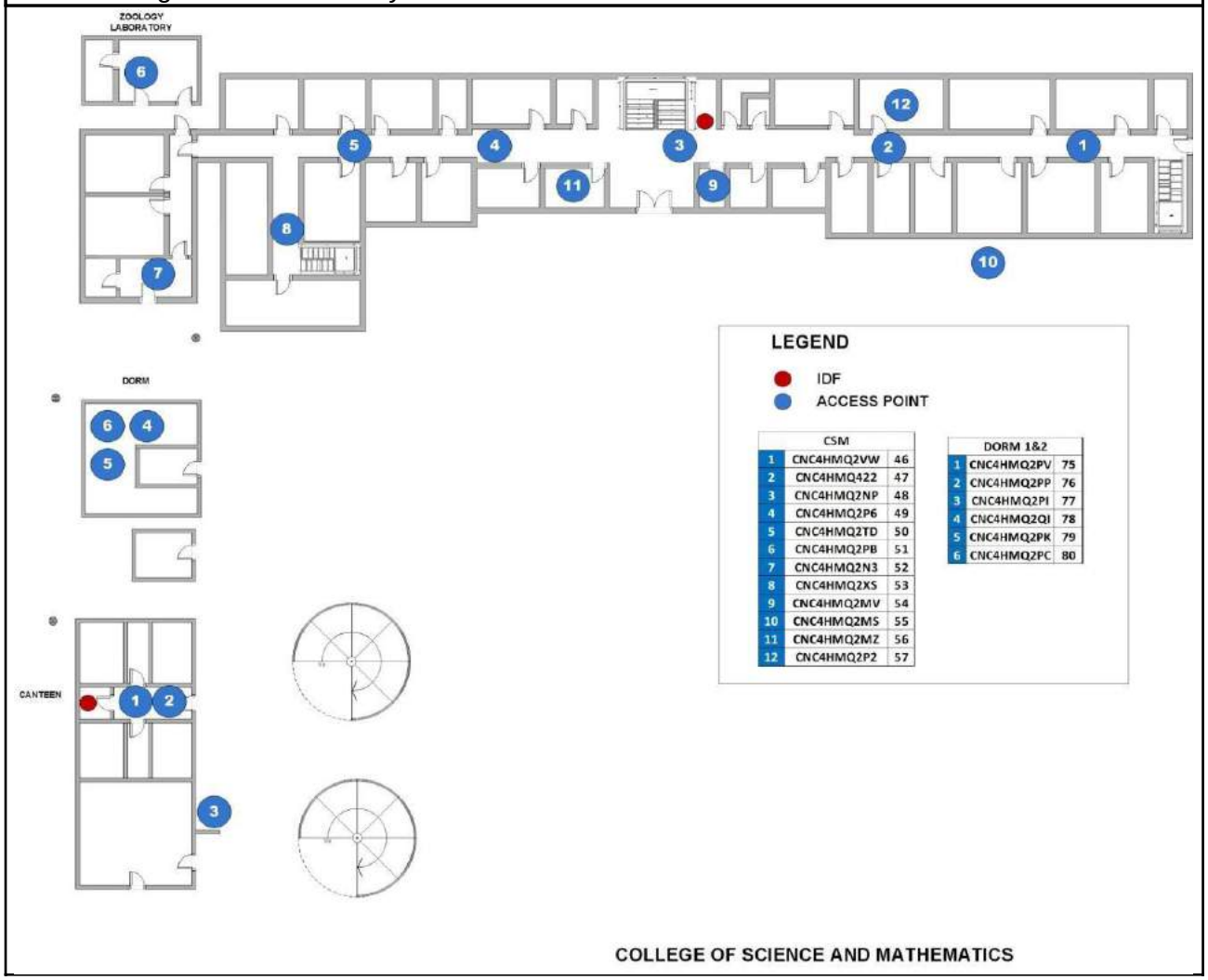
CHSS 2F		
8	CNC4HMQ1WZ	21
9	CNC4HMQ1YX	22
10	CNC4HMQ1Y5	23
11	CNC4HMQ2FH	24
12	CNC4HMQ1X2	25

ADMIN 2F		
9	CNC4HMQ318	99
10	CNC4HMQ2MM	100
11	CNC4HMQ1VZ	101
12	CNC4HMQ1VV	102
13	CNC4HMQ25H	103

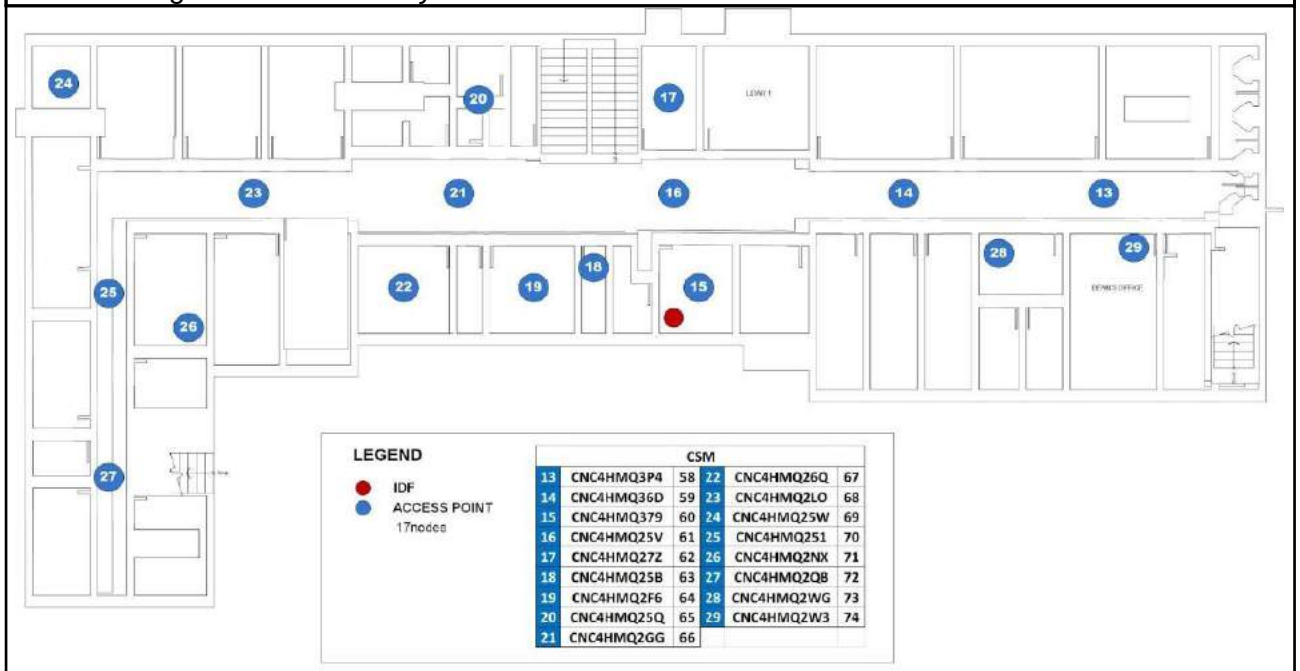
Admin Building Access Points Layout 3rd Floor



CSM Building Access Points Layout Ground Floor



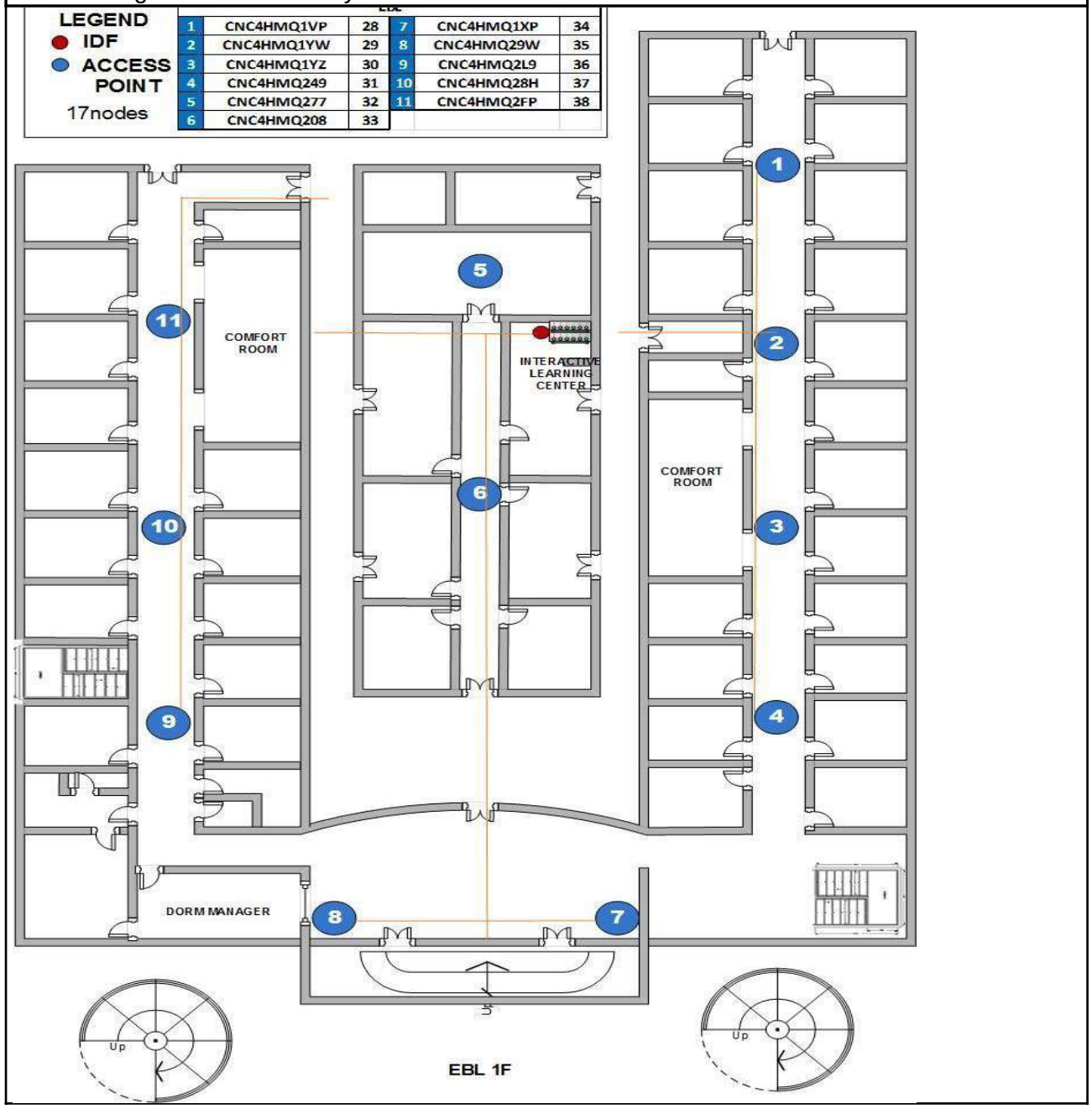
CSM Building Access Points Layout 2nd Floor



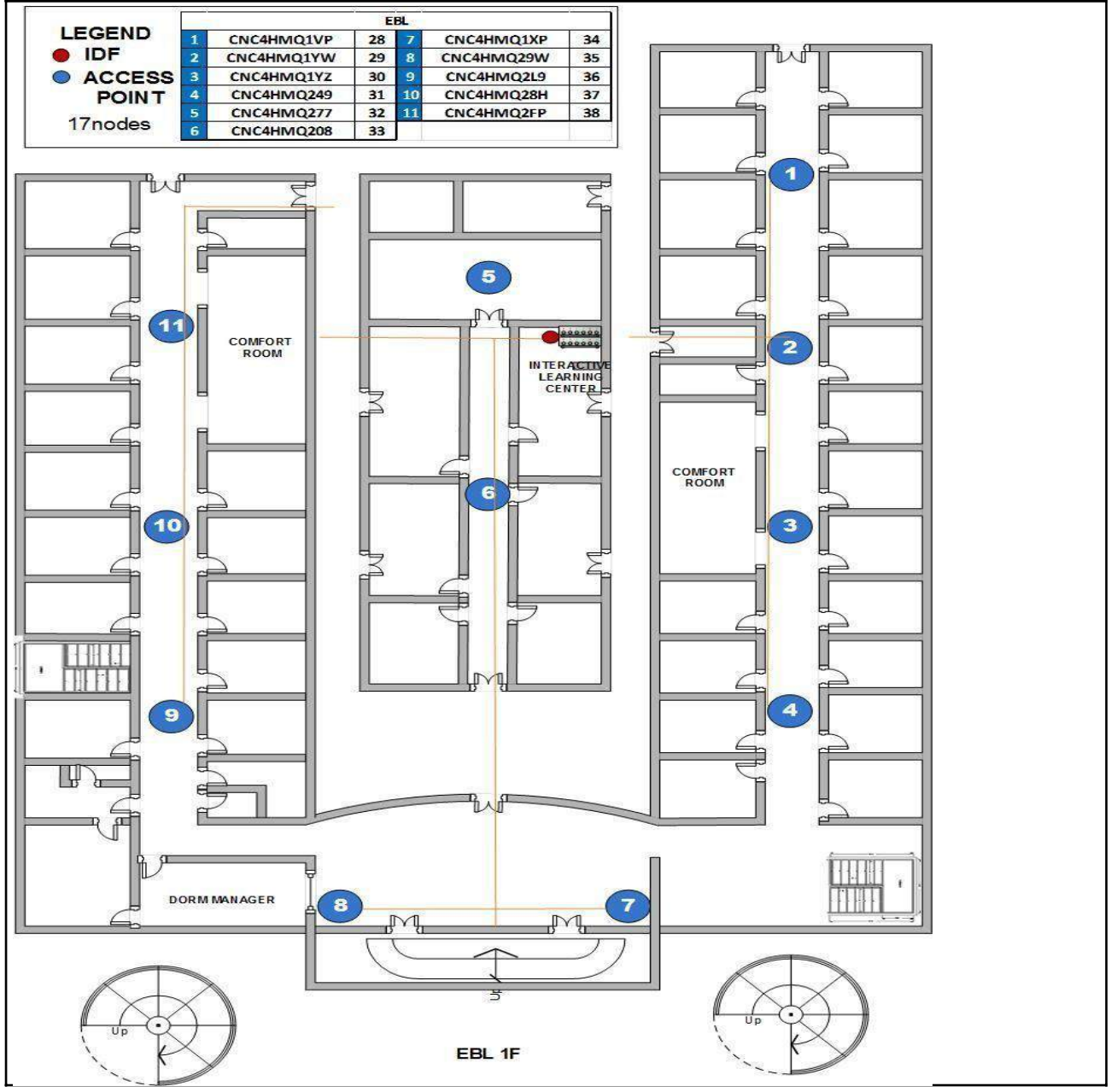
CSM					
13	CNC4HMQ3P4	58	22	CNC4HMQ26Q	67
14	CNC4HMQ36D	59	23	CNC4HMQ2LO	68
15	CNC4HMQ379	60	24	CNC4HMQ25W	69
16	CNC4HMQ25V	61	25	CNC4HMQ251	70
17	CNC4HMQ27Z	62	26	CNC4HMQ2NX	71
18	CNC4HMQ25B	63	27	CNC4HMQ2Q8	72
19	CNC4HMQ2F6	64	28	CNC4HMQ2WG	73
20	CNC4HMQ25Q	65	29	CNC4HMQ2W3	74
21	CNC4HMQ2GG	66			

COLLEGE OF SCIENCE AND MATHEMATICS 2F

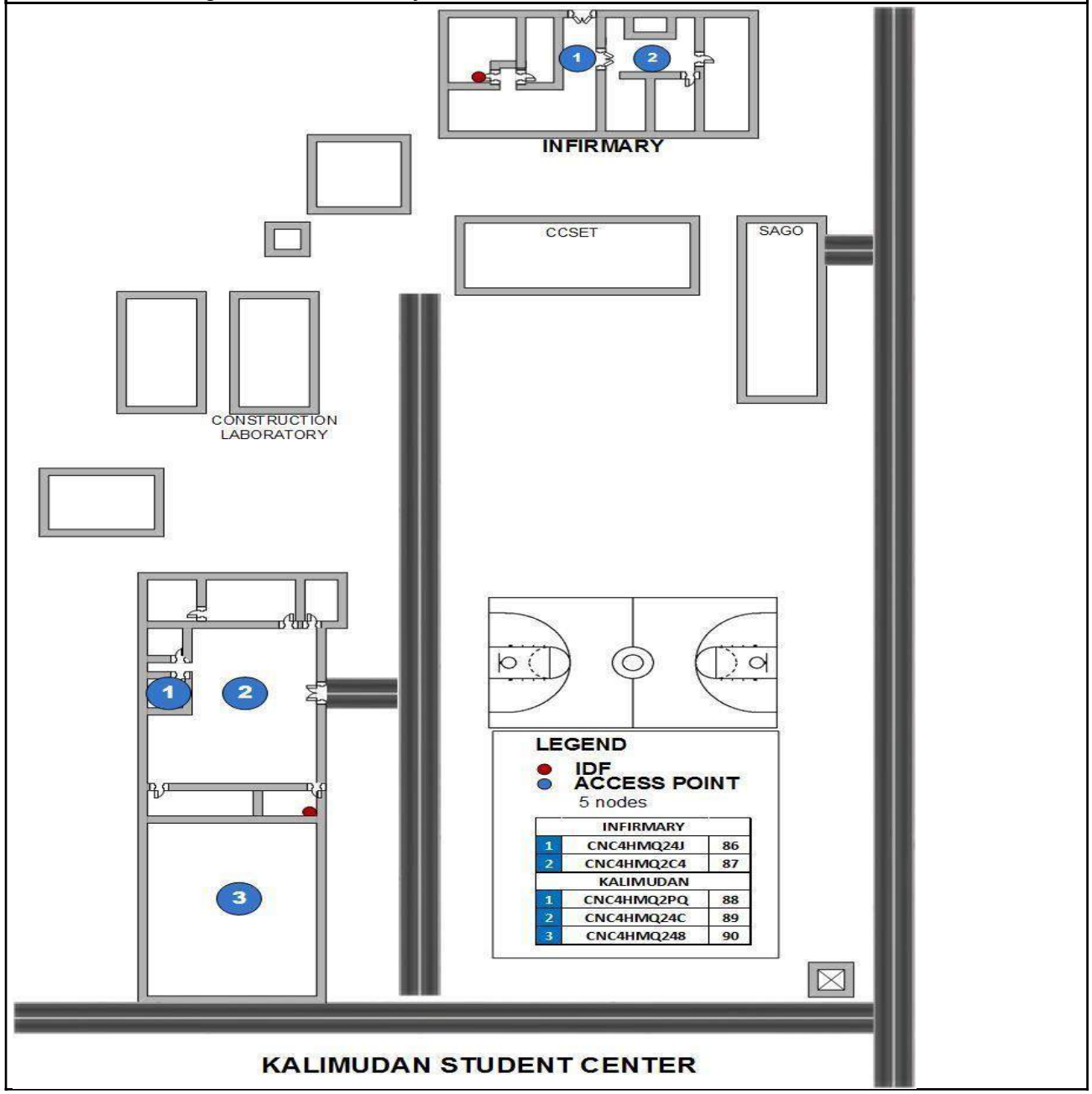
EBL Building Access Points Layout 1st Floor



EBL Building Access Points Layout 2nd Floor

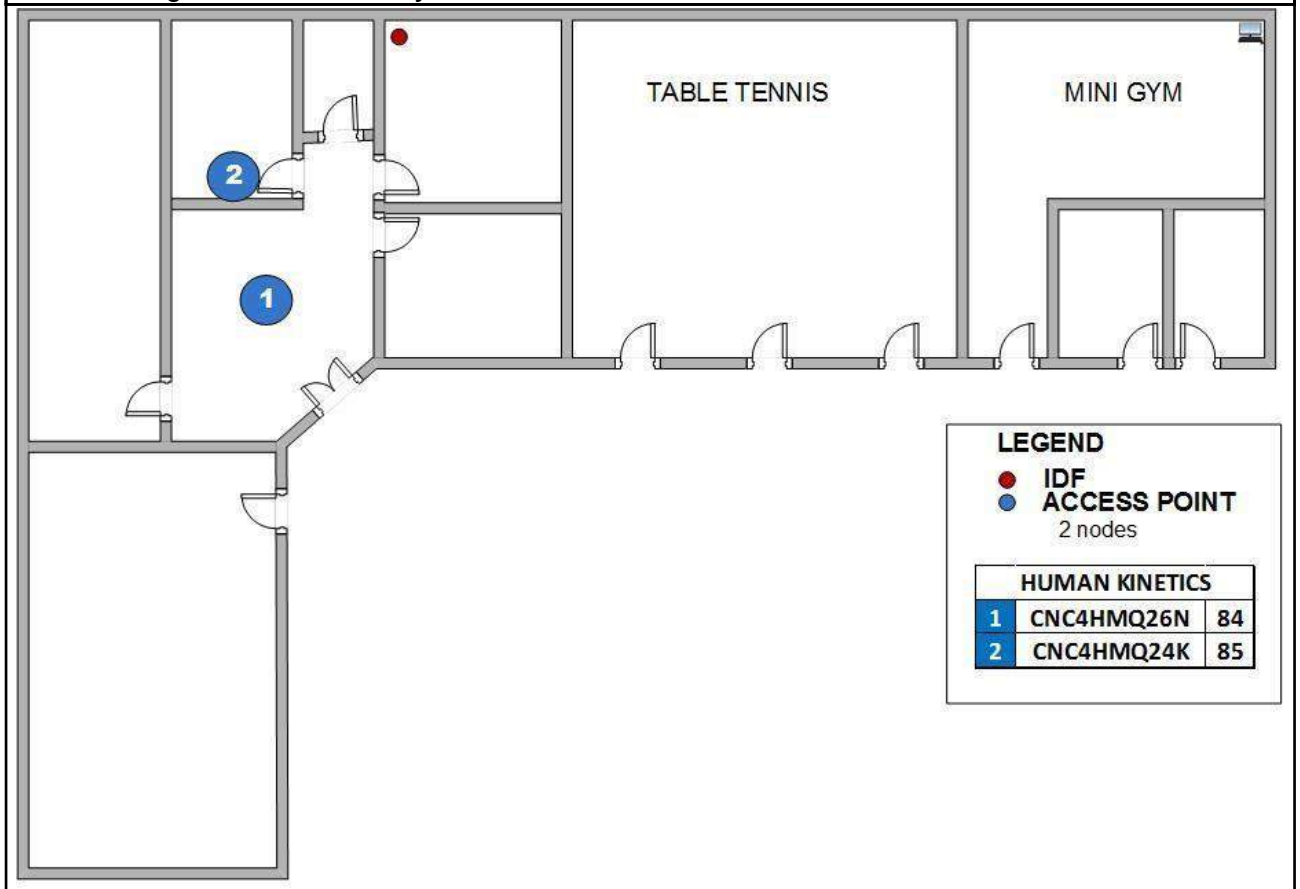


Kalimudan Building Access Points Layout

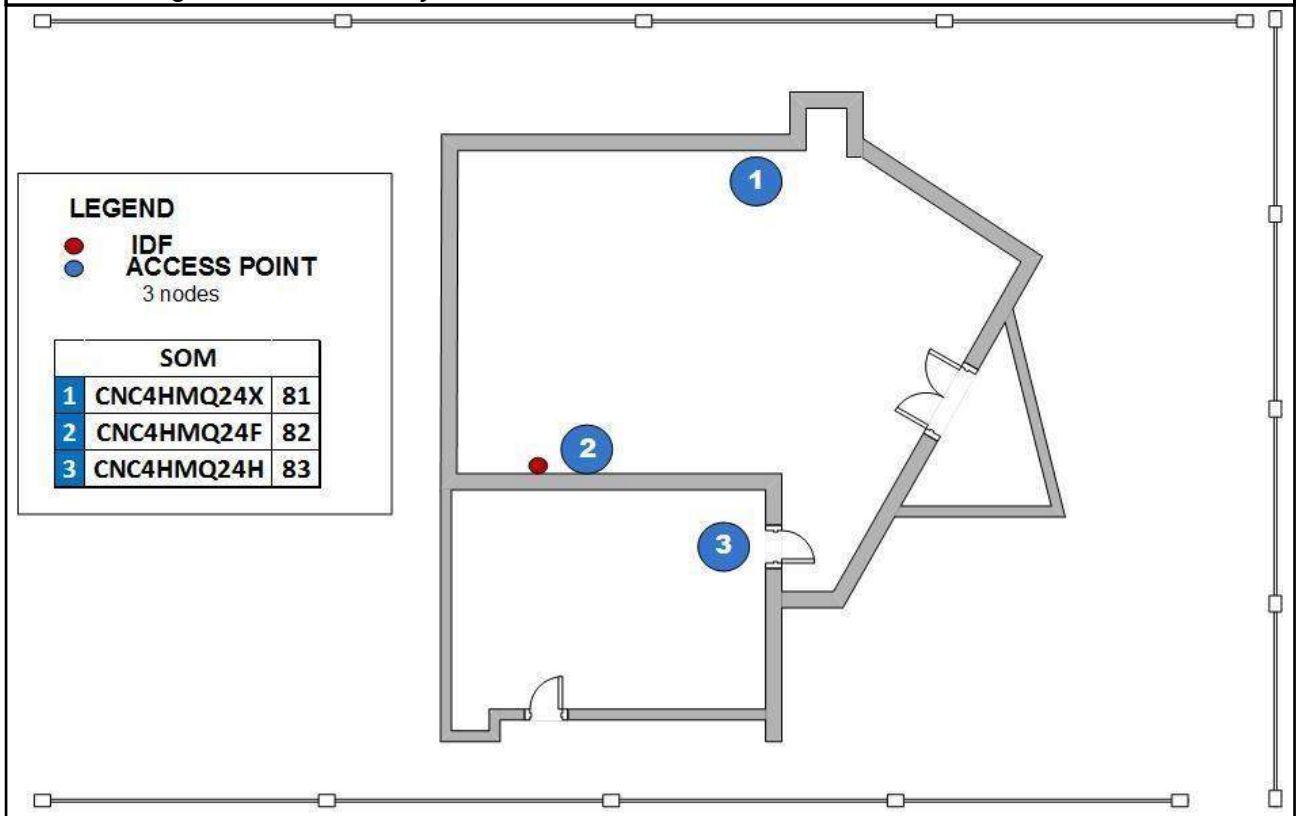


	INFIRMARY	
1	CNC4HMQ24J	86
2	CNC4HMQ2C4	87
	KALIMUDAN	
1	CNC4HMQ2PQ	88
2	CNC4HMQ24C	89
3	CNC4HMQ248	90

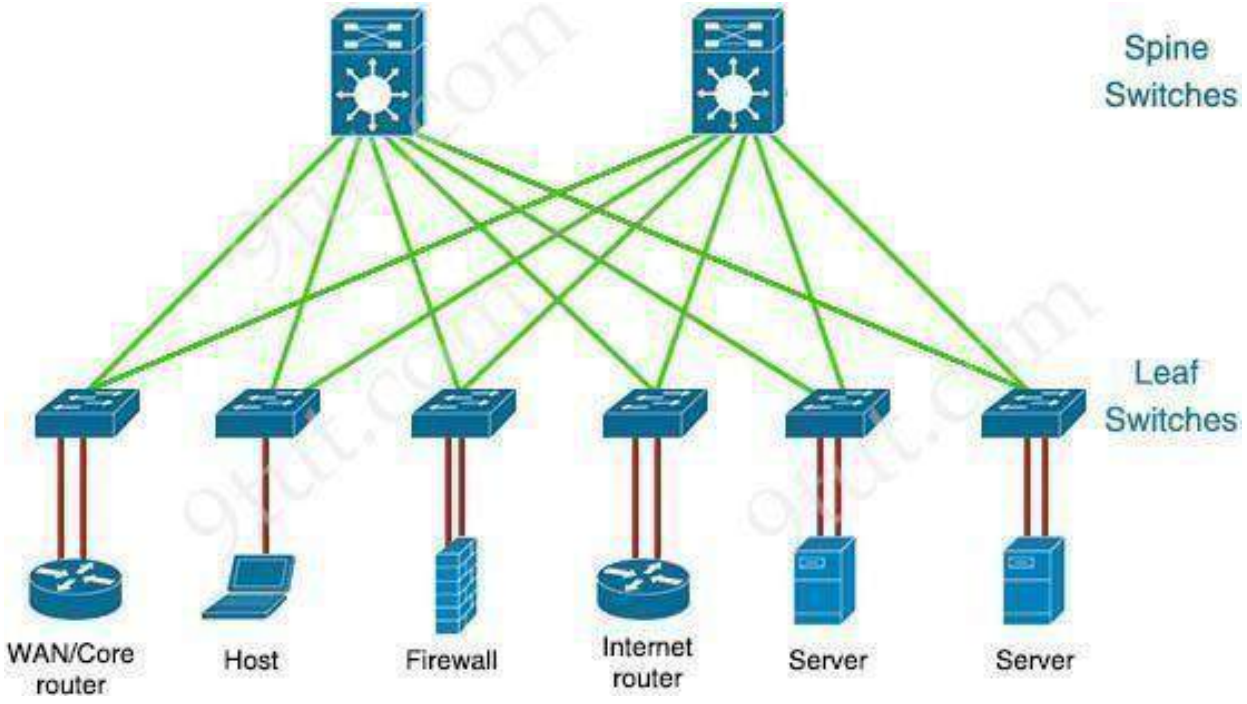
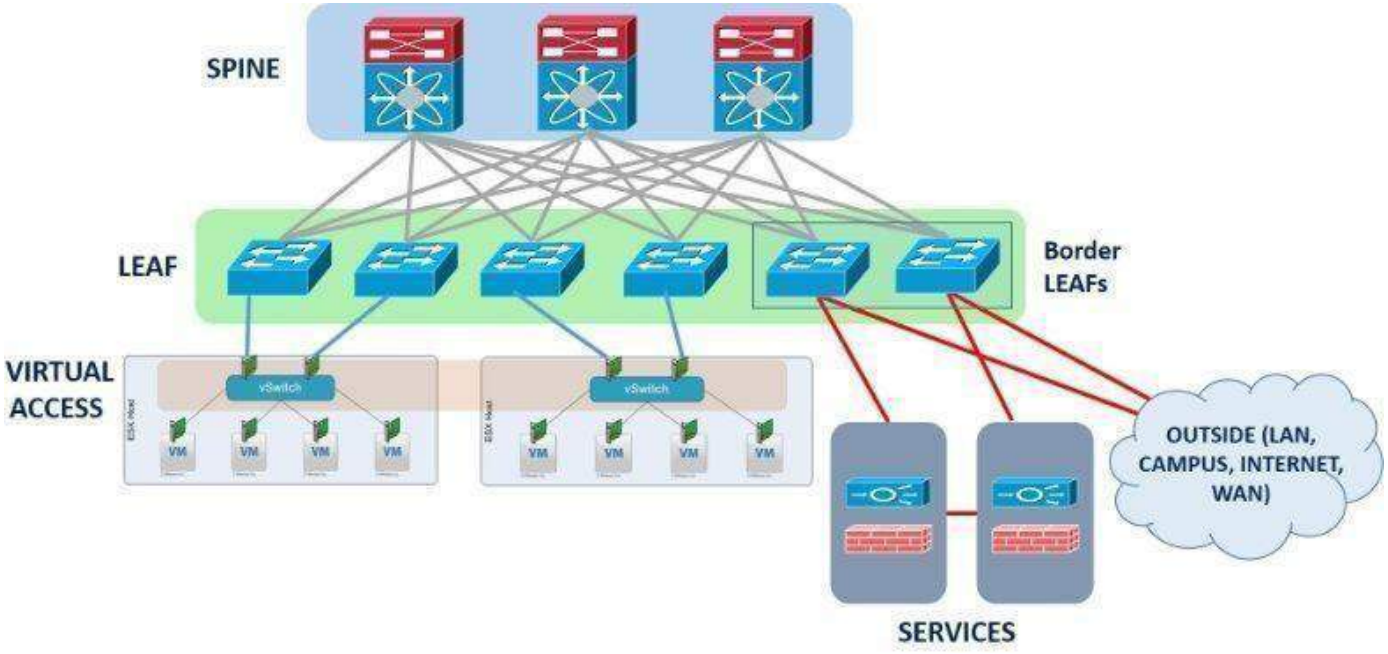
HKC Building Access Points Layout



SOM Building Access Points Layout



Spine-Leaf Architecture Sample 1



Spine-Leaf Architecture Sample 2