**INDIVIDUAL COURSE DETAILS**

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| **A.** Name of the Institute | UTL Technologies Limited |
| **B.** Name / Title of the Course | Certificate Course in Advanced Telecom Transmission Technologies (DWDM, FTTH and GPON) |
| **C.** Course dates and duration  in Weeks | **Batch 01: From:** 04-03-2019 To: 27-04-2019  **Duration:** 08 Weeks |
| **D**. Eligibility criteria for participants  **I.**  Educational Qualifications | Graduates / Engineers / Diploma Holders in Electronics / Electrical / Communications / Telecom or Equivalent with prior Telecom Knowledge |
| **II.**  Work Experienced required if any | Prior work experience in relevant field is desirable |
| **III.** Age Limit | Energetic professionals with a zeal and enthusiasm to learn and implement technologies |
| **IV**. Target group | Officials from ICT Ministry, Telecom Companies, Universities, Colleges, Telecom allied service companies etc. |
| **E.** Aim, Objectives of the Course | **Aim, Objective of the Course**:  This course provides the participants with a comprehensive Knowledge on Planning, Designing, Implementing, Managing and Trouble Shooting DWDM, FTTH & GPON Networks. |
| **F.** Course Contents | **Network Essentials:**   * Network Architecture * Internetworking Devices * OSI, TCP/IP Model * Network Addressing Design: IPv4/IPv6 * Ethernet Technologies * MPLS Fundamentals   **Optical Fundamentals:**   * Light theory * Introduction to fiber optics * Electromagnetic Spectrum * Evolution of fiber, types of fiber, ITU-T Standards. * Light sources & detectors, connectors like FC, SC, ST, LC, MU, Patch chords, Patch panel. * Fusion and Mechanical Splicing, OTDR, Power meter.   **SONET/SDH, DWDM:**   * Multiplexing techniques TDM & FDM. * SDH architectures, STM-1, STM-4, STM-16, STM -64. * SDH multiplexing & protection schemes. * SONET layered Structure STS-N frame structures. * SDH tester, E1 tester. * Elements of WDM link, OADMs and ROADMs, regenerators and transponders. * Types of amplifiers, EDFA, pre-Inline and booster. * DWDM network design considerations, operating wave lengths, DWDM test & measurement, optical spectrum analyzer . Photonic networks and all optical networking * Optical layer, optical routing and elements of all-optical networking * ROADM - Reconfigurable Optical Add-Drop Multiplexing * Coherent optical communications * New optical modulation schemes for 40 G, 100Gb/s transmission * DP-QPSK * Use of Digital Signal Processing along with coherent optical systems to alleviate chromatic dispersion, polarization mode dispersion and OSNR impairments   **Overview of FTTX:**   * Introduction to FTTx Access Networks * What is a FTTX Access Network? * The FTTH network environment * FTTx networks architecture (FTTC, FTTH, FTTN, FTTD, FTTP) * FTTH Topology and Technology * Network Layers * Open Access networks   **Passive Optical Networks:**   * PON Principles & Benefits * How Passive Optical Network is Economical? * PON types (BPON / EPON / GPON) * xPON comparison * GPON vs. GEPON   **Building GPON Infrastructure Networks:**   * G-PON basics * GPON Network Elements * Optical Line Termination * Optical Network Unit (SFU, SBU, MDU, MTU) * Optical Splitter * Optical Distributions Frame (ODF) * Power Budget Calculation * GPON Standards & Infrastructure in-buildings * GPON In-Building wiring * GPON Elements In-Building * Examples based on real installations GPON In-Building wiring * GPON Elements In-Building * Examples based on real installations Transmission Basics (GPON Multiplexing Architecture: GEM Port, TCONT, Allocid, ONU-id, Port-Id) * Downstream and Upstream TDM Architectures * GPON Stack * Control and User Planes in GPON * GPON Services: IPTV, VoIP and Internet, RF Services * GPON System Management Mode: SNMP, TR-069 and * OMCI scopes * GTC Layer Main Functions * GTC Frame Format: Downstream GTC frame, Upstream GTC burst, Upstream GTC frame: ONU bursts combination * ONU state machine * ONU status change: Activate, Deactivate, Disable * ONU, POPUP * PON Physical Parameters * OMCC Channel Establishment   **Case Study**: Case study of UTL GOA Network will be given to participants  **Industry Visit:** All the participants are taken to GOA Broad Band Network (GBBN) implemented by UTL and visit to UTL R & D Manufacturing facilities where the optical fiber equipment’s are designed and manufactured. |
| **G.** Mode of evaluation of performance  of the ITEC participant | * Formative assessment on a Weekly / Topic wise, Summative at the end of the course * Presentations by the participants on a weekly / fortnightly basis. * LAB Experiments and scenarios to Analyze the participants practical knowledge |