Empowering the Telecom World

Telecom

Industry is

Focus on Telecommunications
Radio Technologies are core to operations of any telecom enterprises which enable bearer and value added services by running mission critical applications. Recent surveys have significantly proved the need for the endowed software professionals in the field of protocol development and testing. The applications include designing OSS systems, Switching software and Mobile application development and developing Telecom Protocols.

This course is designed to equip the students with the Wireless Communications skills and networking concepts with the hands on experience on real-time Radio Network Testing and Implementation.

**Eligibility:** People enrolling for Advanced Wireless Communications should have B.E/M.E/M.Sc/MCA in CSE/EEE/ECE/IT.

**Opportunities:** The opportunities for AWC are in Telecom Protocol Testing, Implementation, Deployment, OSS, Telecom Billing etc.

**Duration:** 6 Months

**The Course Syllabus**

**Technology**

**Communication Basics**


**Networking**


**SS7 Signaling and Architecture**

- Telecommunication Systems, Signaling and Switching Technologies, SS7 Architecture, ISDN-Integrated Services Digital Network, ISDN BRI and PRI, Q.921 Signaling, Q.931 Standard, SS7-Messages, ISUP Signaling, SS7 Call Flows, ISUP Supplementary Messages, SS7 - Protocols

**Session and Call Control Protocols**


**Session Initiation Protocol**

- Introduction to SIP, SIP Architecture, SIP Message Fields, Registration, SIP Operation, RFC 3261-3265 Features, SIP Call Flows, Session Description Protocol, RTP and RTCP, SIP Protocol Stack

**SIGTRAN**

- Introduction to SIGTRAN, Soft Switch Architecture, SignalingGateways, Media Gateways and Media Gateway Controller, Sigtran Protocols - SCTP, MTP- 3b, M3UA, M2UA, M2PA, IUA, SUA
Global System For Mobile Communications - GSM

GSM Architecture, IS-136 TDMA Technology, GSM Security, Network Element Identities and Numbers, GSM Channels, Mobility Management and Hand Offs, GSM Channel Coding and Vocoder, Radio Channel Operation, Abis and A Interface Design, BCCH System Information Types and Decoding, Frequency Scanning, TEMS Drive Test, GSM Protocol Architecture, GSM Signaling and Call Processing, GSM Hardware Architecture, BTS Installation, Migration to GPRS

General Packet Radio Services - GPRS


Enhanced Data Rates for GSM Evolution – EDGE

EDGE Network Architecture, EDGE Coding Schemes, Link Adaptation, Incremental Redundancy, GERAN, Radio Network Operation and Network Dimensioning, Implementation Constraints of EDGE

Code Division Multiple Access - CDMA


3G - Universal Mobile Telecommunications Services (UMTS)


Next - Generation Networks (NGN)

Evolution for NGN, World Bodies for Telecom and Networking, HSDPA, HSUPA, 4G LTE, WiMAX

4G LTE – Long Term Evolution

Introduction to 3GPP Long Term Evolution, LTE Architecture, Compatibility with Non-3GPP Evolutions, LTE Physical Layer, OFDMA, SC-FDMA, MIMO, Physical Layer Modulation, Coding and Multiplexing, Channels, Call Processing, LTE Protocol Stack, LTE Rel. 9, Advanced Rel. of 10 & 11.

Telecom VAS and OSS/BSS - Introduction to VAS, VAS Products - SMS, CRBT, USSD, Prepaid Services, Location Based Services, Preferred Roaming, Telecommunications Landscape - Past, Present and Future, Introduction to OSS/BSS, TMN Model, TOM and eTOM, Next - Generation OSS
Advanced Wireless Communications

Telecom Testing


RF Planning and Optimisation


Antenna Technologies

Introduction to Antenna Components, Antenna Parameters, RF Math of dBi, dBm and dBd. Antenna Radiation Patterns in 2D and 3D of Azimuth and Elevation Planes, Tower Mounted Amplifiers, Antenna Types and their Applications

Telecom Protocols

SS7 Protocols

Signaling Connection Control Part (SCCP), ISDN User Part, Transaction Capabilities, Application Part (TCAP), Intelligent Network Application Part (INAP), OMAP

GSM, GPRS & CDMA Protocols

CM-Connection Management, CC- Call control, SS- Supplementary Service, SMS-Short Message Service, MM- Mobility Management, RR- Radio Resource management, LAPDM, BSS Application Part (BSSAP), Mobile Application Part (MAP), Generic Routing Encapsulation (GRE), Subnetwork Dependence Convergence Protocol (SNDCP), Radio Link Control Protocol (RLC), Logical Link Control Protocol (LLC), GPRS Mobility Management (GMM), GPRS Session Management (GSM), GPRS Tunneling Protocol (GTP), Customised Applications for Mobile Services Extended Logic - CAMEL

UMTS & LTE Protocols

ATM & ATM Adaptation Layers, UMTS related Signaling protocols – Access Stratus (AS) and Non-Access Stratus (NAS) Protocols, RRC, RLC, MAC, FP, PDCP, BMC SSCOP, SCTP, NBAP, ALCAP, RANAP, RNSAP, AMR, MM, GMM, MTP3-b, M3UA, STC, SCTP, SCIP, TAF, CBS

Programming

Linux Basics

Introduction to Linux Operating System, Basic Commands, List Commands, File & Directory Commands, Standard I/O and PIPES, File Security, Vim Editor, Filter and Database Commands, Communication & Scheduling Commands

Linux Administration

Disk & File System Management, User & Group Management, Linux Installation & Package Management (rpm & yum), Configuration of the Servers (Telnet, SSH, FTP & TFTP, Web Server, DHCP, Remote Installation Server, NFS, SAMBA, Mail Server), Security Management

Structured Query Language

Introduction to DBMS & RDBMS, Rules for an RDBMS, Data Types, Structure Query Language Commands, Functions, Clause Operators, Constraints, Set Operators, Joins, Sub Queries, Working with Database Objects(Views, Sequences, Indexes, Synonyms, Clusters), Working with Oracle and MySQL RDBMS Applications.
Advanced Wireless Communications

Networking

Convergence Labs networking academy has a pool of resources in not just conventional networking but have expertise in Mobile networking and marching towards next-Generation networking practices. Get a host of networking experience with hands on live network routers.

Telecom Practicals

1) E1 Line Integration
2) Signalling Analysis for SS7, GSM and GPRS Networks
3) GPRS Signalling Analysis
4) IP Networking on Cisco Routers
5) BTS Installation
6) MSC, TRAU and Soft Switch (3G)
7) IP Telephony - VoIP
8) Operations and Maintenance Center - OMC
9) RF Planning for GSM and 3G Networks
10) TEMS Drive test for GSM, GPRS and 3G Networks

Telecom Network Signaling Analysers

Get a hands on experience on Signaling Analysers on host of communication protocols including SS7, GSM, GPRS, VoIP, SIP, Networking, etc.

Wireless technology has been touted as the 'next big thing' in terms of connectivity.

An expansion of technological change and a rising wave of new forms of data are working a deep change in the Internets capabilities and uses. Mobile Networks are accelerating the transition of industry players to an IP based Next Generation Network.

Networking

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Radio network optimization is core to network operations today. TEMS Investigation captures the RF parameters in downlink and reports them in the customized format. These reports are used for optimizing the networks. In addition to traditional RF data, L2/L3 messages, and IP information collection and together with support for a wide range of services, makes TEMS Investigation the ideal choice for network operators.

RF Planning for GSM and UMTS (3G)

The purpose of RF planning is to maximize coverage, increasing capacity and minimizing capital expenditure throughout the life of a network. The tools help in Radio propagation analysis, Automated frequency allocation, Capacity and coverage, Interference mitigation, Throughput and grade of service analysis, Analysis of networks running multiple technologies.

At Convergence Labs you'll get hands on experience on planning GSM and UMTS (3G) Radio Networks on Forsk Atoll RF Planning Tool.
Convergence Labs takes you through portfolio of mobile network integration including installation and testing of Radio networks on both GSM (2G) and UMTS (3G) Technologies.

At Convergence Labs you will experience the total operation of Mobile Networks of GSM and UMTS (3G) including Switching & Core Network Transmission and also Radio Network. You'll develop hands on experience on OMC-R functions including, Configuration Management, Network Supervision, Alarm management, Network Monitoring, Supervision of Counter Thresholds and Fault management and also Signaling Analysis of both Land Line and Mobile Networks.

You'll also experience the Next-Generation Technologies like Soft Switch and Releases of Advanced Telecom Technologies of 3G and 4G that are to be released soon in the markets.

Convergence Labs is official partner of Telecom Edge for the global Telecom placements. All freshers are assisted for placements through Convergence Labs internal HR division and all experienced professionals are assisted through Telecom Edge’s HR pool. With its core focus on Telecom expertise, Convergence Labs has positioned itself as rich source of Telecom Manpower Database both in India and World Wide.

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Live Telecom Network Experience

Our Students @ Work