Sri Lanka Institute of Information Technology

IE1030 - Data Communication Networks
Year 1, Semester 1- 2025

Network Design

Part 3

Group WD.01.33

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CONTENT

3. Physical network design - passive components
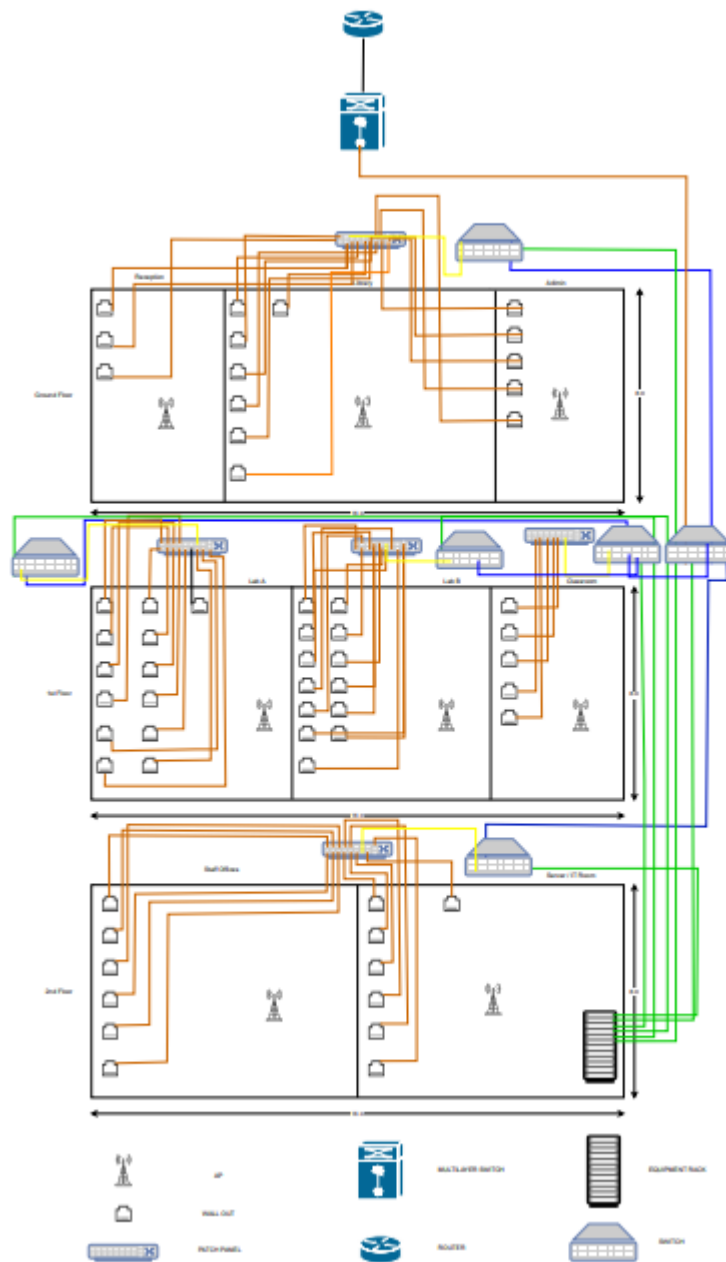
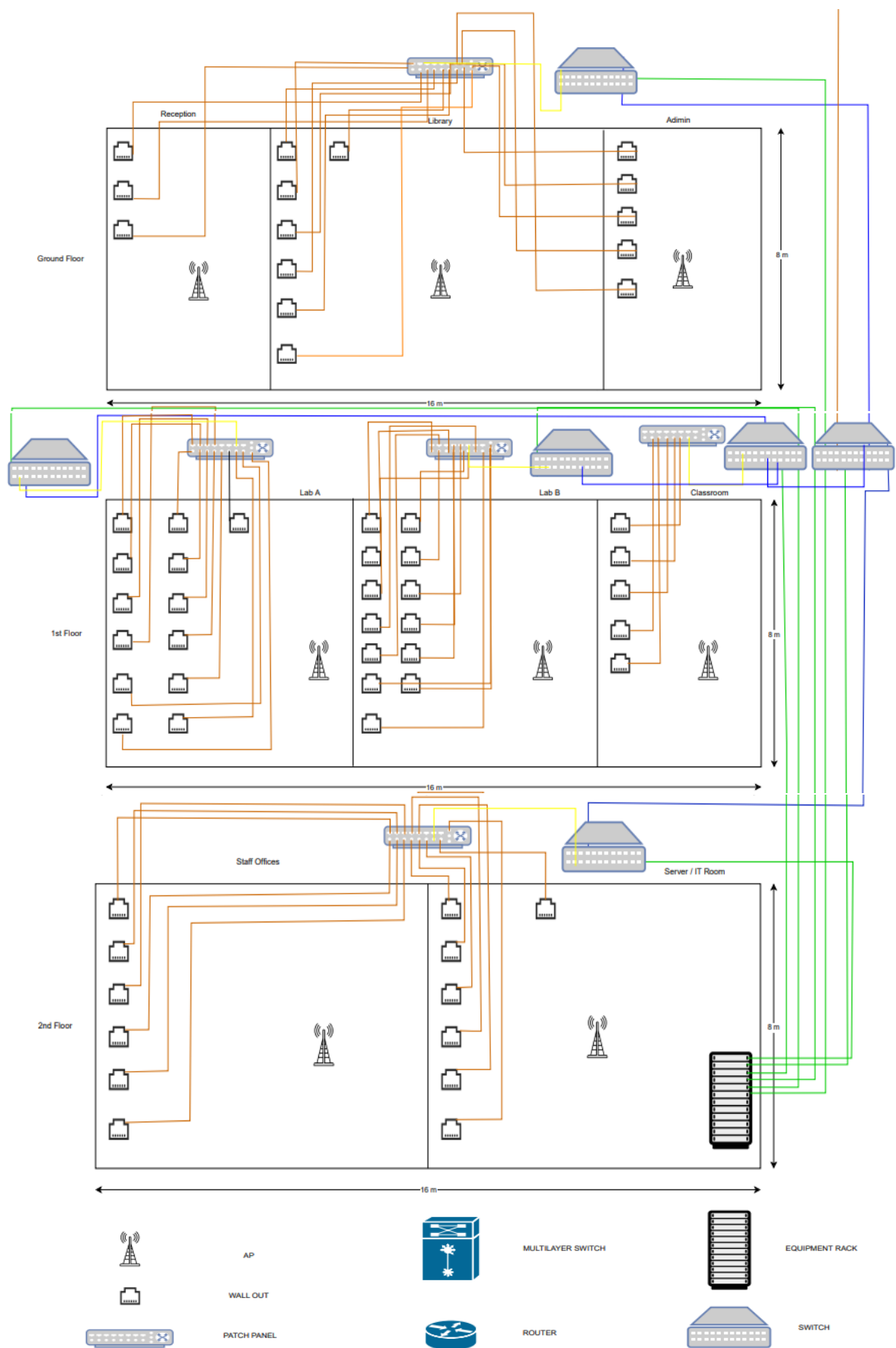Overview of the Physical network Design Floor Plan

Floor Plan

Ground Floor

Reception

Library

Adimin

8 m

16 m

1st Floor

Lab A

Lab B

Classroom

8 m

16 m

2nd Floor

Staff Offices

Server / IT Room

8 m

16 m

AP

WALL OUT

PATCH PANEL

MULTILAYER SWITCH

ROUTER

EQUIPMENT RACK

SWITCH

a) UTP Patch panels

Overview

The structured cabling uses Category 6 UTP for horizontal links (max 90 m per segment). All horizontal cables terminate on patch panels installed in per-floor racks; the second floor rack also hosts a fiber panel for the backbone. Short yellow patch cords (1–2 m) are used for panel-to-switch connections within the racks.

Patch Panel Types

- **UTP Panels:** 24-port and 48-port Cat6

- **Fiber Panel:** 12-port OM3 multimode (second floor)

Per-Floor Allocation

- **Ground Floor: 1× 24-port UTP** panel (covers **18** outlets + spares)

- **First Floor: 1× 48-port UTP** panel (covers **33** outlets + spares/APs)

- **Second Floor: 1× 24-port UTP** panel **+ 1× 12-port fiber** panel (covers **17** outlets + backbone/server uplinks)

Notes

- Color coding (intra-rack): **Yellow** = patch panel ↔ switch

- Floor uplink/core and inter-switch runs follow the color scheme in section (d)

b) Wall Outlets

Overview

End-user connections are provided through Cat6 RJ-45 keystone wall outlets, labeled per location for easy identification and troubleshooting. Each outlet home-runs to the nearest floor patch panel via Cat6 UTP. (Typical mounting height: 30–40 cm A.F.F., unless site conditions require otherwise.)

Quantities

- **Total: 68 outlets across three floors**

    - •**Ground Floor: 18**

    - •**First Floor: 33**

    - •**Second Floor: 17**

Notes

- **Users connect devices with their own device-end patch cords.**

- **Labels follow a room/port ID convention (e.g., GF-ROOM-01).**

c) Equipment Racks

Overview

Standard **19-inch racks** provide structured housing for patch panels, switches, fiber terminations, and power distribution. Racks include **cable management**, **PDUs**, and **ventilation**; all racks are **bonded to building earth**. Critical equipment is fed via **redundant PDUs (~1.5 kW)**.

Placement & Type

- **Ground Floor: Secure utility/administration area – wall-mount rack (houses floor switch, UTP panel, AP PoE as needed)**

- First Floor**: Corridor outside Lab B – wall-mount rack (floor switch, UTP panel, AP PoE)**

- **Second Floor (Server/IT Room): Floor-standing 42U rack (core multilayer switch, router, servers, 12-port OM3 fiber panel, UPS, and UTP panel; also supports APs)**

Cable Routing

- **Horizontal (UTP): Ceiling trays / plenum conduits to outlets**

- **Vertical (Fiber Backbone): Dedicated riser conduit between floors with proper fire-stopping**

Color Coding (Cabling Scheme)

- Blue: Switch ⟷ switch interconnections (e.g., access switches to floor/core)

- Yellow: Patch panel ⟷ switch (intra-rack, 1–3 m)

- Brown: Wall outlet ⟷ patch panel (horizontal Cat6) and per-floor uplink to multilayer/core

- Black: Core (multilayer) switch ⟷ router in the Server Room

- Green: Rack internal power/management leads

At-a-Glance (Passive Items)

- Cat6 UTP outlets: 68

- UTP patch panels: 24-port × 2, 48-port × 1

- Fiber panel: 12-port OM3 × 1 (in Server Room)

- Rack types: 2× wall-mount (GF, FF) + 1× 42U floor-standing (2F Server/IT Room)