



Memorandum of Understanding

**Under the Skill Development
Training Program**

Between

**Himachal Pradesh Technical
University Hamirpur**

And

**Regional Telecom Training Centre
Rajpura**

Date: 08 Sept., 2016

Bharat Sanchar Nigam Limited O/o Principal RTTC Rajpura

Table 1

1	Eligibility of the Himachal Pradesh Technical University Hamirpur approved and funded Institute	Himachal Pradesh Technical University Hamirpur established under legislative Act-16 of 2010
2	Eligibility of the RTTC Rajpura	Full time regular Faculty
3	Duration of the Programme	The training may be spaced between 3 rd , 4 th , and 5 th semesters, covering all Three Certificate Programs (including all seven modules), for the enrolled trainees. (70 practical sessions of 2 hours making a total of 140 Hours)and there will be 14 sessions of 2 Hours each (Total 28 Hours) of Theoretical knowledge, Group discussion ,Theory Exam and presentation etc. making a total duration of 168 Hours .
4	Course Fee	BSNL skill program fees shall be limited to and not lesser than Rs.22,000 + ST per for all semester including Boarding and lodging per trainee.
5	Disbursement of fee	The total fee will be paid by Concerned College affiliated to Himachal Pradesh Technical University Hamirpur in three installments comprising of 1.Rs. 10000/- (1 st for 3 rd semester) 2.Rs. 6000/- (2 nd for 4 th semester) 3. Rs. 6000/- (3 rd for 5 th semester)
6	Relevant Documents	Training completion report with result and grading and issuing of certification. Excellent remarks will be given to those candidates who score more that 90% marks in the respective course.
7	Expected Outcome	To enhance quality of trainees so that they become better employable.
8	Content of course	RTTC Rajpura will try to get the signed copy as soon as possible / Detail Modules of all three certificates may be send to the concerned college affiliated to Himachal Pradesh Technical University Hamirpur .

TABLE-2

S.no	Name of the skill development course	Module	Duration	Fee In (Rupees)
1.	Silver Certification	Module 1	24 Hours	10,000-00 + ST including boarding and lodging per trainee
		Module 2	24 Hours	
		Module 3	24 Hours	
2.	Gold Certification after course at S. No. 1	Module 4	24 Hours	6,000-00 + ST including boarding and lodging per trainee
		Module 5	24 Hours	
3.	Platinum Certification after course at S. No. 2	Module 6	24 Hours	6,000-00 + ST including boarding and lodging per trainee
		Module 7	24 Hours	

(Handwritten signature)

(Handwritten signature)

Bharat Sanchar Nigam Limited O/o Principal RTTC Rajpura

SCHEDULE I

Module 1- Digital Switching System (1 Week)

Learning Objective:	To give the trainee a detailed overview of the electronic switching systems that are nodal points of all telecom networks.
Credits:	As per university norms
Prerequisites:	First year Engineering or Graduate course in science.
Skills acquired:	The trainee shall be able to understand and obtain hands on practice on various components of a digital exchange, create and modify customer and exchange data, carry out testing and trouble-shooting and understand the routing, traffic, trunk and billing administration and management.

S.no.	Curriculum	Skill Hours Practical	Equipment
1	Identification of various components of telephone exchange like MDF , FDF ,DDF, Power Plant and identification of functional blocks of Digital exchanges	2	<input type="checkbox"/> C-DOT MAX or any New Technology Switch <input type="checkbox"/> EPABX
2	CPE and MDF (Analog telephone ,Digital telephone, FAX, Answering machine, Cordless phone, Identification of different types of cables Main Distribution Frame, cabinet pillar, DP) Different services and their access codes, services provided by switch like auto alarm, diversion, call waiting , CLIP,CLIR, and services provided by common platform like VCC,FPH, Making line to line calls and checking the metering	2	<input type="checkbox"/> Line tester <input type="checkbox"/> VoIP Facility <input type="checkbox"/> MDF, DDF, FDF <input type="checkbox"/> Power plant <input type="checkbox"/> ISDN Feature phone Telephone connection with handset <input type="checkbox"/> Types of cables (power, switch board, PCM. LAN)
3	Creation of Subscriber Physical Connectivity from customer premises up to equipment . Interrogation of subscriber characteristics by means of MMC In case of ISDN line NT, TA etc	2	<input type="checkbox"/> Different types of connectors (Euro, D, RJ) <input type="checkbox"/> FAX
4	Deletion and modification of customer data in data base and checking their effect like BNP Anne and BNP disconnection , reconnection safe custody etc	2	<input type="checkbox"/> Pillar, cabinet, DP <input type="checkbox"/> Lab/exchange with two lines created
5	To register and verify various facilities by means of MMC (Call diversion, call waiting, Conferencing	2	<input type="checkbox"/> VCC card <input type="checkbox"/> Telephone line to make VCC/FPH call
6	Hunt group and centrex (creation of hunt groups and centrex groups	2	<input type="checkbox"/> Loop back trunks to test the calls
7	Testing the subscriber line (wedging the line at MDF, Testing the line by means of MMC, fault localisation from the test reports	2	
8	Different types of observations like outgoing , incoming , malicious etc. Different types of traffic reports and CDR details.	2	
9	Digital Trunk and Routing Management (The parameters related to trunk and routes by taking display of TGPs and routes, Testing of trunks)	2	
10	Hierarchy of nodes in PSTN, ISD, and long distance calls, Special service calls. etc	2	
11.	Group Discussion/Presentation, Theory Exam/practical Viva & Evaluation of course (2 Sessions)	4	
Total 12 Sessions		24 Hrs	

B

BShubh

Bharat Sanchar Nigam Limited O/o Principal RTTC Rajpura

MODULE 2- Digital Transmission Technology (1 Week)

Learning Objective	To give the trainee a detailed overview of the Digital Transmission technology that is the backbone of all telecom networks.
Credits	As per university norms
Prerequisites	First year Engineering or Graduate course in science.
Skills acquired	The trainee shall be able to understand and obtain hands-on practice on the various transmission media, system components, transmission systems, SDH equipment, microwave systems, DWDM and FTTH systems.

Session No.	Curriculum	Skill Hours Practical	EQUIPMENT
1	Visit and demo on different transmission media like-MDF, DDF, Copper cable, CAT-5/6, OFC, RF Cable, Antenna etc.	2	<input type="checkbox"/> STM-1 /STM-4 equipped with important cards <input type="checkbox"/> LCT /NMS for SDH Different M/W Systems <input type="checkbox"/> Satellite System <input type="checkbox"/> Mini-Links <input type="checkbox"/> DWDM (OTM, OLA) with LCT <input type="checkbox"/> DXC <input type="checkbox"/> Different types of Splitters <input type="checkbox"/> Different types of ONT's <input type="checkbox"/> GPON/GEAPON OLTE <input type="checkbox"/> MDF,DDF <input type="checkbox"/> FDF/FDMS <input type="checkbox"/> CAT-5/ CAT-6 <input type="checkbox"/> Cables/ Copper Cables <input type="checkbox"/> OF Cable/ RF Cables <input type="checkbox"/> Different types of Antenna <input type="checkbox"/> Different types of Optical Connectors <input type="checkbox"/> PDH System <input type="checkbox"/> Multimedia of SDH (to be provided by BRBRAITT)
2	Visit to Mux room and different transmission system – like PCM, PDH, ADM, TM etc.	2	
3	Identification of connectors and components of Optical Transmission Systems like – SFPs, Optical Connectors-like FC-PC, SC-PC, LC-FC, Pigtail and patch cord, LASER, FDF, TJC etc .	2	
4	Multimedia of SDH & visit	2	
5	Network & Hardware Architecture of SDH Equipment- Identification of different Network Element, Ring Architecture, Identification of different cards and their purpose etc.	2	
6	Software configuration in SDH- Cross connection using LCT/ NMS/ EMS.	2	
7	Software configuration in SDH- Alarm Management, Performance management, Synchronization.	2	
8	Visit and demo to Microwave Mini link /Microwave System/ Ku Band VSAT System*	2	
9	Visit and demo to DWDM System*	2	
10.	Visit and demo to FTTH System	2	
11.	Group Discussion/Presentation, Theory Exam/practical Viva & Evaluation of course (2 Sessions)	4	
Total 12 Sessions		24 Hrs	




Module 3 – TELECOM SUPPORT INFRASTRUCTURES (1 Week)

Learning Objective	To give the trainee a detailed overview of Telecom Support Infrastructure.
Credits	As per university norms
Prerequisites	First year Engineering or Graduate course in science.
Skills acquired	The trainee shall be able to understand and obtain hands-on practice on the maintenance of various power plant equipment and earthing systems, AC units, telecom shelters and towers and engine alternators.

Session No.	Curriculum	Skill Hours Practical	EQUIPMENT
1	Identification of different components in Telecom support infra FR, SMPS, Bty charger, battery set, earth plates, high tension and LT supply)	2	<input type="checkbox"/> SMPS Power plant <input type="checkbox"/> VRLA Battery <input type="checkbox"/> Inverter <input type="checkbox"/> AC <input type="checkbox"/> Voltmeter <input type="checkbox"/> Thermometer <input type="checkbox"/> Earth tester <input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Lightening arrestor <input type="checkbox"/> Circuit Breakers <input type="checkbox"/> HRC fuses, <input type="checkbox"/> Engine Alternator <input type="checkbox"/> Package AC <input type="checkbox"/> Fire Detector <input type="checkbox"/> Fire fighting equipments <input type="checkbox"/> Fire detection apparatus
2	SMPS (functional unit identification, various alarms, trouble shooting)	2	
3	VRLA (Measurements, pilot cell, terminal voltage, individual cell voltage)	2	
4	UPS System, Earthing (Measurement of earth resistance., Appearance of earth plates at different points like MDF, switch room)	2	
5	Air conditioning (AC package unit, Split A/C, Window type A/C)	2	
6	Protective systems (Fire extinguishers and their operation Lightening arrestors, Circuit breakers, HRC fuses)	2	
7	Engine Alternator (Demonstration & maintenance tips.)	2	
8	Site visit to Ground Based & Roof-Top Tower	2	
9	Site visit to telecom shelter	2	
10.	Sub-Station Works in Telephone Exchange and energy conservation features.	2	
11.	Group Discussion/Presentation, Theory Exam/practical Viva & Evaluation of course (2 Sessions)	4	
Total 12 Sessions		24 Hrs	



RS Gupta

Module 4- Optical Fiber Technology (1 Week)

Learning Objective	To give the trainee a detailed overview of Optical Fibre Technology.
Credits	As per university norms
Prerequisites	First year Engineering or Graduate course in science.
Skills acquired	The trainee shall be able to understand and obtain hands-on practice on optical fibre systems that shall include cables, connectors, splicing, tools, optical devices, OTDR and other measuring instruments.

Session No.	Curriculum	Skill Hours Practical	EQUIPMENT
1	Visit and demo of different transmission media- MDF, DDF, Copper cable, CAT-5/6, OFC, RF cable, Antenna etc.	2	<input type="checkbox"/> CAT-5/CAT-6 Cables/Copper Cables <input type="checkbox"/> RF Cables <input type="checkbox"/> Different types of OF cable <input type="checkbox"/> Different types of Optical connectors <input type="checkbox"/> Splice closures <input type="checkbox"/> Pig tail & Patch cord, <input type="checkbox"/> Different types of OF Tools <input type="checkbox"/> OF Cables <input type="checkbox"/> Fusion Splicing Machine <input type="checkbox"/> OTDR <input type="checkbox"/> Fiber Spool <input type="checkbox"/> Power Meter <input type="checkbox"/> Fixed/ variable Attenuator <input type="checkbox"/> Light Source <input type="checkbox"/> Different types of Antennas <input type="checkbox"/> SDH Systems <input type="checkbox"/> DWDM Systems (OTM/OLA) <input type="checkbox"/> Route Index Diagram <input type="checkbox"/> Route/Joint Indicators <input type="checkbox"/> HDPE/PLLB Duct <input type="checkbox"/> Different types of Splitters <input type="checkbox"/> Different types of ONT's <input type="checkbox"/> GPON/GEPON OLT <input type="checkbox"/> OF Systems PDH, <input type="checkbox"/> OF Systems SDH
2	Different types of Optical Fiber Cable Identification of different types of OF Cable, Component of Loose Buffer Tube & Tight Buffer Tube Cable and their functions, Identification of different types of Connectors.	1	
3	Identification of different OFC Tools & Splice closures Different tools and their utility- Cable sheath remover, Buffer Stripper, Fiber Stripper, Fiber Cleaver etc. Different types of Joint Closure- TJC, BJC, SJC etc. Route indicators, RID, ducts and pipes (HDPE & PLLB)	2	
4	Application of OF Cable & Optical Devices FDF Indoor connectivity of OF Systems, Transmitter & Receivers, LASER, APD	2	
5	End Preparation of Cable Steps for end preparation of Optical Fiber Cable for Splicing and demo in lab	2	
6	Splicing of OF cable Component of Fusion Splicing Machine, Procedure for splicing of OF cable and demo, Splice loss measurement	2	
7	Demo on OTDR Study the different components of OTDR, Setup for operation of OTDR, Fault localization and measurement like fiber break, total loss, splices loss, dead zone etc.	2	
8	Power Meter & Other Measuring Instruments Operation of Power Meter, Power measurement of LASER Study of other meters like attenuator, talk-set, source etc.	2	
9	Visit and demo to FTTH Study the network architecture of FTTH, Identify the different network elements of GPON/GEPON Systems	2	
10.	Visit and demo to SDH / DWDM* Study the network architecture of SDH / DWDM* system, Identify the different network elements and cards of SDH / DWDM* Systems and study their function.	2	
11.	Group Discussion, Presentation, Theory Exam and practical Viva (3 Sessions)	4	
12	Evaluation and feed back of module	1	
Total 13 Sessions		24 Hrs.	

Module 5– BROADBAND TECHNOLOGY (1 Week)

Learning Objective	To give the trainee a detailed overview of Broadband Technology Systems.
Credits	As per university norms
Prerequisites	First year Engineering or Graduate course in science.
Skills acquired	The trainee shall be able to understand and obtain hands-on practice on broadband system configuration, modems, CPE devices configuration for internet access and IPTV, LAN, Routers and Broadband Network components such as DSLAM, T1/T2 Switches, BRAS/BNG.

Session No.	Curriculum	Skill Hours Practical	EQUIPMENT
1	Connecting PC, Phone using splitter at Customer Premises, Parallel Phone & Testing Line Parameters using ADSL Tester	2	<input type="checkbox"/> Broadband connection <input type="checkbox"/> Splitters
2	Configuration of broadband connection a) Always-On/PPPoE/Multi-user mode b) Dial-up/Bridge/Single-user mode	2	<input type="checkbox"/> Telephone Instruments <input type="checkbox"/> CPE/ Modem
3	Configuration of broadband Modem	2	<input type="checkbox"/> ADSL line <input type="checkbox"/> RJ-11 Cables <input type="checkbox"/> PC
4	Securing wireless broadband connection & Checking of Speed	2	<input type="checkbox"/> ADSL Tester <input type="checkbox"/> Wi-Fi Broadband Modem
5	Common Broadband Problems, Errors & their troubleshooting	1	<input type="checkbox"/> ADSL CPE , (UTstarcom UT-300R2)
6	Configuration of CPE for multiple services such as internet access, IPTV	2	<input type="checkbox"/> Crimping Tool <input type="checkbox"/> DSLAM
7	Setup of LAN in home environment	2	<input type="checkbox"/> IPTV <input type="checkbox"/> One Switch
8	Router Components, Show commands to see running-conf, status of ports, ping	2	<input type="checkbox"/> Console cable for accessing the router
9	Jumper arrangement at MDF for a) New Customer b) Existing Landline Customer	2	<input type="checkbox"/> Cisco 7613 or any Cisco model <input type="checkbox"/> T-I, T-II Switch
10.	Broadband Network Components DSLAM, T1/T2 Switches, BRAS/BNG	2	<input type="checkbox"/> BRAS / BNG <input type="checkbox"/> OCLAN for field demo
11.	Group Discussion/Presentation, Theory Exam / practical Viva (2 Sessions)	4	
12	Evaluation and feed back of module	1	
Total 13 Sessions		24 Hrs.	



RS Gupta

Module 6- Mobile Communication (1 Week)

Learning Objective	To give the trainee a detailed overview of the Mobile Communication Systems.
Credits	As per university norms
Prerequisites	First year Engineering or Graduate course in science.
Skills acquired	The trainee shall be able to understand and obtain hands-on practice on 2G mobile systems, create and modify customer and exchange data, mobile services, carry out testing and trouble-shooting, mobile antenna systems, GSM radio parameters and optimization of network.

Session No.	Curriculum	Skill Hours Practical	EQUIPMENT
1	2G GSM Equipment Demonstration: GSM Architecture diagram-BTS, BSS, MSC, HLR, VLR and their interfaces	2	<input type="checkbox"/> GSM/ 3G Test Handset <input type="checkbox"/> Demo SIM with VAS services <input type="checkbox"/> CCN Node Terminal <input type="checkbox"/> HLR Terminal <input type="checkbox"/> PC <input type="checkbox"/> BTS BSC <input type="checkbox"/> visit to MSC <input type="checkbox"/> Antenna system with feeder cable <input type="checkbox"/> VSWR meter if available <input type="checkbox"/> OSS/OMCR terminal Field visit and other infrastructure
2	Saving and dialing procedures for Call/SMS in different scenarios; - while on roaming, while in local service area GSM Network Identities – IMSI, IMEI, MSISDN etc	2	
3	GSM Subscriber Creation.(CCN Node/ In Lab) Creation of subscriber using Kennan FX (or in Lab, if available), Billing CDRs, IN Query	2	
4	Creation of various facilities: Assignment and withdrawal of services to mobile subscriber- STD barring, Call Divert, Call Forwarding, Missed Call Alert etc.	2	
5	Mobile Services – VAS- PRBT, IVR and SMS Based, USSD, STK, Activation, De-activation.	2	
6	Internet Access – GPRS & EDGE. Configuration for access through Mobile and PC, APN Configuration, Downloading settings in Mobile	2	
7	2G BSS: BSC/BTS Configuration, Connectivity, Faults / Alarms etc.	1	
8	Mobile Antenna Systems, Feeder Cables Type of Antenna, Gain, Coverage Identification BTS Testing - Feeder Cable & VSWR.	2	
9	Study and Analysis of GSM Radio Parameters through Engineering Handset, Cell, LAC, Channel, HSN, MAIO	2	
10.	Optimization of Network Performance – QOS Parameters, KPIs, Benchmarking	2	
11.	Group Discussion/Presentation, Theory Exam / practical Viva (2 Sessions)	4	
12	Evaluation and feed back of module	1	
Total 13Sessions		24 hrs.	

Module 7- IP Networking & Cyber Security (1 Week)

Learning Objective	To give the trainee a detailed overview of IP Networking and Cyber Security.
Credits	As per university norms
Prerequisites	First year Engineering or Graduate course in science.
Skills acquired	The trainee shall be able to understand and obtain hands-on practice on IP Networking and Cyber Security practices, LAN cabling and configuration, Router configuration, FTP protocol services, various security tools and securing PCs and Servers.

Session No.	Curriculum	Skill Hours Practical	EQUIPMENT
1	Identification of Network Components, Preparing straight & cross RJ-45 LAN cables	2	<input type="checkbox"/> PC, Server and related SW Proxy <input type="checkbox"/> FTP <input type="checkbox"/> IIS <input type="checkbox"/> Firewall <input type="checkbox"/> Look at LAN <input type="checkbox"/> Packet tracer <input type="checkbox"/> Advanced IP Calculator (Freeware) v1.1 <input type="checkbox"/> Network Simulator SW <input type="checkbox"/> Copy of the video demo files for Cyber Security <input type="checkbox"/> UTP, cat5, Cat6, Coax <input type="checkbox"/> OFC <input type="checkbox"/> Hubs <input type="checkbox"/> Repeaters <input type="checkbox"/> Switches <input type="checkbox"/> Bridges, Routers <input type="checkbox"/> Gateways <input type="checkbox"/> CSU/DSU <input type="checkbox"/> Wireless access points (WAPs) ADSL Modems, Crimping Tool
2	Preparing & Testing Wired Local Area Network, Configuring IP Addresses in a LAN, Practice on Wireless Local Area Network, VLAN on simulator / Systems	2	
3	Identify Router Components & Configure Router on simulator / Systems	2	
4	Exercices on TCP/ IP	1	
5	Configuration of Proxy, File Transfer Protocol services	2	
6	Configuration of Dynamic Host Control Protocol services	2	
7	Multimedia Demo of Viruses, Trojan Horse, Worms	2	
8	Multimedia Demo of SPAM, Spoofing, Phising, Identity frauds, Social Networking etc	2	
9	Demonstration on Security tools like IP scanner, Port scanner etc.	2	
10.	Securing Home PC & Web Server – Installing & Updating Antivirus, Antispyware, Hardening of Operating System by turning of unnecessary services, clients & features	2	
11.	Group Discussion/Presentation, Theory Exam / practical Viva (2 Sessions)	4	
12	Evaluation and feed back of module	1	
Total 13 Sessions		24 Hrs.	