



2008/05/31

### *Objective:*

The objective of the ZTE-UET telecommunication centre is to create a workforce trained in key telecommunication technologies.

### *Resources:*

In August 2005, a branch of ZTE University in China was established in Islamabad, Pakistan, to provide quality management and technical trainings to the general public. In order to meet these goals the ZTE-UET Telecommunication Centre was established at UET Lahore, one of the premier engineering institutions in the country, in June 2007, and was inaugurated by the then Governor of Punjab, Lt. General (Retired) Khalid Maqbool. The centre is housed on the top floor in the Department of Electrical Engineering. The telecommunication equipment worth approximately Rs 200 million has been donated by ZTE China to the University.

The centre has three state-of-the-art teaching laboratories and one classroom – all are equipped with the latest audio-visual aids and computing facilities. The teaching laboratories provide hands-on training (a) in Fixed network (MSAN, DSLAM and SDH) and (b) on Wireless (GSM and WCDMA) technologies.

Besides the laboratories and classroom the centre also has space for a conference room, offices and a dining area. All the training sessions are conducted by instructors who have been extensively trained at ZTE University in China and go back there regularly for refresher courses.



### *Director ZTE-UET Telecommunication Center:*

The responsibility of the director is to develop strategies, in consultation with ZTE University, Islamabad, to meet the objectives.

The centre is first of its kind in the country wherein a multinational company (ZTE, China) and a leading educational institution (UET, Lahore) are collaborating to meet the goals. Towards this end the centre has initiated measures to impart training on regular basis. The centre offers certificate courses, at a nominal price, to those who are going to be using ZTE equipment at their workplace. The students (from UET and other institutions), however, are allowed to attend these courses at a subsidized price. Moreover, the faculty is also being trained (in China) on a priority basis so that they are then able to lead courses in the centre thus reducing our dependence on instructors employed by ZTE.

If you have any questions regarding the fee structure or the schedule of trainings then please contact Asim Loan at (042)-902-9130 or send him an email at [aloan@uet.edu.pk](mailto:aloan@uet.edu.pk).

### *Training COURSES:*

The ZTE-UET telecommunication centre offers certified training courses in both the:

- (a) Fixed and
- (b) Wireless technologies.



### *Fixed Access Network:*

By using a Multiple Service Access Network (MSAN) system it is possible to provide a number of services in which a subscriber can use a single twisted pair wire to access voice and any other broadband service such as Asymmetric Digital Subscriber Line (ADSL) with higher data rate. The operator can use the same infrastructure to provide multiple services with less operational cost and with almost no limitation on distance.

Digital Subscriber Line Access Multiplexer (DSLAM) is a major broadband access technology. The first generation DSLAM is based on Asynchronous Transfer Mode (ATM) and the second generation DSLAM is characterized by IP. Both of them can be used in different networks and applications. As the operators are transforming themselves – transitioning their legacy networks to Next Generation Networks (NGN) – a third generation DSLAM the NG DSLAM is now also available.

The Synchronous Digital Hierarchy (SDH) defines the frame structure, multiplexing mode, transmission rate and interface code pattern. It provides a framework in which flexible, reliable and easy to manage transmission networks can be developed and built. Such easy to expand transmission networks are most suitable for launching new telecom services and makes inter-working between equipments of different manufacturers possible. SDH based multi-service node equipment of ZTE provides all applications at the: (a) core layer, (b) convergence layer and (c) access layer, and also provides users with future-oriented integrated Metropolitan Area Network (MAN) solutions. At the centre we have the following SDH equipment: ZXMP S390, ZXMP S385, ZXMP S380, ZXMP S330,



ZXMP S325, ZXMP S320, ZXMP S310, ZXMP S200, and ZXMP S100.

The training duration is ten days. More than three fourths of the time will be spent on lecturing and the rest on demonstration. More details are available in a later section.

The main objectives of this training course are to:

Master the detail knowledge of:

- (a) Access network and
- (b) Frame structure used in SDH.

Understand the:

- (a) Different network architectures,
- (b) Network diagram with real network problems and
- (c) Usage of ring topology in transmission and various security mechanisms.

### *Wireless - GSM Technology*

ZTE GSM BSS products have been successfully deployed in about 40 countries and are being used by approximately 55 operators with a total capacity of 400 million lines. ZTE is China's largest telecommunication equipment exporter and one of the leading vendors of GSM equipment in the world. ZTE-UET telecommunication centre offers GSM certification in the following areas: (a) Planning and Optimization (P & O) and (b) Base Station Subsystem (BSS). ZTE has introduced more than ten different types of Base Transceiver Stations (BTS) that have simplified operation and have reduced the cost. The one we have in the centre is ZXG10-iBSC. The training duration varies from five to ten days. More than three-fourths of the time will be spent on lecturing and the remaining on demonstration. More details are available in a later section.



The main objectives of this training course are to:

- Master the detail knowledge of: (a) GSM network planning such as antenna system, link budget, capacity theory and (b) GSM theory such as channel structure, radio parameters and call process.
- Understand the: detail knowledge of GSM network optimization such as optimization process, signal tracing, optimization methods, optimization tools, the configuration parameters and their significance.

### *Wireless – WCDMA Technology:*

ZTE GSM BSS products have been successfully deployed in about 60 countries and is being used by approximately 100 operators with a total capacity of 30 million lines. ZTE is China's largest telecommunication equipment exporter and one of the leading vendors of CDMA equipment in the world. ZTE-UET telecommunication centre offers CDMA certification in the following areas: (a) Planning and Optimization (P & O), (b) Base Station Subsystem (BSS) and (c) 3G-core network. ZTE has introduced more than ten different types of Base Transceiver Stations (BTS) that have simplified operation and have reduced the cost. The training duration for each session is ten days. More than three-fourths of the time will be spent on lecturing and the remaining on demonstration. More details are available in a later section.



The main objectives of this training course are to:

- Master the detail knowledge of: (a) CDMA network planning such as link budget, capacity theory, selection of propagation model, (b) CDMA theory such as channel structure, radio parameters, call process and (c) 3G CDMA core network such as signaling flow, hardware structure of MGW/MSC, SS7 and digit analysis.
- Understand the: detail knowledge of CDMA network optimization such as optimization process, signal tracing, optimization methods, optimization tools, the configuration parameters and their significance.



### *Details of Courses:*

The breakdown of individual training sessions is given in the tables below:

<b>Day</b>	<b>DSLAM Training Module</b>
1	Introduction to the Broadband Access and DSL Principle
2	ATM Basics and TCP/IP Basics
3	VLAN and PVLAN
4	STP and Trunking Introduction
5	FSAP System Structure and Introduction
6	FSAP 9800 Configuration
7	NMS Introduction / Network Structure of DSLAM
8	CP Modem Introduction and Configuration
9	FSAP 9800 Physical Practice
10	Troubleshooting, Review and Exam

<b>Day</b>	<b>SDH Training Module</b>
1	SDH Overview and Frame Structure
2	Multiplexing and Demultiplexing Structure
3	Overhead Bytes
4	Self-healing Theory and Self-healing Network Application
5	ZXMP Sx Equipment System, Structure and Card Functions
6	ZTE NMS E300 Introduction and Element Initialization
7	Offline Practical System Configuration and Self-healing Network
8	MSTP EOS, SEC Card and SFE Card
9	Maintenance and Troubleshooting
10	Review and Exam



<b>Day</b>	<b>GSM Network Planning &amp; Optimization Training Module</b>
1	Basic Knowledge of Mobile Communications
2	GSM Key Technology / Signaling
3	Frequency and Capacity Planning
4	Radio Network Planning
5	Radio Parameters (Optimization)
6	Radio Parameters (Optimization) – Continued
7	Antenna and Feeder Cable System
8	Network Identities, Call Process and Location Update
9	Traffic Statistic Analysis (Optimization)
10	Drive Test Simulation (TEMS 7.1), Handover, Power Control, Theory and Practical Exams

<b>Day</b>	<b>GSM BSS Training Module</b>
1	Basic Knowledge of Mobile Communications
2	GSM Key Technology / Signaling
3	System Architecture of ZXG10-BSC V2
4	System Structure of ZXG10-BTS V2 / iBSC Hardware Structure of V3
5	iBSC Signaling V3
6	Network Identities, Call Process and Location Update
7	BSS Data Configuration
8	Performance and Alarm Management
9	Radio Parameters
10	Radio Parameters (Continued), Theory and Practical Exams

<b>Day</b>	<b>CDMA Network Planning &amp; Optimization Training Module</b>
1	CDMA Wireless Network Planning Process
2	RF Environment Introduction and Propagation Model
3	CDMA Link Budget
4	Capacity (basic concepts) and Capacity Theory
5	PN Planning and Neighbor List Setting
6	Site Survey and Practice
7	Wireless Network Optimization Process and Wireless Network Evolution
8	CDMA Signaling Trace
9	Handoff Optimization
10	Drop Call Optimization, Review and Exam

<b>Day</b>	<b>CDMA BSS Training Module</b>
1	CDMA Overview and Basic Principles
2	CDMA Channel Structure
3	CDMA Key Technology
4	Hardware Structure of ZXC10-BSCB
5	Hardware Structure of ZXC10-BTSB
6	OMC-R Demonstration
7	1x Voice Configuration
8	1x Data Configuration
9	Integrated Practice
10	Capacity Calculation, Review and Exam

<b>Day</b>	<b>3G-Core Network Training Module</b>
1	Data Communication Basic Knowledge
2	Evolution and Development of 3G Core Network
3	Universal Hardware Platform of 3G Core Network
4	System Structure of MGW and MSCe
5	Number 7 Signaling System (SS7)
6	MAP Flow
7	Media Gateway Configuration
8	Soft Switch Configuration
9	GT and DAS Analysis
10	Integrated Practice, Review and Exam