



I enjoyed the class and found it very beneficial. Thanks Mpirical!



Watch our course intro video.



GPRS and EDGE Air Interface

Course Description

This course builds on the GSM and GPRS System Engineering course and thereby focuses on the specifics associated with the air interface when supporting packet data transfer. This includes detailed analysis of the logical channels, multiframes and protocols before explaining packet data procedures from a radio perspective. EDGE and Evolved EDGE is also discussed in terms of their associated enhancements and feature sets. Finally, the course evaluates the enhancements that have been made to support IoT applications through the introduction of EC-GSM-IoT.

Prerequisites: GSM and GPRS System Engineering would be advantageous.

6

Hours learning
(OnlineAnytime)

6

CPD Learning Credits



Level: 3
(Advanced)

This course will contain the following sections:

1. The GPRS Air Interface

Topic areas covered include:

- Frequency Allocations:
 - GSM900, GSM1800, GSM1900 and GSM850.
- Frequency Reuse.
- Cell Sectorization.
- Air Interface Physical Layer:
 - GMSK.
 - TDMA.
 - Radio, Physical and Logical Channels.
- 52 Frame Multiframe:
 - PDTCH, PACCH, PTCCH, Idle.
- 51 Frame Multiframe:
 - FCH, SCH, BCCH, CCCH, RACH.
- Burst Structures:
 - Frequency Correction, Synchronization, Access, Normal, Dummy (GMSK and 8PSK).
 - Logical Channels to Burst Format Mapping.

2. GPRS Air Interface Protocols

Topic areas covered include:

- SNDCP (Sub Network Dependent Convergence Protocol):
 - Service Primitives.
 - Service Functions.
 - Frame Structure.

GPRS Air Interface Protocols (cont.)

- Logical Link Control:
 - Frame Structure.
 - Logical Link Entity.
 - Multiplex Procedure.
 - LLC Operation.
- Radio Link Control:
 - TBF (Temporary Block Flow).
 - Downlink RLC Data Block.
 - Uplink RLC Data Block.
 - Downlink RLC Control Block.
 - Uplink RLC Control Block.
- Medium Access Control:
 - Downlink MAC Data Block.
 - Uplink MAC Data Block.
 - Downlink MAC Control Block.
 - Uplink MAC Control Block.
- Channel Coding:
 - USF Pre Codes.
 - Coding Schemes – CS1 > CS4.
 - Interleaving.

3. GPRS Air Interface Procedures

Topic areas covered include:

- GPRS Mobility Management States:
 - Idle State.
 - Standby State.
 - Ready State.

6

**CPD Learning
Credits**



**Watch a Sample
Video Online**



OnlineAnytime

GPRS Air Interface Procedures (cont.)

- GPRS Attach:
 - Packet Channel Request:
 - One / Two Phase Access.
 - Contention Resolution.
 - The Attach Process.
- Channel Control:
 - Timing Advance:
 - Initial Timing Advance Estimation.
 - Timing Advance Maintenance.
 - Power Control:
 - Open Loop Power Control.
 - Closed Loop Power Control.
- Uplink Data Transfer.
- Downlink Data Transfer.

4. EDGE

Topic areas covered include:

- EDGE Fundamentals:
 - EDGE Classic.
 - EDGE Compact.
- Key Changes to the GPRS Air Interface:
 - Modulation.
 - Modulation Coding Schemes – MCS1 > MCS9.
 - Modulation Coding Scheme Families.
- EDGE Enhancements:
 - Packet Handling.
 - RLC / MAC Improvements.
 - Interleaving.
 - Link Adaptation.
 - Incremental Redundancy.
 - EGPRS Capabilities:
 - Device Capabilities.
 - Cell Capabilities.
- EGPRS RLC / MAC Formatting:
 - EGPRS Downlink RLC / MAC Header.
 - EGPRS Uplink RLC / MAC Header.

5. Evolved EDGE

Topic areas covered include:

- Evolved EDGE Feature Set.

Evolved EDGE (cont.)

- Latency Reduction:
 - FANR and PAN.
 - Reduced Transmission Time Interval.
- Downlink Dual Carrier:
 - Downlink Dual Carrier with Dual Transfer Mode.
- Higher Order Modulation:
 - 16QAM, 32QAM.
- Increased Symbol Rate.
- RLC / MAC Modifications:
 - Downlink EGPRS2-A Modulation and Coding Schemes.
 - Uplink EGPRS2-A Modulation and Coding Schemes.
 - Downlink EGPRS2-B Modulation and Coding Schemes.
 - Uplink EGPRS2-B Modulation and Coding Schemes.
 - RLC / MAC Header Formats.

6. EC-GSM-IoT

Topic areas covered include:

- Fundamentals of EC-GSM-IoT.
- EC-GSM-IoT Air Interface:
 - Extended Coverage and Coverage Classes.
 - Logical Channels:
 - EC-CCCH, EC-BCCH, EC-PTCH.
 - Modulation and Coding Schemes.
 - Radio Link Control and Medium Access Control:
 - RLC / MAC Data Blocks.
 - RLC / MAC Control Blocks.
 - Overlaid CDMA.
- EC-GSM-IoT Operation:
 - Initial Procedures:
 - C1_EC, C1_GC.
 - Cell Selection.
 - Cell Reselection.
 - Coverage Class Selection.
 - Packet Transfer:
 - Mobile Originated Packet Transfer.
 - Mobile Terminated Packet Transfer.
 - Security Enhancements.
- Power Efficient Operation:
 - Power Save Mode.
 - Extended Discontinuous Reception.



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