

Introduction to GSM Systems

21 - 24 March 2016
Kingston, Jamaica



COMMONWEALTH
TELECOMMUNICATIONS
ORGANISATION



Overview

Participants will learn the reasons for and consequences of development towards mobile computing. The necessary enhancements of IP are explained thoroughly. The information presented about routing and registration for mobile users and the security issues that are emerging will enable the participants to understand Mobile IP in the protocol versions - Mobile IPv4 and 6.

For more information:
about this course, or to register,
contact us on:
Tel: **+44 (0) 208 600 3808**
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Objectives

The objectives of the course is to achieve the following learning Outcomes

- Understand basic concepts related to GSM networks
- Understand GSM network architecture and its components
- Understand GSM base station subsystem signalling
- Appreciate the history of wireless telecommunications focused on the evolution of GSM
- Gain knowledge of GSM mobility management concepts
- Understand GSM radio resource management concepts
- Aware of different types of calls and service aspects
- Introduce GSM standards and related organizations
- Understand migration to GPRS, EDGE and Nokia 3G Technologies

Target Audience

This course is primarily designed for those wanting a good understanding of GSM technology. Engineers and managers who support and make decisions related to GSM technology will find this course very useful.

This course is very useful for those working in areas related to various telecommunication operations such as field engineering, project and management, optimisation, network planning and operations.

Although the course is designed for those who already know basics of telecommunications, non technical staff members who have a good background on telecommunications, will benefit from the course. The course is also well suited to engineers and other staff members working in regulatory functions since it gives a good overview of skills required for developing regulatory and policy framework for GSM related activities. The course will cover broad range of topics related to GSM technology. Hence the delegates have an opportunity to get a complete overview of the GSM technology.

Course Outline

Review of radio communications

- Transmitter, propagation channel, receiver
- Radio propagation review
- Duplex and Multiple Access
- Link budgets
- Multipath propagation
- Frequency Selectivity
- Mobile channels: Doppler and Time selectivity

Digital Communications Review

- Review Shannon's information theory
- Capacity, bandwidth, SNR trade-offs
- Signal (Speech) Compression
- Error control coding
- Digital Modulation

Cellular radio concepts

- Frequency Re-use
- Co-channel Interference
- Propagation environments – rural, semi-rural, urban
- Propagation slope and radio planning
- Macro – micro – pico - indoor cells
- Cell splitting
- Other techniques:
 - Power control
 - Adaptive time advance
 - Frequency hopping
 - Discontinuous transmission/reception

GSM Network

- GSM History
- GSM Network Elements
 - Mobile Station
 - Base station subsystem
 - Network Switching Subsystem
- MS – BTS : Air Interface
- BTS – BSC : A-bis interface
- Core Network Signalling Protocols

Mobile network design and optimisation

- Review – radio propagation
- iReview – Traffic Theory
- Radio System Planning
 - Configuration Plan
 - Coverage Plan
 - Capacity and Frequency Plan
- Network Evolution
- Network Optimisation
 - Improvement Stages
- Dimensioning
 - Radio System Planning
 - Parameter Optimisation

GPRS, EDGE and 3G

- Review – Wireless Data Applications
- Circuit versus packet switched data on GSM
- Evolution of GSM Data services
 - Circuit switched bearer services: 2.4, 4.8 and 9.6kb/s
 - High Speed Circuit Switched Data
 - GPRS
 - EDGE
- GPRS Network Elements
- Evolution to EDGE
- 3G Networks
 - UMTS (WCDMA), CDMA2000
 - UTRAN
 - 3G Services
 - 3G Evolution

Course trainer

Dr Charles Nche PhD MSc. BSc MIEEE

Dr Charles Nche is currently the Head of Department in the School of Information Technology and Computing (SITC), at the American University of Nigeria (AUN). Charles is experienced in delivering high quality interactive training courses on current and emerging technologies in Telecommunications, including UMTS, 3G, 4G, LTE etc. Prior to joining AUN, Charles has worked as a Principal Engineer for over 17 years for various companies including DisplayLink, Nemerix, BroadCom, Marconi, Mitel (Zarlink), etc. During this period, he has been involved with the design of GPS receiver for Satellite Navigation systems, VOIP, Physical layer protocols including ATM and SDH, Photonic DWDM networks and CCTV for Town centres, Railways and Airports.

Charles Nche area of specialty is in Computer networks and Telecommunications. He earned his PhD in Computer networks from Loughborough University of Technology, Britain. He holds an Electrical and Electronics Engineering degree and a master degree in Digital Communication Systems. His research interest is centred around providing capacity, improving coverage, and increasing the efficiency of the network, using Heterogeneous Network (HETNET) and Device to Device communications (D2D). His other areas of interest include but not limited to High Speed Networks (40GBase-T System); Wireless infrastructures and Networks, and bringing broadband to rural areas, using TV White Space Technology.

He has published research papers in refereed journals and conferences in the areas of High Speed Networks and Multimedia Services.

For more information about registration please contact **Fargani Tambeayuk** at **+44 20 8600 3808** or email **f.tambeayuk@ccto.int**

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Who we are

The CTO is the oldest and largest Commonwealth organisation engaged in multilateral collaboration in the field of ICTs. Using in-house and partner experience, it supports members in integrating ICTs to deliver effective development interventions that emancipate, enrich, equalise and empower people within the Commonwealth and beyond.

What we do

The work of the CTO goes back to the Organisation's creation in 1901 as the Pacific Cable Board. Since then, the CTO has been at the centre of continuous and extensive international communications development funding, cooperation and assistance programmes. Since 1985, the Organisation has delivered to its members in Europe, the Caribbean, the Americas, Africa and Asia-Pacific over 3,760 bilateral and multilateral telecommunications and ICT capacity building projects in the form of policy, operational and regulatory training, and expert assistance. Moreover, the CTO has been at the forefront of generating cutting-edge knowledge through its research and consultancy services, as well as sharing ideas through its conferences and workshops held around the world. This long history as a development facilitator provides the Organisation with a unique and growing delivery capacity for ICT4D programmes and services.

Supporting ICT4D in the Commonwealth

The CTO seeks to work collaboratively with other Commonwealth bodies to build mutually beneficial synergies in the interests of its members. The CTO has a key role to play in leading ICT4D initiatives across the Commonwealth, and it is committed to working together with other Commonwealth entities to reduce overlap and replication of activities. The CTO welcomes the opportunity to offer secretariat support to any Commonwealth ICT initiatives that reflect the needs and interests of its members.