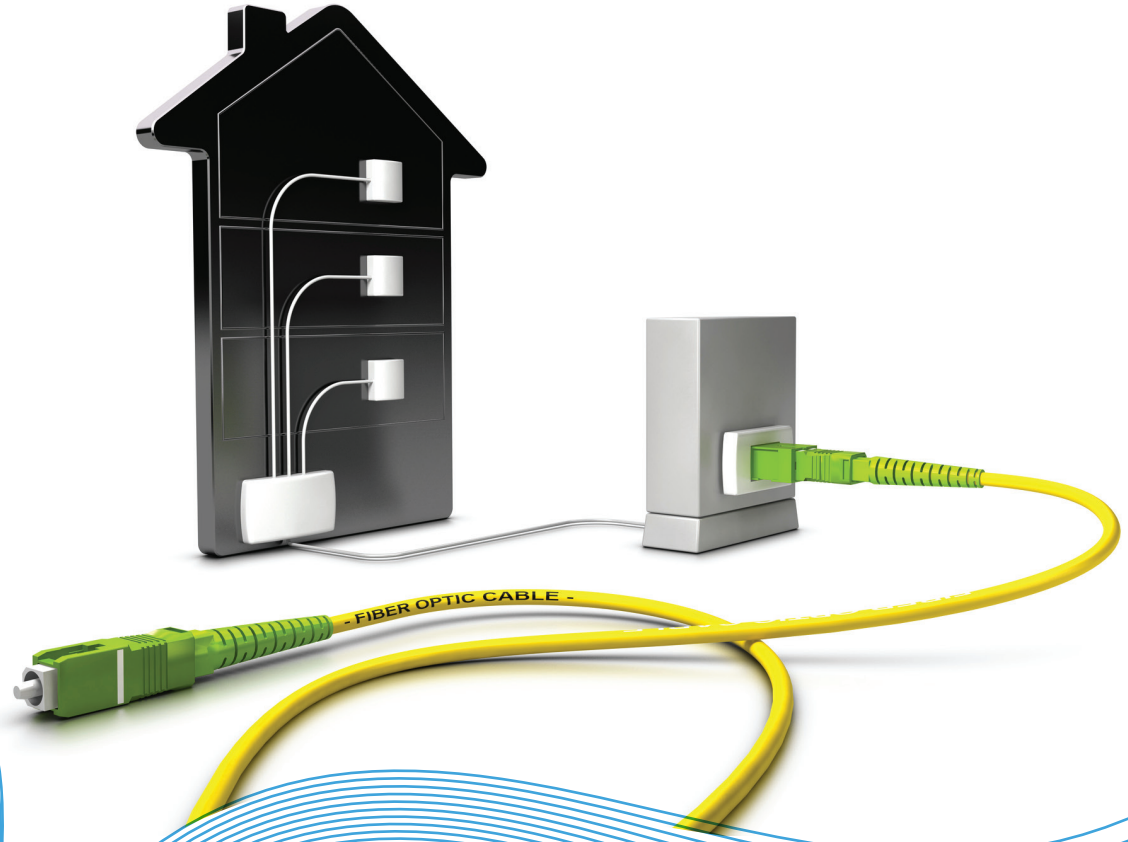
AIIPL
Advanced Innovative Instruments for Professional Learning

AKADEMIKA

Empowering your Future:



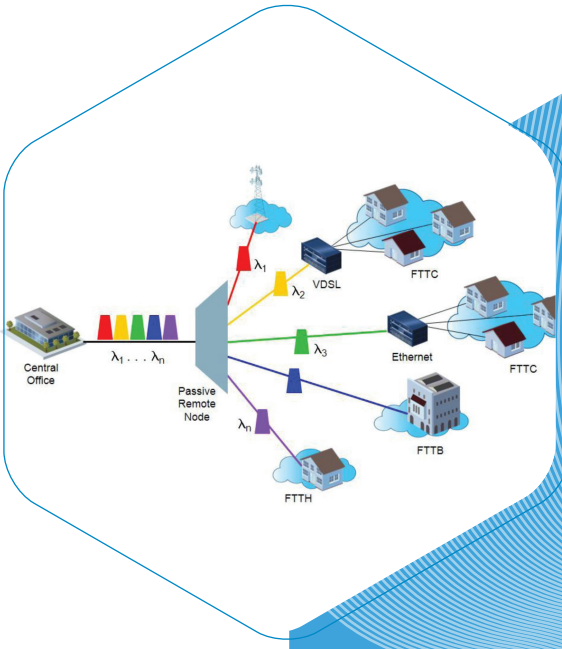
Unlock the potential of Gigabit Passive Optical Networking

CURRICULAM

- Basic Fiber Measurements - Attenuation - Numerical Aperture
- Multimode and Single Mode Fiber: - Bandwidth,
  - Dispersion, - Pulse propagation
- Transmitters: -LED's , - LASERS , - Bandwidth, - Spectra, - Modulation
- Receivers - PiN, - APD detectors , SNR, Noise , Bandwidth
- Coarse Wavelength Division Multiplexing and Add/ Drop of Channels
- Software tool for planning OSP Fiber Network and seamless management of entire integrated infrastructure
- Introduction to FTTx (FTTH, FTTP,FTTB) and its Architectures

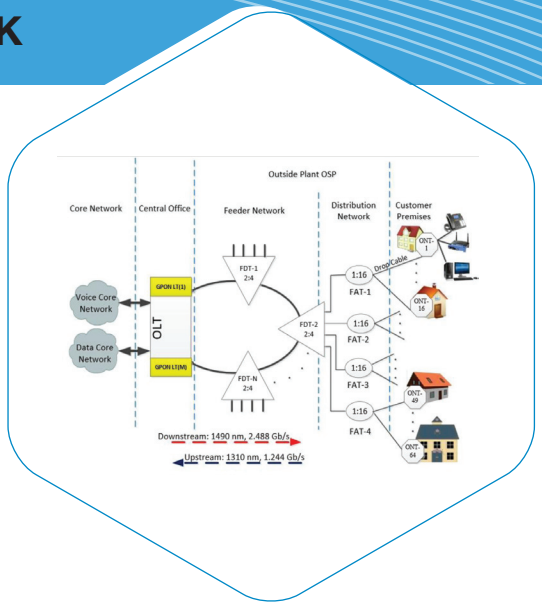
- PON Optical Infrastructure:
  - Fiber optic cables and connectors used in PON systems.
  - Installation considerations for PON infrastructure.
  - Fiber distribution hubs (FDH) and optical splitters.
  - Optical power budgets and loss calculations.
- PON System Deployment and Commissioning:
  - PON system installation guidelines and best practices.
  - Fiber optic cable routing and management. Prepare, crimp, terminate and test various cables and connectors, use crimping tools, splicing tools and test various cables used in FTTH network
  - Check various types of Splitters, connector terminations and perform Insertion Loss testing of Optical splitters in FTTH network
  - Installation of OLTs and ONUs at customer premises.
  - Testing and verification of PON links.
- PON System Configuration and Management:
  - OLT and ONU configuration parameters.
  - PON system provisioning and subscriber management.
  - Quality of Service (QoS) settings for PON networks.
  - PON network monitoring and performance optimization.
  - DBA profile
  - SFU Authorization
  - HGU Authorization
  - Automatic Configure the ONU By Profile
  - Case 1 SFU Bridge
  - Case 2 SFU Bridge With IPTV
  - Case 3 HGU Router --Internet
  - Case 4 HGU Router --VoIP
  - Case 5 HGU Bridge --IPTV

- GPON Architecture, Interfaces and Protocols
  - GPON Services
  - Downstream and Upstream TDM Architectures
  - GPON Stack
  - Network Protocol Support
  - OLT PMD and ONU PMD
  - Frame Structure
  - GPON Encapsulation Method (GEM)
  - GTC adaptation sublayer
  - GTC framing sublayer protocol stack
  - Transmission container (T-CONT)
  - Physical Parameters
- PON Troubleshooting and Maintenance:
  - Identifying common PON network issues and their causes.
  - Troubleshooting PON connectivity problems.
- Optical time-domain reflectometry (OTDR) for PON troubleshooting.
  - Perform OTDR test, measure the signal strength & losses and assess cable performance using Optical Power meter
  - Select FTTH network, test the fiber for any damage or break using fiber detection OTDR meter, Check power and configuration of ONU/ONT
- Physical Parameters affecting Network Performance
  - Dirty or damaged connectors/Connector mismatch/Incorrect splicing
- Testing Procedures during the Construction Phase
  - Maintaining connectors / Characterization of IL and ORL
  - OTDR based Techniques
- Testing Procedures – Activation Phase
  - Testing power in Passive Optical Networks
- Testing Procedures - Maintenance Phase
  - Troubleshooting Live Systems
- Test Documentation
- PON Security and Upgrades:
  - Security considerations for PON networks.
  - Encryption and authentication techniques in PON systems.
  - PON system upgrade options and procedures.
  - Future trends and advancements in PON technology.



GIGABIT PASSIVE OPTICAL NETWORK

A Gigabit Passive Optical Network lab designed by AKADEMIKA provides a safe and controlled environment for experimenting with different GPON configurations, network topologies, and equipment settings. It allows students to test different scenarios, evaluate performance, and identify potential issues.



SPECIFICATIONS

A. Outside Plant (OSP) Fiber Network Design Software

B. OPTICAL NETWORK CONFIGURATION AND MANAGEMENT SYSTEM

This System should have the facility to configure and manage the Fiber Optic Network

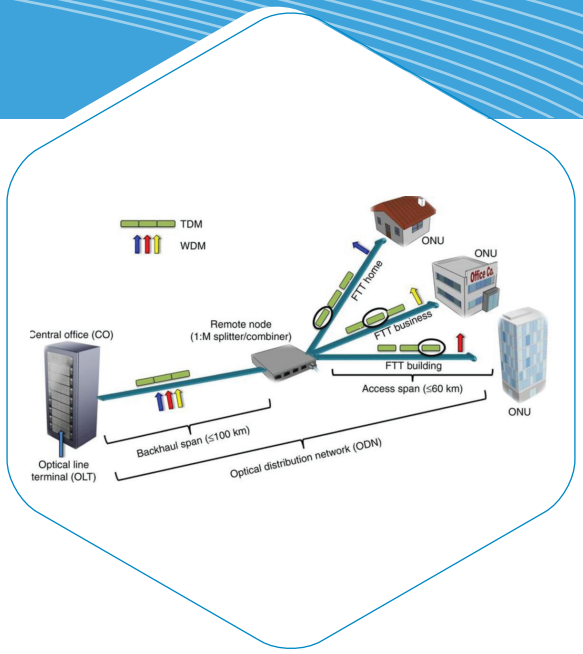
Hardware Specification:

- Minimum of 8 Gigabit ports ,
- Minimum of 4 –PON Ports provided with 4 SFP
- Wavelength: Tx 1490nm , Rx 1310nm
- Transmission Distance : 20 Km
- Voice , Data and IPTV Support

Management Software Specification:

- Support IPv4 and IPv6 Networks
- Port Status monitoring and configuration management; configuration such as VLAN, Trunk, RSTP, IGMP, QOS, etc
- Management function: DBA, Network Unit authorization, ACL, QOS, etc;
- Online Network Unit configuration and management
- Support data encryption, multi-cast, port VLAN
- Support Static & Dynamic Bandwidth Allocation
- Support port based QinQ and Selective QinQ (Stack VLAN)
- Support port-based/MAC-based/IP subnet-based VLAN
- Remote ONT configuration for internet and voice
- Support HTTP enable/disable from OLT
- In built DHCP Server with DHCP
- Has advance encryption standard(AES) for securing downstream traffic
- AC/DC voltages shall have protection against short circuit and overload. (Grounding point available)
- Fully compliant with ITU GPON standards.

GIGABIT PASSIVE OPTICAL NETWORK



C. OPTICAL NETWORK COMPONENTS

- Single Mode G.652 , 9/125 , 6 Core Feeder Cables
- Singe Mode G.652, 9/125, 6 Core Distribution Cables
- Single Mode G.657 Drop Cables
- PLC Optical Splitters
- Fiber Management System
- Joint Enclosures
- FTTH Boxes
- Fiber Optic Termination Boxes
- Optical Patch Chords
- Optical Pigtails
- 0dB Adaptors
- Dual Band Optical Network Units

D. OPTICAL TOOLS AND MEASURING INSTRUMENTS

1. Optical Time Domain Reflectometer with Event Module

-Display 5.6” LCD Touch Screen
-Wavelength: 1310/1550 Single Mode Fiber,
-Dynamic Range: 32/30 dB
-Event Dead Zone: 3m/12m
-Pulse Width: 5 ns to 1280ns
-Optical Connector Type:FC/SC
-Inbuilt VFL: 650nm with Max test distance of 3 km
-Event Module: Mounted on a Sturdy Aluminium Casing containing various Test Singlemode Optical Fiber Network suitable for uni & bi-directional interrogation.

2. Fusion Splicing Machine with FTTH Fiber Optic Tool Kit

Fiber alignment: Core/cladding alignment / Manual alignment
Splicing time : 9 Sec , Heating time: 22 Sec
Applicable Fibers: SM (G.652/G.657), MM (G.651),
DS (G.653), NZDS (G.655), EDF,BIF/UBIF (G.652/G.657),
MM (G.651), DS (G.653), NZDS (G.655), EDF,BIF/UBIF)
Fiber diameter: Cladding Diameter: 90-150μm
Coating diameter:125～1000μm
Splice Loss : 0.02dB(SM), 0.01dB(MM), 0.04dB(DS),
0.04dB(NZDS)
Return loss: Better than 60 dB
No of Motors: 4
Screen: 5-inch color LCD screen is resistant to impact, scratches, and protective shell
Magnification: X/Y:115 times, X or Y:230 times
FTTH Tool Box in a Casing

TRAINING MODULE FOR FIBER OPTIC COMMUNICATION AND APPLICATION

1. FOL-DUAL: DUAL WAVELENGTH LASER SOURCE AND DETECTOR MODULE

SPECIFICATIONS

- Provision for analog input, TTL input and RS-232input
- Displays (DPM) to indicate forward voltage across and forward current flowing through LED source
- Voltage and current is varied using intensity control potentiometer
- LASER : 1310nm & 1550nm , Output power :1.5mW
- DETECTORS : PIN photo diode , Spectral Bandwidth : 1250nm ~ 1600nm
- Pulse Generator Pulse width : Selectable from 30ns and100ns

2. FOL-PASSIVE : FIBER OPTIC PASSIVE COMPONENT MODULE

SPECIFICATIONS

- Coupler with Coupling ratio: 50: 50
- Isolators with Operating wavelength : 1310nm & 1550nm
- Attenuator : 5 dB & 10dB
- WDM with Wavelength range (λ1 λ2) : 1310nm / 1550nm

3. FOL-FIBER: SINGLE MODE FIBER OPTIC CABLE MODULE

SPECIFICATIONS

- Fibers is provided inside the cabinet and end points are provided on the front panel making it easy for the students to handle long lengths of fiber
- Length of fiber-1 100meter, Length of fiber-2 : 500meter, Length of fiber-3 :1000meter
- Type of fiber :9/125 µm single mode

4. FOL-CWDM: COARSE WAVELENGTH DIVISION MULTIPLEXING MODULE.

SPECIFICATIONS

LASERS : 1.25Gbps CWDM Laser Diode Modules at wavelengths of 1510nm,1530nm, 1550nm, 1570nm

Detectors: 1.5 GHz InGaAs PIN Photo diode Module

-Spectral Range : 1250nm to 1600nm

CWDM multiplexer and demultiplexer (4 channels)

- Center Wavelength : 1510nm,1530nm,1550nm,1570nm

Three Port Circulator

- Band : C+L
- Wavelength Range : 1525nm to 1610nm

Fiber Bragg Grating

- Central Wavelength : 1550 ± 0.5nm

SOFTWARE

- User friendly GUI for monitoring, controlling of CWDM system
- Operating modes like CW mode, VI characteristics mode, Internal & External Modulation
- LASER control like Supply ON/OFF, wavelength selection and driving current
- Real time signal level monitoring of Photo-detector.
- Graphical representation : XY plot of VI characteristics and Interna Modulation

KEY FEATURES OF THE OPTICAL NETWORK LABORATORY AND JOB PROFILES

- **State of the art Training Equipment:** The laboratory is equipped with Fiber Optic Training System to get a real world understanding of Fiber Optic Technology in Laboratory environment, Professional Test and Measuring Instruments and Fault finding event Modules to enhance learning.
- **Training Modules:** The Laboratory offers a comprehensive curriculum that covers fundamental concepts of Fiber Optics, Optical Networks, Its Design, Deployment and Commissioning
- **Maintenance:** The Laboratory focuses on the specific maintenance procedures for Optical systems, including inspection, cleaning, and testing of various components. Students learn how to properly handle and maintain optical Equipments.
- **Troubleshooting Techniques:** The laboratory covers troubleshooting techniques for identifying and resolving common issues that may arise in Optical networks. Students learn how to use diagnostic tools and test equipment to locate faults, isolate problems, and restore service.
- **Fiber Optic Testing:** A significant portion of the Curriculum is dedicated to fiber optic testing inOptical Networks. Students learn how to use optical power meters, OTDRs, and other testing equipment to measure optical power levels, identify signal degradation, and troubleshoot fiber optic cables and connectors.
- **Hands-on Practical Exercises:** Practical hands-on exercises play a crucial role, allowing students to apply the theoretical knowledge they have gained.

FIBER TECHNICIAN/MAINTENANCE

FTTx ENGINEER

FIBER OPTIC NETWORK ENTREPRENEUR

TELECOM INFRASTRUCTURE PROVIDER/
INTERNET SERVICE PROVIDER

OUR PRODUCTS

- DRONE TECHNOLOGY
- OPTICAL FIBER NETWORK
- COMPUTER NETWORKS
- ANALOG & DIGITAL COMMUNICATION
- IoT and WIRELESS COMMUNICATION
- RF/MICROWAVE/ ANTENNA
- TEST & MEASURING INSTRUMENTS

DRONE TECHNOLOGY

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TEST & MEASURING INSTRUMENTS

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