



Advanced Mobile Technology Certification

ETSI GSM today is the most widely deployed wireless network worldwide. This second generation mobile standard has revolutionized wireless industry since its inception. To satisfy accelerated growth of data, ETSI evolved GSM and created **GPRS** standard. One of its kind in beginning GPRS paved the way for more data intensive standards. EDGE further enhances GPRS data services to provide higher speeds. **3GPP UMTS** (Universal Mobile Telecommunications System) is designed to fulfill high quality of service requirements for rapidly growing internet applications and to provide higher data rates to access a full range of services and applications. **3GPP LTE (Long Term Evolution)** Project was launched to improve the UMTS mobile phone standard to cope with future technology evolutions. Goals include improving spectral efficiency, lowering costs, improving services, making use of new spectrum and reframed spectrum opportunities, and better integration with other open standards.

Course Description

Advanced Course in Mobile Technology offers unique course structure which provides in-depth understanding of evolution path of mobile technology including GSM, GPRS, UMTS & LTE.

Who Should Attend

Individuals interested in understanding how Mobile technology is being leveraged to enhance end-user experience in a wireless network and how GSM/UMTS/LTE network is deployed should attend this course. Students or professionals who currently serve in sales, systems engineering, architecture, design, test, support, or operations roles will find this course to be especially beneficial.

Course Objectives

Upon completion of this course, the participants are expected to have a good understanding of LTE/SAE technology as detailed below.

- ❖ Telecom Fundamentals
- ❖ Signaling System # 7 (SS7)
- ❖ Global System for Mobile communications (GSM)
- ❖ General packet radio service (GPRS)
- ❖ Universal Mobile Telecommunications System (UMTS)
- ❖ Long Term Evolution (LTE)

Course Prerequisite

Although this course requires no previous knowledge or understanding of mobile telephony, a basic understanding of telecommunication network and OSI models would be beneficial.

Delivery Media

- ❖ Streaming audio and video presentation
- ❖ Student Quizzes

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eLearning Modules

Fundamental of Telecommunication

PROGRAM OVERVIEW

This is a self-paced e-learning course and part of TelecomMentor-NgnGuru advanced training series. Seminar style presentations provide telecom professionals with easy access to the information they need. Topics are presented by instructors renowned for their technical expertise, industry experience, and outstanding presentation style.

Advanced Fundamentals of Telecommunication course is available online and on CD-ROM. It includes streaming audio/video presentation and student quizzes.

Advanced Fundamentals of Telecommunication training provides a complete introduction of telecommunication concepts and gives very good understanding of the telecommunication networks, elements and models.

This course is developed utilizing the latest learning and delivery techniques that offer unrivalled development opportunities.

Upon completion of this course, the participants will have a good understanding of:

- Basic Concepts
- Switching Concepts
- Communication Networks
- Network Models
- Data & Signals
- Multiplexing

Although this is a foundation course and requires no previous knowledge or understanding of telecommunications topics, a basic understanding of data communications would be beneficial.

PROGRAM OUTLINE

Lesson 1: Basic Concepts

- What is telecommunication?
- Components of a Telecommunication System
- Data Flow
- Communication Node

Lesson 2: Switching Concepts

- Switching Networks
- Circuit Switching
- Packet Switching

Lesson 3: Communication Networks

- Data Networks
- Local Area Network
- Wide Area Network
- Metropolitan Area Network
- Internet

Lesson 4: Network Models

- Different Layering Architectures
- OSI Model
- Layered Architecture
- TCP/IP Protocol Suite

Lesson 5: Data & Signals

- Analog and Digital Signal
- Time and Frequency domain representation
- Transmission Impairment
- Modulation

Signaling System # 7 (SS7)

PROGRAM OVERVIEW

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Advanced SS7 course is available online and on CD-ROM. It includes streaming audio/video presentation and student quizzes.

Advanced SS7 training provides good understanding of the SS7 signaling network, architecture and protocols. This course is developed utilizing the latest learning and delivery techniques that offer unrivalled development opportunities.

Upon completion of this course, the participants will have a good understanding of:

- SS7 (Signaling System 7) Network Architecture
- Signaling Network Elements: SSPs, STPs and SCPs
- Signaling Network Structures
- SS7 Protocols & Protocol Stacks
- SS7 Signal Units
- Signaling Links
- Message Transfer Part (MTP) Level 1-3
- SCCP, TCAP and ISUP
- SS7 in Mobile Networks

Common Channel Signaling System No. 7 (i.e., SS7 or C7) is a global standard for telecommunications defined by the International Telecommunication Union (ITU) Telecommunication Standardization Sector (ITU-T). The standard defines the procedures and protocol by which network elements in the public switched telephone network (PSTN) exchange information over a digital signaling network to effect wireless (cellular) and wireline call setup, routing and control.

Although this course requires no previous knowledge or understanding of SS7, a basic understanding of telecommunication network and OSI models would be beneficial.

PROGRAM OUTLINE

Lesson 1:SS7 Overview

- What is SS7?
- SS7 History
- SS7 Objectives
- SS7 Network Elements
- SS7 Links
- OSI vs. SS7
- SS7 Protocol Layers
- SS7 Functional Architecture

Lesson 2:SS7 Protocol Description

- MTP1
- MTP2
- MTP3
- ISUP
- TUP
- SCCP
- TCAP

Lesson 3:SS7 in Telecom Networks

- SS7 in 2G/3G Networks
- PSTN, PSTN-2G/3G Control Plane
- 2G, 3G core network Control Plane
- 2G/3G access network Control Plane

Lesson 4:SS7 Signaling

- Normal Alignment
- Signalling Link Activation
- Signalling Link Handling
- Basic Call Setup/Release

Global System for Mobile communications (GSM)

PROGRAM OVERVIEW

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Advanced GSM course is available online and on CD-ROM. It includes streaming audio/video presentation and student quizzes.

Advanced GSM training provides good understanding of the GSM signaling network, architecture and protocols. This course is developed utilizing the latest learning and delivery techniques that offer unrivalled development opportunities.

Upon completion of this course, the participants will have a good understanding of:

- 2 G architecture
- GSM Air interface
- GSM location area / cell/frequency/frame/Modulation concepts
- GSM physical and logical channels
- GSM E2E signaling procedures and protocols
- GSM access and core network

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM differs from first generation wireless systems in that it uses digital technology and time division multiple access transmission methods.

Although this course requires no previous knowledge or understanding of GSM, a basic understanding of communication network, SS7 and OSI model would be beneficial.

PROGRAM OUTLINE

Lesson 1: GSM Overview

- What is GSM?
- GSM Frequency

Lesson 2: GSM Architecture

- GSM Network Architecture
- Radio Subsystem
- Network Subsystem (NSS)
- Operation Subsystem (OSS)
- BTS/BSC/MSC

Lesson 3: GSM Concepts

- Geographical Characteristics
- Cell Characteristics
- Cellular Concept

Lesson 4: GSM Air Interface

- Air Interface
- FDMA/TDMA
- Bursts and
- Logical Channels
- Common Control Channels
- Dedicated Control Channels

Lesson 5: GSM Protocol Architecture

- Protocol Architecture Signaling LAPDm/RR
- BTS-BSC Interface
- BSC-MSC Interface
- MS-MSC Interface

General packet radio service (GPRS)

PROGRAM OVERVIEW

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Advanced GPRS course is available online and on CD-ROM. It includes streaming audio/video presentation and student quizzes.

Advanced GPRS training provides good understanding of the GPRS signaling network, architecture and protocols. This course is developed utilizing the latest learning and delivery techniques that offer unrivalled development opportunities.

Upon completion of this course, the participants will have a good understanding of:

- 2.5 G architecture
- GPRS Air interface
- GPRS routing area/ frame/Modulation concepts
- GPRS physical and logical channels
- GPRS E2E signaling procedures and protocols
- GPRS access and core network

General Packet Radio Services (GPRS) is a packet-based wireless communication service that provides high data rates and continuous connection to the Internet for mobile phone and computer users. The higher data rates allow users to take part in video conferences and interact with multimedia Web sites and similar applications using mobile handheld devices as well as notebook computers.

Although this course requires no previous knowledge or understanding of GPRS, a good understanding of GSM technology would be beneficial.

PROGRAM OUTLINE

Lesson 1: GPRS Overview

- Goals of GPRS
- GPRS Applications
- GSM -> GPRS

Lesson 2: GPRS Architecture

- GSM Architecture
- GSM/GPRS Architecture
- GPRS Core Network Enhancements
- GSM vs GPRS
- Channel Sharing in GSM and GPRS

Lesson 3: GPRS Air Interface

- GPRS Air Interface
- Channels
- Channel coding schemes

Lesson 4: GPRS Interface & Protocols

- User Plane/Control Plane
- MS-BSS Interface
- MS-SGSN Interface
- BSC-SGSN Interface
- Gn Interface GTP Functions

Lesson 5: GPRS Signaling

- GPRS Uplink Access
- GPRS Downlink Access
- GPRS Attach
- SGSN Routing Area Update
- GPRS PDP Activation

Universal Mobile Telecommunications System (UMTS)

PROGRAM OVERVIEW

This is a self-paced e-learning course and part of TelecomMentor-NgnGuru advanced training series. Seminar style presentations provide telecom professionals with easy access to the information they need. Topics are presented by instructors renowned for their technical expertise, industry experience, and outstanding presentation style.

Advanced UMTS course is available online and on CD-ROM. It includes streaming audio/video presentation and student quizzes.

Advanced UMTS training provides good understanding of the UMTS signaling network, architecture and protocols. This course is developed utilizing the latest learning and delivery techniques that offer unrivalled development opportunities.

Upon completion of this course, the participants will have a good understanding of:

- 3G 3GPP architecture
- UMTS Air interface
- UMTS physical and logical channels
- UTRAN Interfaces
- UMTS E2E signaling procedures and protocols
- RLC/MAC/RRC/NBAP/RNSAP/RANAP protocols
- UMTS access and core network

UMTS stands for Universal Mobile Telecommunications System. UMTS is also known as third-generation, or 3G. Third-generation systems are designed to include such traditional phone tasks as calls, voice mail, and paging, but also new technology tasks such as Internet access, video, and SMS, or text messaging.

Although this course requires no previous knowledge or understanding of UMTS, a basic understanding of telecommunication network and GSM/GPRS technology would be beneficial.

PROGRAM OUTLINE

Lesson 1: UMTS Overview

- What is UMTS ?
- Cellular Evolution
- UMTS network overview
- 3GPP UMTS Architecture
- UTRAN Interfaces

Lesson 2: UMTS Air Interface

- Physical Radio channel
- Why spreading ?
- OVSF code generation
- Scrambling codes
- UL/DL Physical Channels
- Physical Layer Procedures
- RLC/MAC/RRC

Lesson 3: UTRAN

- 3GPP UTRAN Architecture
- Node B/RNC functions
- Serving/Drift concept
- UTRAN- SRNS Relocation
- Iub/Iur interface
- NBAP
- RNSAP

Lesson 4: UTRAN Iu Interface

- Iu interface
- Iu-CS/PS Protocol structure
- RANAP
- UMTS CS/PS Control/User Plane

Long Term Evolution (LTE)

PROGRAM OVERVIEW

This is a self-paced e-learning course and part of TelecomMentor-NgnGuru advanced training series. Seminar style presentations provide telecom professionals with easy access to the information they need. Topics are presented by instructors renowned for their technical expertise, industry experience, and outstanding presentation style.

Advanced LTE/SAE course is available online and on CD-ROM. It includes streaming audio/video presentation and student quizzes.

Advanced LTE/SAE training provides good understanding of the LTE/SAE signaling network, architecture and protocols. This course is developed utilizing the latest learning and delivery techniques that offer unrivalled development opportunities.

Upon completion of this course, the participants will have a good understanding of:

- Evolved 3GPP architecture
- LTE Air interface
- LTE physical and logical channels
- E-UTRAN Interfaces
- LTE E2E signaling procedures and protocols
- LTE Nodes eNB/MME/SGW/PDN-GW
- S1/X2 Interfaces

LTE (Long Term Evolution) is initiated by 3GPP to improve the mobile phone standard to cope with future technology evolutions and needs. Requirements include reduced cost per bit, increased service provisioning – more services at lower cost with better user experience, flexibility of use of existing and new frequency bands, simplified architecture, open interfaces and reasonable terminal power consumption.

Although this course requires no previous knowledge or understanding of LTE, a good understanding of telecommunication network and UMTS technology would be beneficial.

PROGRAM OUTLINE

Lesson 1: LTE Overview

- Evolution
- Need of LTE
- High Level Requirements
- High level architecture for the evolved system
- LTE-SAE Nodes
- Functional Architecture E-UTRAN EPC
- LTE-SAE Interfaces

Lesson 2: Evolved UTRAN

- EUTRAN Architecture
- eNode B
- Radio Interface User Plane
- Radio Interface Control Plane
- Frame Structure
- Physical channels
- Transport Channels
- MAC / RLC
- PDCP / RRC
- X2 Interface
- X2AP Protocol

Lesson 3: Evolved Packet Core

- MME
- Serving Gateway (S-GW)
- PDN Gateway (P-GW)
- S1 Interface
- S1AP Protocol
- Security

Lesson 4: LTE Signaling

- Random Access