

**NAME OF THE TRADE: INFORMATION TECHNOLOGY AND ELECTRONIC SYSTEMS MAINTENANCE.**

Duration of the training: - 2 years (104 weeks)  
4 semesters of six months each

42 hours per week

1 hour/week social studies

4 hour/week extra curricular activities

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42 – 5 = 37 hours/week for Theory and Practical

10 hours/week Theory

27 hours/week Practicals, electronic drafting & Workshop Practice

Total No. of Hours for the Course 104 x 37 = 3848 Hours

Total No. of Theory Hours 104 x 10 = 1040 Hours

Total No. of Practical 104 x 27 = 2808 Hours

(Inch. Electronic drafting & workshop practice)

**ENTRY QUALIFICATION:**

**ESSENTIAL:** 10<sup>TH</sup> Qualification

Passed in 10<sup>th</sup> class examination under 10+2 system of education with minimum 60% marks individually in Moths and science.

**DESITABLE:** 12<sup>TH</sup> (10+2) Qualification Passed 12<sup>th</sup> (10+2) class with moths and physics

**Note:**

For preparing the merit list, the following weight age of marks may be given to the candidates with 10+2 qualification on and above the marks obtained by them in 10<sup>th</sup> class examination.

1<sup>st</sup> Division /60% or above marks in 12<sup>th</sup> (10+2)=5%

2<sup>nd</sup> Division 45% or above marks in 12<sup>th</sup> (10+2) =3%

3<sup>rd</sup> Division /less than 45% marks in 12<sup>th</sup> (10+2) =2%

**OBJECTIVE:**

1. Cognitive domain: Knowledge and understanding.
  - (1) To develop basic understanding of electrical, electronics, communication and computing operations.
2. Psychomotor domain : skills
  - i) To develop skills in using measuring instruments.
  - ii) To develop skills of trouble – shooting and maintenance of Electrical appliances, consumer electronics gadgets communications – small office and home office (SOHO) Equipments, computers and peripherals.
3. Affective Domain: Personality Traits.
  - i) To develop the habit of team work.
  - ii) To develop positive attitude for service and maintenance of Variety of IT and electronics and electrical equipments.
  - iii) To develop institutive skills of integrating various types of Systems.

## SEMESTER-WISE SUBJECTS OF STUDY

Brno.	Subjects
<b>Its</b> 1.1 1.2 1.3 1.4	<b>Semester</b> <b>Basics of Electricity</b> <b>Measuring Instruments &amp; Components</b> <b>Basics of Electronics</b> <b>Communicative Skills - I</b>
<b>Kind</b> 2.1 2.2 2.3 2.4	<b>Semester</b> <b>Electronic Components</b> <b>Electronic Systems</b> <b>Other Electronic Systems</b> <b>Communicative Skills – II</b>
<b>Bird</b> 3.1 3.2 3.3 3.4	<b>Semester</b> <b>Basics of Communication Theory</b> <b>Communication Systems</b> <b>Other Systems</b> <b>Generic Skills</b>
<b>Itch</b> 4.1 4.2 4.3 4.4	<b>Semester</b> <b>Digital Electronics</b> <b>IT Systems</b> <b>IT Applications</b> <b>Industrial Project and Project Report</b>

## IT AND ELECTRONICS SYSTEM MAINTENANCE SYLLABUS

Week No.	THEORY	PRACTICALS	Electronic Drafting	Workshop Practice
01 & 02	To be familiar with the Institute, its regulations safety rules, importance of quality and basic first aid.	Visit of Labs, Introduction to staff.		
03.	COMMUNICATIVE SKILLS English Grammar			
04.	<b>BASICS OF ELECTRONICS:-</b> Example of electrical devices e.g. transformer, tube light, fan, generator, batteries etc. Concept of current and potential difference and energy.	Introduction to various electrical devices and its operation.	Freehand sketching of straight lines, squares, polygons and circles.	Use if switches and fudges.
05 & 06	Ohm's law, series and parallel circuits, star and delta conversion, testing and charging of batteries.	Verification of ohm's law.	Freehand sketching with dimensions.	Applied workshop problems involving multiplication and division.
07 & 08	Concept of AC Voltage Frequency & power Factor in AC circuit, concept of MMF & faraday's laws, self & induced elf, representation of sinusoidal quantities, by pharos, relation between voltage & current in RLC circuits.	Demonstration of sine wave, average peak & rams value, experiments with magnet. Demonstration of induced magnetism experiments on R, L & C.	Reading of simple blue prints.  Conventional Symbol of electrical installations.	Application of friction to shop problems.  Properties & uses of metals like copper, zinc, lead, tin, aluminum, brass etc.

09 & 10	<p>Theremin's theorem, concept of 3 phase supply, concept of single phase &amp; 3 phase induction motor, synchronous motor, servo motor &amp; stepper motor.</p> <p>Concept of alternator.</p>	<p>Experiments on Theremin's theorem</p> <p>Experiments on star &amp; delta circuit.</p> <p>Demonstration of Alternator.</p>	<p>Drawing of the typical diagram of D type cartridge, fuse, and HRC type fuse.</p> <p>Simple isometric drawing.</p>	<p>Properties &amp; uses of cast iron, wrought iron, and plain carbon steel, high speed steel &amp; alloy steel.</p>
11.	<p>Construction of secondary cells, its testing &amp; efficiency.</p>	<p>Charging &amp; discharging of secondary cells.</p>		
12 to 14	<p>Construction &amp; working principles of moving iron &amp; moving coil voltmeter/ammeter Servo controlled stabilizer.</p> <p>DC machine and its Application.</p>	<p>Study of moving Coil instruments.</p> <p>Demonstration on Servo controlled Stabilizer.</p> <p>Demonstration of DC machines.</p>	<p>Free hand Sketch of nut &amp; bolt with Dimensions.</p>	
15	<p>Transformer.</p> <p>COMMUNICATIVE SKILLS – English Grammar and composition.</p>	<p>Study of transformer &amp; its rewinding.</p>	<p>Example of simple orthographic Projection.</p>	
16 & 17	<p>MEASURING INSTRUMENTS &amp; COMPONENTS –</p> <p>Components, R,L,C different fuses, relays &amp; switches, ammeter, volt meter –working principle, construction &amp; extension Of range.</p> <p>Multi meter principle of Measurement of AC/DC,</p>	<p>Experiment with R,L &amp; C</p> <p>Experiment on ohm's law</p> <p>Study of function</p>		<p>Metric system unit conversion , factors, manufacture of plastic &amp; resin</p>

18	Current , voltage & resistance, concept of digital multi meter.  Function generator- Principle of working	Generator		Meaning of tenacity, elasticity, malleability , brittleness, hardness, compressibility & Educability
19		Study of wattmeter	Example of third angle projection	
20		Study of CRO		
21	Watt meter- construction- & working principle  CRO- block diagram, Working principle & Function of front panel , Control of CRO	Demonstration of Radio, TV , keyboard & synthesizer		The weight of Body .Unit of weight.
22 to 24	<b>BASICS OF ELECTRONICS;</b>  Example of electronics System, transistor, radio Television , keyboard Synthesizers etc.	Experiment on Diode-& transistor	Familiarization & sketching the components	Algebraic symbol formula & Equation.
25	Basics of electronics & Semiconductor devices  P-N type Semiconductor, transistor , constant voltage & constant current source (Concept only).		Use of T, square, drawing board & other drawing instruments	
26	<b>COMMUNICATIVE SKILLS</b> English grammar, composition, reading, and writing.  <b>TEST</b>			

	IInd Semester ELECTRONIC COMPONENTS			
27	Active & passive compo- Nets			
28	Resistor carbon film, metal film ,wire wound Fixed & variable	Study of resist ion Co-its coding Testing of active And passive com- Opponents	Lettering number & alp- Habits	Heat & temperature
29	Capacitors- ceramic, paper electronics its Important specification	Study of capacitor & its coding	Symbol of series and parallel compo Nets	Meaning of Stress & attain Modules of elasticity
	Inductor air core ferrite Core application & specification	Study of inductor Co& its coding		
30	Semi conductor intrinsic & extrinsic majority & Minority carrier PN junction electronics& holes	Demonstration of various types of semi conductor Material	Free hand sketching of plan & elevation	B-H curve
31	Active components diode transistor IC s power diode SCR sneers. diode Photoreaction diode	Demonstration of active components	Reading of simple circuit	Calculation of frequency & Time period
32	PN junction diode, vela- Niche breakdown calculi- Ton of dynamic resistance & specification ,	Study of characteristics of diode	Drawing of block diagram of multistage amplifier	Calculation of frequency & Time period
33	Bipolar transistor concept of NPN & PNP transistor CB, CB, & CC configuration dynamic resistance, transistor biasing & stabilizing	Study of CB CE & CC configuration of Transistor		
	MOSFET& Operational amplifier	Study of MOSFET		

34	Basics of PCB , grades Lamination concept of Preparing film , making PCB  ELECTRONIC SYSTEM: (RADIO TV)	Developing a printed circuit board		
35	Basic Amplifiers , Classes of amplifier Principles of feedback  Oscillator crystal Oscillator & multivibrator	Study of different type of amplifier & effect of feed- back on amplifiers Study of oscillators & masturbator	Symbol for Different wave shapes	Logarithm & its Calculation.
	Modulation & dictation AM/FN waves	Study of modulation & detection of AM/FN waves	Drawing of AM/FN waves. .	
36	Block diagram of AM/FM radio receiver & working of each stage  Loudspeaker direct radiating & horn loaded  Various types of Microphones.	Study of loudspeaker		
37	Principle of sound recording on magnetic tape Concept of HI-FI & stereo	Study of audio tape recording/ Audio cassette Recorder study of HI-FI & stereo amplifier		

38	<p><b>MONOCHROME TV.</b>  Basics principle &amp; working interlaced non-interlaced  Scanning persistence of vision frame field and line  Frequency , aspect ratio  bandwidth requirement  blanking &amp; synchronizing  Pulses</p> <p>Construction &amp;working  Of monochrome picture  Tube</p> <p>VSB transmission block  Diagram of TV transmitter  &amp; its function</p> <p>Indian TV standards</p>	<p>Study of various  TV signal with  the  Help of CRO</p> <p>Study of  monochrome  picture tube</p> <p>Industrial visit</p> <p>Study of various  TV standard  with  The help of  CRO</p>	<p>Drawing of  block diagram  of TV receiver</p>	<p>Problem of  conjugation</p> <p>Problem of  Pressure &amp;  Pressure gauge</p>
39 & 40	<p>Block diagram of  monochrome TV receiver  and  VGA monitors function of  its various stage</p> <p>Function of AGC &amp; AFC  Function of various  control in TV receiver</p>	<p>Demonstration  and study of  different stages  of a  monochrome  TV &amp; VGA  monitor</p> <p>Study of various  control of a TV  receiver</p>		<p>Representation  of forces by  vector &amp; their  calculation</p>
41	<p><b>COMMUNICATION  SKILLS</b>  English grammar ,  composition &amp; noting</p>			



42 To 46	<p>COLUOR /CABLE TV Primary colors</p> <p>Color picture tube</p> <p>Block diagram of TV transmitter and its working</p> <p>Study of PAL TV receiver &amp; its working</p> <p>PAL WISC SECAM Standard &amp; their conversion</p> <p>SIF &amp; sound output stage</p> <p>Horizontal &amp; vertical oscifillator , Line driver Stage LOT stage power Supply chrome &amp; RGB O/P stages</p>	<p>Study of colors With the help Of pattern generation</p> <p>Study of color picture tube</p> <p>Study of various stages of a color TV receiver</p>		
47 to 48	<p>VCR/VCP/VCD Principle of video recording on magnet tape</p> <p>OTHER ELECTRONIC SYSTEM</p>	<p>Demonstration of different stages of VCR/VCP/VCD</p>	<p>Free hand sketch of block diagram of VCR/VCP</p>	
49 to 50	<p>Well-known digital clock Earphone condenser music System burglar alarm electronic buzzer microwave oven washing Machine cordless phone</p>	<p>Demonstration &amp; study of different stages of well known digital clock earphone condenser mice Music system burglar alarm electronics buzzer, microwave oven washing machine, phone.</p>	<p>Study of electronic circuit diagram Of various command devices</p>	

	COMMUNICATIVE SKILLS :			
51	Grammar and composition noting and proposal making.	Demonstration of communication skill.		
52	TEST <b>3<sup>rd</sup> semester Basics of Communication Theory</b>			
53	Examples, wireless system (radio communication) telephony, fax, video conferencing, satellite communication, microwave communication, telegraphy, telex etc.	Demonstration of wireless system, telephone, fax, telex etc.	Drawing of block diagram of satellite communication and microwave communication	Trigonometric functions.
54	Electromagnetic wave propagation, concept of ground wave, sky wave and troposphere wave propagation.	Study of wireless antenna		
55	Modulation - CW & pulse modulation, amplitude & frequency modulation.			
56 & 57	Physical concept of radiation from an antenna derivation of half wave, dipole & yagi antenna, ferrite rod antenna, wireless & audio receiver, simplex & duplex			

<b>Week No.</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>ELECTRONIC DRAFTING</b>	<b>WORKSHOP PRACTICE</b>
58&59	<b>COMMUNICATION SYSTEM</b> Cordless telephone and telephone answering machine, basic telephony electrician exchange, time domain and frequency domain, multiplication pulse code modulation.	Study of different stages of a cordless telephone study of electronic change.	Drawing of block diagram of telephone exchange	Discussion on magnetic deflection theory.
60	Characteristics of telephone line, telephone instrument and its basic components.	Study of telephone lines and cables		
61	Conversion of data and video signals-role of Modem in this respect.	Study of modem		
62&63	Concept of facsimile transmission, scanner & modem, facsimile receiver (fax) auto answering machine	Study of fax & auto answering machine	Block diagram of fax	Photo conduction & photo switches
64	Microwave radio communication, basics of radar components of microwave communication system	Industrial visit study of microwave communication system.		
65 &66	Satellite communication concept of transponder geostationary satellite Ku & kef band HUB ,V-Sat	Industrial visit		
	<b>OTHER SYSTEM:</b>			
67	Concept of far-code technique & its importance for cataloguing of stores & materials movement etc.	Study of Bar-code reader		
68 & 69	Photocopying machines, scanner, toner ,sensor etc.	Study of photocopying machine , scanner , toner & sensor	Drawing of block diagram of photocopying machine	Quantity of heat & specific heat.
	<b>GENERIC SKILLS:</b>			
70	Standard and its importance. National Standardization authority, their role, international standardization authority, other national / international laboratory, for testing product specifications, standards & safety.	Demonstration of good quality & poor quality product.		Safety for occupational hazards & work environments

	<b><u>ENTEPRENEURSHIP ORIENTATION.</u></b>			
71&72.	Emphasis on self employment, risk taking & analytical ability , paining , entrepreneurial goal, setting , identification of pro, etc., steps in setting , of business , information about various restitutions, providing financial & technical assistance , project formulations , time management ,resource management.			Basic house keeping & orderliness. Concept of self forming environmental consciousness
73	Concept of IPR, IPR authority in India, procedure of filing patent information & application, information regarding IPR attorneys in India. Testing & quality assurance, quality control of product , different standards for component & products , BIS, JSS , JS , IEC etc.			
74	TEST			
	<b>4<sup>TH</sup> semester DIGITAL ELECTRONICS:</b>			
75	Member system Binary, octal, Hexadecimal. Logic gates – AND , OR , HAND , NOT , NOR & X-OR	Study of logic gates , digital ICS		Calculation of binary numbers, octal numbers & hexadecimal
76	IIL gates. 74/54 series of IC numbers & coding			
77	Registers. Shift regulators ,SIPO PISO Universal shift register ALU	Study of registers		
78	Flip flops, basic function, truth table, counter & timers digital, IC's (SSI, MSI, LSI, etc.)	Study of flip flop counts, timers. Testing of digital IC's		
79	Semiconductor memories RAM, ROM, EPROM, EEPROM static & dynamic memory	Study of various types of memories		
80	IT SYSTEM : Computer architecture & organization , PC/AT	Demonstration of working of a pc	Drawing of block diagram of a pc	

81 & 82	Evolution of microprocessors.	Study of microprocessor	Block diagram of microprocessor system	Calculation of binary addition, subtraction, multiplication & division
83	Add on cards, peripherals, display adopter hard disk cd rom drive printer, key board, mouse their controller cards IDE cards.	Study of peripheral Devices & their Interfacing.		
84 & 85	Installation of operating systems : DOS,WINDOWS 95/98 , WINDOWS MT, UNIX/LINCUX	Practice on various operating system.		Flow charting of a computer program
86	Memory concept, memory location, atatus, choosing & stalling memory.	Study of memory location.		
87	Types of buses-isa, eisa , vesa, pci & hca	Study of various buses		
88	Motherboard – introduction & function of resotilogic, DHA, Walt state, P.AH/ROH parity, NHI, I/O port, logic address BIOS & device drivers.	Study of motherboards bios setup and related feature regarding power management etc.	Drawing of black diagram of motherboard.	
89	Construction of keyboards, working & interfacing.	Study of keyboard	Black diagram of keyboard	
90	Monitors-elementary principle of scanning, different. Modules in monitor their function.	Study of monitors.	Block diagram of monitor.	
91	FDD-use of FDD, different types, different parts, R/W head, logic board, spindle motor, stepper motor, termination resistor, write protect mechanism.	Study of FDD	Block diagram of FDD	
92	HDD-testing, drive components, logic board jumper selection, configuring the drive, hard disk controller software for HDD installation, CTD/CD- ROM – Brief Con- Copt, types, working principal,usefullnese , installation & configuration	Study of CD ROM	Drawing of block diagram of CD-ROM drive	
93	Multimedia components like sound card, TV tuner card, video card, mike, camera etc.	Study and installation of multimedia components.		

94	Printer, different type construction & working principal, DMP, line printers, achieving different fonts.	Study of printers.	Block diagram of printers.	
95	Installation & prevention maintenance, virus, & its prevention system up gradation of mother boards, memories, storages capacity & optimisation of their performance, role & use of power conditioners like UPS & CVTs.	Study of computer virus.  Study of different memory devices.		Calculation of the speed of a PC working
96	Network equipment cable connection and their specification and usages.	Hub repeater line driver different types of cables like RS232 VIP fibre optics thin (co-axial)/thick (AUI) etherneyt etc connector (9/25) pin D type male/female, 15 pin D type male / female, BHC, RJ11, RJ45 etc. connection like 9/25 pin male / female straight/ cross printer cable etc.		Preparation of different kind of cables for communication like RS232 VTP thin/thick Ethernet etc.
97	Computer networking : Type of networks, LAN, WAN network Topology, communication protocols using dial-up Modems, leased lines & V-SAT.	Different types of connection & cable used for networking like RS232 & RJ 45 etc. LAN setup showing the physical connection.		Preparation of LAN plan for a small office.
98	Power supplies(SMPS) green PC, EPA compliance	Study of computer power supply.		Interpretation of technical literature & technical manual.
99 to 101	Internet, E-mail, FTP ,WWW ISP in India, server, introduction to business data processing, database, lotus, WordStar common office. Automation packages: MS office, SHARTSUIT/leap office etc. Record keeping, transaction processing, computerized business applications, scanner video conferencing.	Study of internet DSS, GIS, OOPS & E-commerce etc. study of various business data package practice on various common package.		Preparation of system specification & discussion on purchase. Discussion on virtual reality, Cyberspace & Denizens.

Sr. No.	Name of the tools & equipment as per the syllabus	No. of required for Instructor & Trainees for one Unit as per DGET Norms.
1	D.C. REGULATED POWER SUPPLY (CWCC 0-30 V/24 DUAL)	2
2	OSCILOSCOPE 20-25MHZ DUAL TRACE	2
3	DIGITAL MULTIMETER 4 & ½ DIGIT	4
4	ANALOG MULTIMETER	4
5	MAGNIFIER WITH LIGHT FACILITY	1
6	SOLDERING DESOLDERING STATION	4
7	DRILLING MACHINE ELECTRIC	1
8	VARIAC WITH AMP AND VOLTMETER (4 AMP)	2
9	VACCUM CLEANER	1
10	BENCH VICE	1
11	BREAD BOARD	4
12	FREQUENCY COUNTER	1
13	TTLIC TESTER	1
14	IN CIRCUIT TESTER	1
15	LOGIC PROBE	2
16	EHT PROBE (1-1000V)	1
17	WATT METER (DIGITAL)	1
18	RHEOSTAT-10AMP (0-30 OHM)	1
19	HIGH VOLTAGE TESTER (0-5 KV ACDC)	1
20	TONG TESTER	1
21	LCR METER	1
22	POWER GENERATING SET	1
23	PHOTOCOPYING MACHINE	1
24	BAR CODE READER	1
25	WALKMAN AUDIO SYSTEM	2
26	DIGITAL CLOCK	2
27	MUSIC SYSTEM	2
28	MICROWAVE OVEN	1
29	WASHING MACHINE (MANUAL)	1
30	WASHING MACHINE (AUTO)	1
31	SYNTHESISERS	2

32	LEAD ACID CELL	2
33	HYDROMETER	2
34	CRAMPING TOOL FOR VTP/RJ45	8
35	CRAMPING TOOL FOR COAXIAL/BNC	8
36	KOREAN TOOL KIT/SCREW DRIVER SET WITH TESTER	8
37	COMPOSITE PLIER	8
	<b>B : EQUIPMENT REQUIRED FOR MAINTANCE OF COLOUR &amp; B&amp;W TV</b>	
38	COLOUR TV SET (DIFFERENT TYPES)	4
39	B&W TV SET (DIFF. TYPES)	4
40	COLOUR PATTERN METER (PORTABLE)	1
41	FIELD STRENGTH METER (PORTABLE)	1
42	DEGAUSSING COIL	1
43	YAGI ARRAY ANTENNA	2
44	DISH ANTENNA	1
45	VCR/VCP/VCD	1
46	VIDEO TRANSMITTER	1
	<b>C : EQUIPMENTS REQUIRED FOR RADIO AND TWO-IN-ONES</b>	
47	RADIO RECEIVER SET AM/FM	4
48	TWO IN ONE (STEREO)	2
49	RF GENERATOR WITH AUDIO MDULATOIN FACILITY	2
50	FUNCTION GENERATOR	4
	<b>D : EQUIPMENT REQUIRED FOR COMMUNICATION SYSTEM</b>	
51	TELEPHONE	4
52	CORDLESS TELEPHONE	2
53	TELEPHONE ANSWERING MACHINE	2
54	FAX	2
55	MODEM	2
56	SATALITE RECEIVING SYSTEM	1
57	INTERCOM SYSTEM	1
58	P.A.SYSTEM	1
	<b>E : EQUIPMENT REQUIRED FOR IT SYSTEM &amp;APPLICATION</b>	
59	PERSONAL COMPUTER (PENTIUM II (200 MHZ OR HIGHER) 8 MB 256 KB, CACHE, 2.1 GBHDD, 1.44 MBFDD PCIVGA, 32 BIT ETHERNET, MONO MONITER, 104 KB, MOUSE)	4
60	PERSONAL COMPUTER (PENTIUM-166 MMX OR HIGHER) 16 MB, 256 KB, CACHE, 2.1 GBHDD, 1.44 MBFDD, PCIVGA 32 BIT ETHERNET .MM KIT, COLOUR MONITER, 104 KB, MOUSE)	4
61	OSCILLOSCOPE 60 MHZ DUAL TRACE, NON-STORAGE	2
62	DC POWER SUPPLY (0-30 V DUAL 2A)	2



63	MULTIMETER ANALOG 3.5 DIGIT DIGITAL	4
64	MULTIMETER DIGITAL 3.5 DIGIT	4
65	MAGNIFIER WITH LIGHT	1
66	SOLDERING / DESOLDERING STATION	4
67	DRILLING M/C ELECTRIC	1
68	VARIAC WITH AMP & VD.ME.	1
69	LOGIC PULSE CUM PROBE	1
70	TOOL KIT	5
71	TTL IC TESTER	1
72	EPROM ERASER	1
73	EPROM PROGRAMMER	1
74	MICROPROCESSOR TRAINER KIT	4
75	ANALOG TRAINER KIT	4
76	UPS 1KVA ON-LINE	1
77	UPS 625 VA OFF-LINE	7
78	DESKJET PRINTER (COLOUR)	1
79	132 COLOUM DMP PRINTER (COLOUR)	1
80	OPTICAL SCANNER (HAND HELD TYPE)	1