

GOVERNMENT OF THE PUNJAB
TECHNICAL EDUCATION & VOCATIONAL
TRAINING AUTHORITY



CURRICULUM FOR
TELECOM TECHNICIAN (LINE & MOBILE)
(3 – Month Course)

CURRICULUM SECTION
ACADEMICS DEPARTMENT

96-H, GULBERG-II, LAHORE

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TRAINING OBJECTIVE.

This is an age of communication and the older methods as communication are becoming obsolete and newer & modern ones are continuously replacing them. One of such a modern of communiqué is mobile communication. It has now become a necessity & has been enthusiastically adopted by the people throughout the world. The modern mass cannot think of life without this facility to connect with his family and friends at any place at any time.

As a sequel of time a necessity, it is absorbing more people into it than any other field of life these days, keeping in view this fact, it is felt imperative to introduce some courses about communication.

Repairing of mobiles and maintaining telecom equipment are such courses being introduced to produce semi skilled manpower to carry out repairs of the mobiles and household telecom equipment to meet the job market.

CURRICULUM SALIENTS.

Entry-level	:	Matric
Duration of course	:	03- Months
Total Training Hours	:	400 Hours
	:	40 Hours per Week
	:	6 Days per week
	:	7 Hours per day (Friday 5 hrs.)
Training Methodology	:	Practical. 85%
	:	Theory 15%
Medium of Instruction	:	Urdu / English

SKILL PROFICIENCY DETAILS:

On successful completion of this course, the trainee should be able to:-

1. Work according to general workshop rules & regulations.
2. Use the measuring instruments safely.
3. Operate the instruments like microscope, hot air gun & **soldering station etc.**
4. Read the block diagram of mobile sets.
5. Troubleshoot the different mobile sets.
6. Handle power supply, UPS, Stabilizer etc.
7. Lay, Test, Joint of cable system
8. Install / repair of telephone sets.
9. Use the relevant test equipments.
10. Install and troubleshoot PABX.

KNOWLEDGE PROFICIENCY DETAILS:

On successful completion of this course, the trainee should be able to:-

1. Explain the safety precautions & safety practices.
2. Explain the communication system.
3. Describe the basic information about computer applications
4. Describe the wireless standards.
5. Define the information about multiple access & GSM.
6. Define the troubleshooting of mobile and telecom, hardware & software.
7. Explain the function & parts of telephone sets, PABX and line.

SCHEME OF STUDIES
Telecom Technician (Line & Mobile)
 (3–Month Course)

Sr. No.	Subjects	Theory Hrs.	Practical Hrs.	Total Hrs.
1.	Electronics	16	86	102
2.	Cable	1	9	10
3.	PABX	1	6	7
4.	Communication System	5	25	30
5.	Computer Software Application	6	29	35
6.	Fundamentals of Mobile Telephony	8	20	28
7.	Basic Network Overview	2	6	8
8.	Repair Methodology	2	12	14
9.	Testing Method with Instruments	2	22	24
10.	Trouble Shooting	8	82	90
11.	Functional English	20	20	40
12.	Work Ethics	-	12	12
Total		71	329	400

DETAIL OF COURSE CONTENTS
Telecom Technician (Line & Mobile)
 (3 - Month Course)

Sr. No.	Detail of Topics	Theory Hours	Practical Hours
1	Electronics		
	1.1. Introduction	1	3
	1.1.1. Introduction & Application of electricity & electronics		
	1.1.2. Safety rules & quantity of electrical and electronics		
	1.1.3. Symbols for Electronics Components		
	1.2. Measuring Instruments	1	5
	1.2.1. Introduction Safety for measuring tools and equipments		
	1.2.2. Function Generators, Pattern generator, Signal Generator AF/RF		
	1.2.3. Multi-meter.(Analogue) & Multi-meter.(Digital)		
	1.2.4. Oscilloscope		
	1.3. Atom Conductor & Insulator	1	2
	1.3.1. Atomic structure Charge of proton, neutron, electrons Similar, dissimilar charges & Flow of electrons (current)		
	1.3.2. Generation of EMF (voltage) Definition of Conductivity, Definition of Conductor & Insulator Types of conductor & insulator		
	1.4. Resistance	1	2
	1.4.1. Definition of resistance, Resistance dependent material and unit		
	1.4.2. Color coding and de-coding of resistance		

	(basic & advance) & Types of resistance		
1.5.	OHMS LAW	$\frac{1}{2}$	3
	1.5.1. Ohms law (relation between I & V when R is constant)		
	1.5.2. Ohms law relation between I & V when R is variable)		
	1.5.3. Electrical Power		
1.6.	Series and Parallel Circuits	$\frac{1}{2}$	4
	1.6.1. Resistors in series and Parallel circuit		
	1.6.2. Current in series and Parallel circuit		
1.7.	Capacitors	$\frac{1}{2}$	4
	1.7.1. The capacitors & Types of capacitors		
	1.7.2. Capacitors in D.C.& AC circuits		
1.8.	Inductors	$\frac{1}{2}$	4
	1.8.1. The inductors ,Types of inductors & Inductors in Series & Parallel		
	1.8.2. Inductors in AC & DC circuits		
1.9.	Batteries	1	5
	1.9.1. The voltaic & Carbon-zinc dry cell		
	1.9.2. Alkaline Cell, lithium Cell, Lead-acid wet Cell		
	1.9.3. Additional types of primary & secondary cells		
1.10.	Electricity & Magnetism	$\frac{1}{2}$	4
	1.10.1. The magnetic field		
	1.10.2. Electromagnetism & Electromagnetic induction		
1.11.	Transformers	$\frac{1}{2}$	4
	1.11.1. The basic principal of transformers		
	1.11.2. Types of transformers		
1.12.	Semiconductor Devices	1	3

1.12.1. Conduction in semiconductor material		
1.12.2. N type & P type semiconductors PN junction		
1.12.3. Biasing the diode, Diode characteristics		
1.13. Diodes & Their Applications	½	2
1.13.1. Half-wave rectifier , Full-Wave rectifier & Rectifier filters		
1.13.2. Zener diode, L.E.D & Varactor Diode		
1.14. Bipolar Transistor	1	6
1.14.1. Basic principle & Transistor biasing		
1.14.2. Current, voltage Gain		
1.14.3. Transistor as Amplifier & as Switch		
1.15. Field Effect Transistors	1	5
1.15.1. Construction of JFET		
1.15.2. N channel , p channel & Types of FET		
1.15.3. MOS FET		
1.16. Integrated circuits	1	4
1.16.1. Construction of I.C		
1.16.2. Types of ICs		
1.16.3. Level of Integration		
1.17. Operational Amplifier	1	6
1.17.1. The differential Amplifier		
1.17.2. Operational amp as Inverting & Non-Inverting Amplifier		
1.17.3. Applications of op Amplifier		
1.18. Electronic Timer	½	4
1.18.1. Construction of timer 555		
1.18.2. Applications		
1.19. Regulated power supply	1	6
1.19.1. Transistorized regulated power supply(fixed) & (adjust able)		

	1.19.2. Integrated Regulators 1.20. Digital Electronics 1.20.1. Introduction 1.20.2. Basic functions of logic operation 1.20.3. AND, OR, & NOT operation 1.20.4. NAND , NOR & Exclusive OR Operation	1	10
2	Cable 2.1. Introduction & Tyes of Cables 2.2. Selection of proper cable 2.3. Cable Connectors and their tyes	1	9
3	PABX 3.1. Introduction of Exchanges (PABX) 3.2. Block diagram of Exchanges (PABX) 3.3. Trunk and local number & loop side	1	6
4	Communication System 4.1. Radio Transmitter 4.1.1. Block Diagram of radio transmitter (AM/FM) 4.1.2. Signal Transmission 4.2. Radio Receiver 4.2.1. Block diagram of S.H. Radio Receiver(AM) 4.2.2. Principle of Heterodyning Action 4.3. Modulation 4.3.1. Introduction 4.3.2. Fundamental of AM Modulator 4.3.3. Fundamental of FM Modulation 4.4. Sampling and Pulse code Modulation 4.4.1. Sampling 4.4.2. Pulse code Modulation (PCM)	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	3 3 5 7

	<p>4.4.3. Differential Pulse code Modulation (DPCM)</p> <p>4.4.4. Delta Modulation</p> <p>4.5. Introduction to Wireless Communication System</p> <p>4.5.1. Abbreviations of Communication Systems</p> <p>4.5.2. Mobil Radio system Around the world</p> <p>4.5.3. Examples of wireless Communication System</p> <p>4.5.4. Paging</p> <p>4.5.5. Cordless Telephone system</p> <p>4.5.6. Cellular Telephone System</p> <p>4.5.7. Comparison of Common Wireless Communication Systems</p>	2	7
5	Computer Software Applications		
	<p>5.1. Introduction to Computers</p> <p>5.1.1. What is Computer</p> <p>5.1.2. Hardware & Software</p> <p>5.1.3. Computer Storage Devices</p> <p>5.1.4. In put Devices Output Devices</p>	1	4
	<p>5.2. Microsoft Windows</p> <p>5.2.1. Introduction to Windows 98/2000 & XP</p> <p>5.2.2. Getting Started with new desktop</p> <p>5.2.3. Working with windows application / Programs</p> <p>5.2.4. Files, Folders, Short Cuts (Windows Explorer)</p> <p>5.2.5. Using Windows Applications, Using scandisk & Recycle bin</p> <p>5.2.6. View Hardware Information /Printer</p>	1	6

	<p style="text-align: center;">Setup</p> <p>5.3. Microsoft Word</p> <p>5.3.1. Introduction to Word 2000 / XP</p> <p>5.3.2. The Menu Bar and commands</p> <p>5.3.3. Use of Ruler, Entering Text, Undo & Redo and Saving documents</p> <p>5.3.4. Opening files in word 2000 / XP and Coping documents in Word 2000 / XP</p> <p>5.3.5. Word's window Menu, Correcting Mistakes & Formatting Text, Page Setup Printing Tool and Background Printing</p> <p>5.3.6. Inserting Page Breaks, Insert a picture from the clip Gallery, Inserting another word document into an open document</p> <p>5.3.7. Overview of tables</p> <p>5.4. Internet & Electronic Mail</p> <p>5.4.1. Introduction to WWW</p> <p>5.4.2. Internet Service Provider</p> <p>5.4.3. Internet Explorer. Netscape</p> <p>5.4.4. A Specific Web Select a Link</p> <p>5.4.5. Search a Web</p> <p>5.4.6. Introduction to E-mail, Create a message Send and Receive E-Mail</p>	2	7
		2	12
6	<p>Fundamentals of Mobile Telephony</p> <p>6.1. Introduction to Wireless Communication System</p> <p>6.1.1. Abbreviations of Communication Systems</p> <p>6.1.2. Mobil Radio system Around the world</p> <p>6.1.3. Examples of wireless Communication System</p>	2	6

	6.1.4. Paging 6.1.5. Cordless Telephone system 6.1.6. Cellular Telephone System 6.1.7. Comparison of Common Wireless 6.1.8. Communication Systems 6.2. Wireless System and Standards 6.2.1. Duple Xing Techniques 6.2.2. Introduction to Duple Xing Technique 6.2.3. Frequency Division Duple Xing (FDD) 6.2.4. Time Division Duple Xing (TDD) 6.3. Multiple Access 6.3.1. Introduction to Multiple Access 6.3.2. Frequency Division Multiple Access (FDMA) 6.3.3. Time Division Multiple Access (TDMA) 6.3.4. Code Division Multiple Access (CDMA) 6.3.5. Advance Mobile Phones Service(AMPS) and European Total Access 6.3.6. Communication System (ETACS) Overview 6.4. Global System for Mobile (GSM) 6.4.1. GSM History, GSM Specifications & GSM Band Spectrum 6.4.2. GSM Benefits 6.4.3. Growth in Wireless Data 6.4.4. Mobile Data Technology Evolution 6.4.5. GPRS (General Packet Radio Services)	2	4
		2	5
		2	5
7	Basic Network Overview 7.1. Traffic/signaling, Network overview 7.2. SIM-Card , mobile Equipment & SIM-Card Function	2	6

	<p>7.3. Mobile Identification and Trends in mobile Station</p> <p>7.4. Tele services, Supplementary Services & Intelligent Net work Services</p> <p>7.5. Cellular Principles ,GSM Radio Subsystem & GSM Channel Types</p> <p>7.6. Functions and Protocols</p>		
8	<p>Repair Methodology</p> <p>8.1. Instruction to repair system for mobile phones hand set</p> <p>8.2. Fault diagnoses procedure</p> <p>8.3. Block diagram of mobile phones Nokia series</p> <p>8.4. Block diagram of mobile phones Sony – Erricson series</p> <p>8.5. Block diagram of mobile phones Samsung series</p>	2	12
9	<p>Testing Method with Instruments</p> <p>9.1. How to operate the Microscope</p> <p>9.2. How to operate the Hot air gun, Soldering station and Rework station</p> <p>9.3. How to operate the Soldering Lead ,Soldering Paste & De-Soldering wire</p> <p>9.4. Demonstration to Replace SMD, Exchange SMD Components</p> <p>9.5. Repairing steps & Repairing tips</p>	2	22
10	<p>Trouble shooting</p> <p>10.1. Introduction</p> <p>10.1.1. How to unzip & zip Telephone Receiver</p> <p>10.1.2. How to unzip & zip Wire less Receiver Telephone and base station</p>	2	25

	<p>10.1.3. How to unzip & zip Mobile Phone Receiver</p> <p>10.1.4. How to Replace the Microphone</p> <p>10.1.5. How to Replace the Antenna, Speaker and Vibrator</p> <p>10.1.6. How to Replace the Changing Pin, battery terminal, Filter cap & Charging IC</p> <p>10.1.7. How to Replace the display & Transmitter</p> <p>10.2. Troubleshooting of Software Problems</p> <p>10.2.1. Introduction of Software problem of a Handset</p> <p>10.2.2. Introduction of requirements (Basic Knowledge)</p> <p>10.2.3. How to identify the software problem of different models of handsets</p> <p>10.2.4. What is the cause of this problem</p> <p>10.2.5. What is the effect of this problem</p> <p>10.2.6. Cleaning Brush(Skills and Techniques)</p> <p>10.2.7. Demonstration ,Repairing Steps & Repairing Tips</p> <p>10.2.8. How to use the appropriate equipment and software for troubleshooting</p> <p>10.3. Repairing IMEI, Unlock SP Lock and Upgradation of Software Version of handset</p> <p>10.3.1. Introduction of the requirements(Basic Knowledge)</p> <p>10.3.2. What is IMEI</p> <p>10.3.3. What is Phone Lock</p> <p>10.3.4. What is SIM Lock</p>	<p>3</p> <p>3</p>	<p>25</p> <p>32</p>
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	10.3.5. What is the requirements to do handset upgrade 10.3.6. Tools and equipment 10.3.7. Introduction of the related equipment and software to do the job 10.3.8. Skills and techniques 10.3.9. Demonstration ,Repairing Steps & Repairing Tips		
11	Functional English	20	20
12	Work Ethics		12
TOTAL		71	329

LIST OF TOOLS / EQUIPMENT / LAB. OR WORKSHOP
(For The Class Of 25 Students)

Name of Course	Telecom Technician
Duration of Course	3 – Month Course

Sr. No.	Nomenclature of Equipment / Tools	<u>Quantity</u>
1.	Multi-meters	Five
2.	Cables (Multi wires / Extension wires)	Assorted
3.	PCxx486 OR Higher with Monitor, Key Board and Mouse	Five Sets
4.	Screw Drivers	Twenty Five
5.	Pliers	Twenty Five
6.	Cable Jointing Machine	One
7.	Telephone Set	Twenty Five
8.	PAB x (Different Models)	Assorted
9.	Soldering Guns	Five
10.	Suckers (For De-soldering)	Five
11.	Registers (Different Values)	Five
12.	Floppy Diskettes	One Dozen
13.	UPS	Five
14.	Power Supplies (Different Models)	Five
15.	Batteries (Nid)	Five
16.	Oscilloscopes	Five
17.	Terminal Boxes	Five
18.	Surface mount device rework station	5 Nos.
19.	micro scope	2 Nos.
20.	Product specific jigs for different brands.	2 Nos.
21.	GSM test set	2 Nos.
22.	Universal antenna coupler with complete base station	2 Nos.
23.	Power supply digital	10 Nos.
24.	Storage box	200 Nos.
25.	Flash Programmer	5 Nos.

26.	Universal battery tester	10 Nos.
27.	Grounding station (EST / SMD)	5 Nos.
28.	Soldering Iron	25 Nos.
29.	BGA rework station	25 Nos.
30.	SMD rework station	10 Nos.
31.	Tool kits (for mobile repacking)	25 Nos.
32.	RF Signal generator 2000 MHZ	2 Nos.
33.	Digital / Analog, Multimeter	10 Nos.
34.	Digital Oscilloscope	2 Nos.
35.	Authenticator / Nokia software downloader	25 Nos.
36.	Wood bench	25 Nos.
37.	Est chairs	2 Nos.
38.	Service station	2 Nos.
39.	Hot air gun	2 Nos.

REFERENCE BOOKS

- Wireless Communication Principles & Practice by Ordor Rappaport
- Fundamentals of Electronics by Floyd (3rd Edition)
- Manuals of Telecom Technician
- Electronics Devices & Circuits by Bogart Jr. (2nd Edition)

MINIMUM QUALIFICATION OF INSTRUCTOR

B.Sc. Engineering with 2 Years relevant experience

OR

DAE in relevant field with 4 Years relevant experience

OR

2 Years Proficiency certificate with 6 Years relevant experience

EMPLOYABILITY OF THE PASS OUTS

The pass outs this course this course can find job / employment in the following areas / sectors: -

- PTCL
- Mobile Companies e.g. Nokia, Sony Ericsson, Samsung, Motorola, Siemens & Panasonic etc.
- ISP (Internet Service Provider)
- Mobile Phone Repair workshops.