**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 Mobile Communication Technologies (3G, 4G) |
| **C.** Proposed dates and duration  of the Course in Weeks / Months | **Batch 01: From:** 07-01-2019 To: 02-03-2019**Duration:** 08 Weeks |
| **D**. Eligibility criteria for participants **I.**  Educational | Graduates / Engineers / Diploma Holders in Electronics / Electrical / Communications / Telecom or Equivalent with prior Telecom Knowledge |
|  **II.**  Work Experience | Prior work experience in relevant field is desired |
|  **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 aims at providing the participants with a comprehensive knowledge in Installation, Troubleshoot and Managing 2G, 3G and 4G Networks. Practical training provided during the course on Network Elements will give the participants much need hands-on experience |
| **F.** Course Contents   | **Telecom and Datacom Fundamentals** * Telecommunication Fundamentals, Understanding of Wired and Wireless communications
* Electromagnetic Spectrum, Frequency, Velocity, Wavelength, Bandwidth
* Transmission media - Twisted pair, Coax, Fiber, Satellite and Microwave (LOS), E1 standards
* Introduction to Modulation Methods, Multiplexing techniques, Antennas theory and characteristics
* Introduction to LAN’s, MAN’s and WAN’s, IEEE standards, Switching concepts and Gigabit Ethernet
* IP addressing, IPv4 and IPv6 concepts.

**Global System for Mobile communication & Signaling System*** FDMA, TDMA, CDMA, Introduction to cellular concepts Wireless Generations: 2G, Frequency ranges
* GSM Architecture MS, BSS, MSC, Transcoder, HLR, VLR and other network elements
* Authentication, Channels on Air-Interface, Handovers, Time slot and Frame structure
* Call process procedures and Transmission process, Traffic Engineering, SS7 signaling, Architecture nodes, Protocol stack, Signal units and Call setup
* GPRS network elements, GPRS attach and PDP context activation
* EDGE concepts
* Configuration of cell site
* Drive Test and RF planning

**3G Technologies*** Introduction to WCDMA, Radio channels, Frame structure, UTRAN Architecture, Node-B, RNC, Core network
* WCDMA Key Technologies: Spreading Codes, Scrambling codes, Coding, Interleaving, Modulation, Power control, Hand over, Admission Control, Load Control, Call flows
* HSDPA Overview: Need for HSDPA, HSDPA Network Architecture, HSDPA Channels, HSDPA key concepts, Mobility in HSDPA coverage, Call flows
* HSUPA Overview: Need for HSUPA, HSUPA Network Architecture, HSUPA Channels, HSUPA key concepts, Mobility in HSUPA coverage, Power Control, Call flows
* UMTS Radio network planning and dimensioning
* Coverage issues, Link budget

**4G Technologies*** Introduction to LTE, Goals and market drivers, LTE Network architecture, e-UTRAN and EPC, roles of UE, eNB, MME, S-GW, P-GW and HSS, LTE Interfaces including S1, X2, S6a, S5/S8, S10 and S11
* LTE Bandwidths, Spectrum, LTE Frame structures (TDD & FDD), OFDMA, SC-FDMA, LTE air interface, Basic call flows, Handover, Power control, MIMO, Antenna considerations
* LTE interoperability, CSFB, VoLTE, SRVCC, SON features and functions, IMS introduction and architecture
* LTE Advanced Pro Overview

**Case study**: UTL has installed more than 2 million GSM lines and 2 million CDMA lines. A study of the installation techniques, practical problems faced on the field, Do's and Don’ts for the installation etc., will be dealt in the **case study.****Industry training:** UTL is associated with Operators and OEMs for conducting Industrial / Practical Training on Mobile Communication equipment’s for participants |
| **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 participant’s practical knowledge
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