Aspire Academy

Diploma in 3G Mobile Communications Signaling

Course Code :- DL3GSIG-P
Duration :- 20 Weeks*
Technical Level :- Professional

** Exclusive of Optional Step-Up Course*

Training Objectives: - "Diploma in 3G Mobile Communications Signaling" is a professional grade training program for industry professionals & beginners who seek to understand the signaling & call flows in a UMTS mobile communications network. We are offering "*Diploma in 3G Mobile Communication Signaling*" and "*Work Experience Certificate*" in this program. This is highly recommended for beginners and professionals looking for job opportunities in wireless or mobile communications industry.
This program is also suitable for industry professionals who plan to start projects in the UMTS or GSM mobile communications area requiring extensive knowledge of signaling and call flows.

Learning Objectives: - On completion of this program the student will learn:

1. Mobility Management Concepts
2. Call Control Concepts
3. Call flows for basic Mobility Management Procedures
4. Inter-working between Landline and Mobile networks
5. Call flows for M-M, M-L, L-M calls
6. Basic concepts of UMTS Protocols
7. Direct Transfer Application Part (DTAP)
8. Mobile Application Part (MAP)

Pre-Requisites:- B.E, B.E (Final Year), M.C.A, B.C.A, M.E or equivalent

Audience: - Suitable for students, fresh graduates having some knowledge of GSM/UMTS concepts. Also suitable for technical professionals planning to start work requiring extensive knowledge of GSM/UMTS call flows.

Benefits & Key Highlights:-

1. Covering advanced topics directly picked from 3GPP specifications. Students are encouraged to directly refer 3GPP specifications.
2. Detailed information on call-flows like message flows & various parameters of messages are covered in this course.
3. Opportunity to work on an Industry Standard Project *[Optional Module]*
4. Diploma on completion of training program
5. Work experience Certificate on completion of project work
6. Practice interviews with those actually conducting interviews in IT companies
7. Placement guidance & full technical support, even after completion of training

Course Contents: - This training program is divided in three parts; (i) optional step-up course (ii) the main course (iii) optional project work.

The purpose of step-up course is to quickly bring our students to the intermediate level from where they can begin to learn advanced topics covered in the main course. The step-up course covers following topics:

1. GSM Network Architecture
    a. Cellular Architecture
    b. Network Components
    c. GSM Network interfaces
2. Public Land Mobile Network (PLMN)
    a. PLMN Identifier.
    b. Location Area Identifier (LAI)
    c. Cell Global Identifier (CGI)
3. Identification of Mobile Station
    a. IMSI (International Mobile Subscriber Identity)
    b. MSISDN (Mobile Station International ISDN Number)
    c. IMEI (International Mobile Equipment Identity)
    d. TMSI (Temporary Mobile Subscriber Identity)
4. Evolution from GSM to UMTS

5. Advantages of UMTS
6. UMTS Network Architecture
7. UMTS Terrestrial Radio Access Network Architecture (UTRAN)
    a. UTRAN Architecture
    b. UTRAN Connection Management Functions
    c. Radio Network Subsystem (RNS)
    d. Radio Access Bearer (RAB)
    e. Node-B
    f. Radio Network Controller
8. UMTS Core Network
    a. UMTS Core Network Architecture
    b. Home PLMN
    c. Home Location Register (HLR) / Authentication Center (AuC)
    d. Circuit Switched Domain
    e. Mobile Switching Center (MSC)
    f. Visitor Location Register (VLR)
    g. Gateway Mobile Switching Center (GMSC)
9. Simultaneous connection of UMTS CN to GSM BSS and UTRAN

The main course covers following topics:

1. Introduction to UMTS Protocols
    1. User Plane vs Control Plane
    2. Access Stratum vs Non Access Stratum
    3. Access Stratum Signaling Protocols
    4. NAS Signaling Protocols
2. Introduction to Mobile Application Part (MAP)
3. Role of Direct Transfer Application Part (DTAP)
4. Connection Setup between UE & Core Network
5. Initial Transfer of Service Request from UE to Core Network
6. Identity Procedure
7. Check IMEI Procedure
8. Requesting Authentication Information from HLR/AuC
9. Authentication Procedure
10. Security Mode Control Procedure
11. TMSI Reallocation Procedure
12. Insert Subscriber Data Procedure
13. Delete Subscriber Data Procedure
14. Location Update Procedure
15. Paging Procedure
16. Assignment Procedure
17. Concept of Roaming Number
18. Mobile to Mobile Call
    1. Mobile Originating (MO) Call Establishment
    2. Mobile Terminating (MT) Call Establishment
    3. End to End Call flow
19. Mobile to Land Call
    1. MO Call Establishment
    2. Terminating PSTN Call Establishment
    3. End to End Call flow
20. Land to Mobile Call
    1. Originating PSTN Call Establishment
    2. MT Call Establishment
    3. End to End Call flow

Course Material: - This course is covered as following:

1. Classroom white-board sessions & discussions
2. 3GPP specifications given during classroom for further in-depth knowledge of call flows & signaling procedures. Students are encouraged to directly refer to 3GPP specifications
3. Video Conferencing sessions are scheduled for English speaking foreign students
4. Printed technical notes for step-up course
5. White Board sessions recorded in a DVD covering topics for the step-up course

Query Resolution Methods:-

1. Interactive classroom discussions
2. Video conferencing sessions for foreign students
3. Emails
4. Discussion Forum in e-University

Evaluations:

1. Quizzes and Assignments
2. Interviews at regular intervals

Project Work ***[Optional Module]*****:-** In Parallel, you may choose to work on an industry standard project. These projects have been carefully picked based on current technology focus of telecom companies. On completion of this program, you would get a work experience certificate from our parent company.

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Benefits of Project Work:-

1. Adds great value to your CV.
2. Helps you in applying for jobs that require experience.
3. With experience and a good industry standard project in your CV, you can expect far more interview calls.
4. Makes you familiar with software development & design procedures used for telecom & mobile communications industry.
5. Helps you in understanding professional methods of software development

Projects Offered at Aspire Academy:-

1. **BSSMAP Library –** BSSMAP messages carry signaling over GSM A-Interface or between BSC and MSC. This library would be focused on implementing BSSMAP message dissectors and encoders.

2. **DTAP Mobility Management Library** – DTAP MM Library is focused on DTAP MM message encoders & dissectors. These messages form the backbone of Mobility Management procedures executed between GSM/UMTS Terminal & GSM/UMTS network.

3. **DTAP Call Control Library** – DTAP CC Library is focused on DTAP CC messages encoders & dissectors. These messages form the backbone of Call Control procedures executed between GSM/UMTS Terminal & GSM/UMTS network. These messages play important role in mobile call setup.

4. **BSSMAP Location Services Extension Library -** Location Services are being implemented by every mobile network operator for generation of higher revenues. These services are customizable based on the location of the mobile subscribers.

5. **Security Architecture of 3G Networks** - The security architecture of 3G/UMTS networks.

Project Duration: - Expected duration for project work is *20 Weeks*. Project Work would be scheduled in parallel with study.

Main Course Fee:-

1. Rs. 12000 for Indian Students (including postal charges)
2. $1000 for Non-Resident (Foreign) Students (excluding postal charges)

Step-Up Course Fee:-

1. Rs. 3000 for Indian Students (including postal charges)
2. $350 for Non-Resident (Foreign) Students (excluding postal charges)

Project Fee:-

1. Rs. 8000 for Indian Students
2. $ 500 for Non-Resident (Foreign) Students