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| **Part II Telephony (45 Hours)** |

***Objectives***

At the end of this course, the student will be able to:

* Describe a telephone exchange.
* Describe the telephone service.
* Examine and interpret a telephone station.
* Dimension a server.
* Explain the cellular telephone concepts.

***Teaching Methodology***

* Explain simply the general role of the telephone, and especially that of the local network system.
* Introduce the main components of the telephone system.
* Show the bloc-diagram of a telephone exchange.
* Show the control and connection units and explain their operations.
* Beginning by the local loop and continuing by the signals and signalizing, explain in details the sequence of operation of a local call then across a local telephone exchange (use an illustrations and real examples).
* With the help of illustrate a schematics and a real set, describe in details various kinds of telephone stations with their components.
* Represent on a chart, a private telephone exchange; describe the traffic and give an idea about the dimensioning of a server without entering in details.
* Introduce the cellular telephone, describe it and give an idea about the mobile system BTS (details of technology not required).

***Teaching aids***

* Overhead projector or power point on white board or active board with accessories.
* A notebook.
* A technical manual (Book or sheets).
* A multi-media computer (if possible).
* Technical information documentaries (movies).
* Telephones for demonstrations.
* Library access (guided if possible).

***Evaluation***

The student will be evaluated according to his capacity to:

* Describe the telephone system.
* Explain the telephone transmission signals.
* Draw the bloc-diagram of a telephone exchange.
* Describe the control and connecting units.
* Describe the telephone service.
* Examine a telephone station.
* Describe a private telephone exchange.
* Describe the cellular system.

***Content***

Chapter 1 Introduction

Chapter 2 The telephone exchange

Chapter 3 The auto switch (PBX)

Chapter 4 The Traffic: dimensioning a server

Chapter 5 Transmission of telephone signals

Chapter 6 The Cellular network

**Chapter 1: Introduction (4h)**

1. Role and objective.
2. Interconnection network.

1.3. Director plans of architecture.

**Chapter 2: The telephone exchange (10h)**

2.1. General architecture.

2.2. Comparison between the transmission and reception signals in analog and digital telephony.

2.3. The block diagram of the digital telephony apparatus, role of each block.

2.4. The block diagram of the microphone-earphone, role of each block.

2.5. The block diagram of the speakerphone circuit, role of each block.

2.5. The block diagram of the alarm circuit, role of each block.

2.6. The keywords.

**Chapter 3**: **The Auto switch (PBX) (4h)**

3.1. Introduction.

3.2. Connection function.

3.3. Signaling function.

3.4. Command function.

**Chapter 4: The Traffic: dimensioning** **a server (4h)**

4.1. Definition of the traffic.

4.2. Mathematical model.

4.3. System have lost calls.

4.4. System have waiting delays.

**Chapter 5: Transmission of telephone signals (7h)**

5.1. Elaboration of the digital telephone.

5.2. The PCM with 30 channels.

5.3. Space connection.

5.4. Temporal connection.

**Chapter 6 : Cellular network (16h)**

6.1. Introduction.

6.2. Cellular concepts.

6.3. The MS terminal and SIM card.

6.4. Canonical Architecture.

6.5. Technical dimensioning of the network.

6.6. Radio resource management.

6.7. Four generations:

-Definitions of four technologies 1G, 2G, 3G and 4G.

-Characteristics and speed of transmission for each technology (Comparative table).

-Utility (High bit rate internet, video conference).

-Advantages and disadvantages of the four technologies.