

**GOVERNMENT OF THE PUNJAB**

**TECHNICAL EDUCATION & VOCATIONAL  
TRAINING AUTHORITY**



**CURRICULUM FOR**

**ELECTRICIAN  
(2 – Years Course)**

Revised, May, 2017

**CURRICULUM SECTION  
ACADEMICS DEPARTMENT**

96-H, GULBERG-II, LAHORE

Ph # 042-9263055-9, 9263064

[gm.acad@tevta.gop.pk](mailto:gm.acad@tevta.gop.pk), [manager.cur@tevta.gop.pk](mailto:manager.cur@tevta.gop.pk)

**TRAINING OBJECTIVES:-**

Owing to rapid pace of technological development, the demand for properly skilled manpower in every field of technology is on the rise. The revised curriculum not only address this trend but also intended to prepare a new 'crop' of competent electricians equipped with latest skills and professional attitude and hence capable of meeting the demands of the trade in the modern working environment. While designing the curriculum, various constraints such as financial resources, capacity of the trainers and teaching & training facilities available at various institutes, were also considered.

The revised curriculum is based on a systematic learning approach for electrical technology component of the course while incorporating necessary contents pertaining to modern electronics. New subjects such as Illumination, Development of PCB, Digital Logics and Circuits and Industrial Electronics, OHSE and Introduction to IT and its applications etc. have been added to widen the scope of course and ensuring opportunities for employment for the qualifiers.

**Curriculum Salients:-**

**Entry Level Qualification:** Secondary School Certificate 'Matric'

**Preferable Qualification:** S.S.C (Tech.) / S.S.C (Science) Certificate  
(Commonly known as 'Matric (Tech.)' and 'Matric with Science', respectively)

**Duration of Course:** 4 Semesters spread over 2- Years

**Total Teaching /Training Hours** 3200 Hours [800 Hours / Semester]

40 Hours / Week, based on  
07 Hours / Day (Friday 5 hours)

**Theory to Practical** 1:4  
Theory 20% & Practical Work 80%

**Language (s) of Instructions** Urdu /English

**SKILL COMPETENCY DETAILS:-**

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

1. Work according to general workshop rules & regulations and safety instructions.
2. Use of common hand tools to carry out the bench work and measuring.
3. Use of common hand tools for Electricians.
4. Identify and prepare for use of standard domestic accessory and components in respect of P.V.C channel and pipe wiring system and install them according to standard practices.
5. Draw the circuit diagram according to the lay out and identifying their function.
6. Install all types of domestic and industrial wiring system including distribution board for single and three phase 4 wires supply system.
7. Select and work on different types of protected devices (fuses, re-wire able and HRC. Types) and circuit breaker etc.
8. Connect and read Voltmeter, Ammeter, Wattmeter, Frequency meter, KWH meter, power factor meter and use of tong tester.
9. Install surface wiring (Cable duct wiring, Channel wiring and P.V.C pipe wiring in domestic type installation. concealed wiring and their earthing).
10. Install and operate single phase and 3 phase motor with drum switch / contactor and protection switches.
11. Repair household appliances i.e. electric iron, fans, electric heater, electric kettle, toaster, washing machine, sandwich maker etc.
12. Connect wires to circuit breakers, transformers, or other components.
13. Repair or replace wiring, equipment, and fixtures, using hand tools and power tools.
14. Assemble, install, test, and maintain electrical or electronic wiring, equipment, appliances, apparatus, and fixtures, using hand tools and power tools.
15. Use and test electrical systems and continuity of circuits in electrical wiring, equipment, and fixtures, using testing devices such as ohmmeters, voltmeters, ammeters and oscilloscopes, etc. to ensure compatibility and safety of systems.
16. Plan layout and installation of electrical wiring, equipment and fixtures, based on job specifications and codes.
17. Inspect electrical systems, equipment, and components to identify faults, defects, and the need for adjustment or repair.
18. Direct workers as a Junior Supervisor to install, maintain, or repair electrical wiring, equipment, and fixtures.
19. Diagnose malfunctioning electrical systems, apparatus, and

components, using test equipment and hand tools, to locate the cause of a breakdown and correct the problem

20. Have knowledge about IT applications for electrician trade and basic electronic systems
21. Have basic knowledge and competency to use tools to diagnose and repair basic electronic circuit.

**KNOWLEDGE PROFICIENCIES DETAILS**

The course objectives are as stated below :-

1. Define the safety precautions and safety practices and apply the first-aid to the victim of electric shock,
2. Define the Basic concept of electricity and its sources of generation,
3. Explain current, volt, and resistance their units and relationship among them i.e. ohm's law and its simple application with the measuring resistance current and voltage drop in the resistor, use of ohm meter and magger,
4. Describe the series parallel and complex circuit of resistors,
5. Describe the voltage drops in the line, calculation of wire sizes and use of current tables,
6. Express the estimation of material and tools for small domestic installation,
7. Express the concept of magnetism, electro magnetism, inductor and capacitor (construction of choke with its working principle, construction of capacitor and their capacity)
8. Define the construction of simple measuring instruments i.e. voltmeter, ammeter, watt and KWH meter and their working principle.
9. Define the Working principle of single phase motor (fans) capacitor and non-capacitor types, cooker, electric iron simple and automatic their construction and function.
10. Explain the basic concept of single phase and three-phase generation and its distribution.
11. Explain the concept of single-phase motor used on machine and their faults rectification
12. Express the construction of 3-phase motor and their faults rectification.
13. Express the concept of single-phase transformer (construction working principle and their parts).
14. Understand the basic concepts pertaining to electronics and electronic systems and relate them with the current applications.
15. Describe and apply the diagnostic equipment for repair and maintenance of electrical devices and systems
16. Know about IT applications for electrician trades

**CURRICULUM DELIVERY Structure:-**

The curriculum delivery scheme as defined by TEVTA is retained and shown below:-

**CURRICULUM DELIVERY SCHEME FOR ALL SEMESTERS**

	<b>Curriculum Delivery</b>	<b>Co-curricular activities / Vacations</b>	<b>Test</b>	<b>Total</b>
<b>Week</b>	1-20	21-25	26	26
	20	5	1	

**SCHEME OF STUDIES**

<b>SEMESTER -1</b>			
<b>Sr. #</b>	<b>Subject</b>	<b>T</b>	<b>P</b>
1	Workshop Practice	20	80
2	Technical Mathematics – I	40	0
3	Electrical Principles and their Applications - I	50	150
4	Technical Drawing – I	0	60
5	Handling of Wires and Cables	14	266
6	Functional English	20	20
7	IT Fundamental	16	64
<b>Total</b>		<b>160</b>	<b>640</b>

<b>SEMESTER -2</b>			
<b>Sr. #</b>	<b>Subject</b>	<b>T</b>	<b>P</b>
1	Technical Mathematics – II	40	0
2	Technical Drawing – II	0	40
3	Basic Electronics	40	90
4	Electrical Circuits	20	90
5	Electrical Installation, Repair & Maintenance	14	316
6	Occupational Health & Safety Environment (OHSE)	10	20
7	Functional English	20	20
8	IT -Fundamental	16	64
<b>Total</b>		<b>160</b>	<b>640</b>

<b>SEMESTER 3</b>			
<b>Sr. #</b>	<b>Subject</b>	<b>T</b>	<b>P</b>
1	Troubles of Electrical Equipment's	20	180
2	Electrical Principles and their Applications – II	40	136
3	Electrical Instruments and Measurements	20	90
4	Development of PCB	20	90
5	Earthing, Protective Devices and Faults	24	60
6	Functional English	20	20
7	IT Fundamental	16	64
	<b>Total</b>	<b>160</b>	<b>640</b>

<b>SEMESTER 4</b>			
<b>Sr. #</b>	<b>Subject</b>	<b>T</b>	<b>P</b>
1	Digital Logics and Circuits	20	60
2	Distribution of Power Supply	20	60
3	Illumination	20	60
4	Industrial Electronics	32	100
5	Programmable Logic Controls (PLC)	32	136
6	Final Projects	0	140
7	Functional English	20	20
8	IT Fundamental	16	64
	<b>Total</b>	<b>160</b>	<b>640</b>



## COURSE CONTENTS

SEMESTER- 1			
S.N.	Detail of Topics	Theory Hrs.	Practical Hrs.
1	<p><b>WORKSHOP PRACTICE (THEORY)</b></p> <p><b>1.1 MEASURING</b></p> <p>1.1.1 Purpose of measuring</p> <p>1.1.2 Accuracy of measuring</p> <p>1.1.3 Introduction of metric system</p> <p>1.1.4 Conversion of units (milli, centi, deci)</p> <p>1.1.5 Introduction of steel foot rule</p> <p>1.1.6 Introduction of Vernier calipers</p> <p>1.1.7 Introduction of micro meter</p> <p>1.1.8 Introduction of wire gauge</p> <p>1.1.9 Introduction of try square</p> <p><b>1.2 METALS</b></p> <p>1.2.1 Workshop safety practice</p> <p>1.2.2 Introduction to metals (Cast iron, Steel, Copper &amp; its alloys and Aluminum &amp; its Alloys)</p> <p><b>1.3 HAND OPERATION TOOLS / BENCH WORK</b></p> <p>1.3.1 General Introduction</p> <p>1.3.2 Introduction to Marking</p> <p>1.3.3 Introduction to Cutting</p> <p>1.3.4 Introduction to Metal sawing</p> <p>1.3.5 Introduction to Metal filing</p> <p>1.3.6 Introduction to Metal drilling</p> <p>1.3.7 Introduction to Metal grinding</p> <p>1.3.8 Introduction to Pipe cutting and threading</p> <p>1.3.9 Introduction of Sheet metal work</p> <p>1.3.10 Introduction to Riveting</p> <p>1.3.11 Introduction to Chiseling</p> <p>1.3.12 Introduction to Shearing</p> <p>1.3.13 Introduction to Scraping</p> <p><b>1.4 WORKSHOP PRACTICE (PRACTICALS)</b></p> <p>1.4.1 Metal Work</p> <ul style="list-style-type: none"> <li>• Marking of work piece</li> <li>• Cutting of work piece</li> <li>• Filing of work piece</li> </ul>	20	
	<ul style="list-style-type: none"> <li>• Drilling of work piece</li> </ul>		80

	<ul style="list-style-type: none"> <li>• Grinding of work piece</li> </ul> 1.4.2 Preparation of try square 1.4.3 Preparation of a funnel 1.4.4 Preparation of spanner (Small size) 1.4.5 Work on metal pipe <ul style="list-style-type: none"> <li>• Marking of a metal pipe</li> <li>• Cutting of a metal pipe</li> <li>• Threading of metal pipe</li> </ul>		
<b>2</b>	<b>TECHNICAL MATHEMATICS - I</b> 2.1 Fractions 2.2 Addition, subtraction, multiplication and division of fraction 2.3 Transposition of equations 2.4 Transposition of formula 2.5 Magnitudes of current of voltage & resistance. 2.6 Ohm's law 2.7 Calculation on resistance of wire 2.8 Voltage drop and laws of voltage 2.9 Calculation of resistance and temperatures 2.10 Series connection 2.11 Parallel connection 2.12 Series-parallel connection	<b>40</b>	
<b>3</b>	<b>ELECTRICAL PRINCIPLES AND APPLICATIONS – I</b> 3.1 Static electricity and electrons in motion 3.2 Structure of an atom 3.3 Conductor, insulator, semiconductors and their properties 3.4 Concept of electric charge 3.5 Concept of e.m.f and potential difference 3.6 Current and current density 3.7 Chemical bonds (Covalent and Metallic) 3.8 Materials used for electrical work 3.9 Concept of resistance and OHM's Law 3.10 Laws Of Resistance 3.11 Electrical Power (in DC Circuits) 3.12 Electrical Energy 3.13 Series/Parallel Connection of resistance 3.14 Color coding of resistance <b>LABORATORY EXPERIMENT</b> 3.1.1 Generation of EMF	<b>50</b>	<b>150</b>
	3.1.2 Ohm's law 3.1.3 Resistance of wires		

	3.1.4 Loss of voltage on lines 3.1.5 Current capacity of wires and cables 3.1.6 Resistant and temperature 3.1.7 Series connection 3.1.8 Parallel connection		
4	<b>TECHNICAL DRAWING – I</b> 4.1 Kinds of lines 4.2 Drawing instruments 4.3 Lettering exercises 4.4 Drawing tools and materials 4.5 Introduction to pictorial drawing 4.6 Line sketching 4.7 Symbols (international) 4.8 Types of electrical diagram. (layout, wiring, Current path) <ul style="list-style-type: none"> <li>• Layout diagrams</li> <li>• Wiring Diagrams</li> <li>• Current path diagrams</li> <li>• Single pole switch circuit</li> </ul> 4.9 Multi pole switch circuit 4.10 Two way switch circuit 4.11 Connection of voltmeter 4.12 Combination of two circuits 4.13 Kitchen installation 4.14 Living room installation		<b>60</b>
5	<b>HANDLING OF WIRES AND CABLES</b> 5.1 Introduction to wires and cables 5.2 Use of cable table 5.3 Cutting and stripping of wires 5.4 Bending the wires 5.5 Making and soldering T joint 5.6 Making and soldering cross joint 5.7 Making and soldering of Britannia joints 5.8 Spot soldering 5.9 Handling of wires and cables 5.10 Types of wiring 5.11 Tests of wiring 5.12 Making of test boards 5.13 Single pole switch circuit	<b>14</b>	<b>266</b>
	5.14 Two lamp switch circuit 5.15 Kitchen installation		

	5.16 Single pole and two way switch circuit 5.17 Bell indicator circuit 5.18 Tunnel point wiring		
<b>6</b>	<b>Functional English</b> Detail of contents are given at the end of whole course	<b>20</b>	<b>20</b>
<b>7</b>	<b>IT - Fundamental</b> Detail of contents are given at the end of whole course	<b>16</b>	<b>64</b>
<b>Total</b>		<b>160</b>	<b>640</b>

<b>SEMESTER 2</b>			
<b>S.N.</b>	<b>Detail of Topics</b>	<b>Theory Hrs.</b>	<b>Practical Hrs.</b>
<b>1</b>	<p><b>TECHNICAL MATHEMATICS-II</b></p> <p>1.1 Electric power            1.2 Mechanical and electric power conversion            1.3 Electrical energy            1.4 Calculation of produced heat            1.5 Trigonometric ratios            1.6 Vector quantities and their solutions            1.7 Transformer ratios (single phase and three phase)            1.8 EMF of AC generator            1.9 Terminal voltage            1.10 Calculation of period of frequency            1.11 Effective and maximum value of AC circuit            1.12 Inductive and resistive AC circuits            1.13 Capacitive and resistive AC circuits            1.14 RLC series and parallel circuits            1.15 Power factors in AC circuits and improvement of power factor            1.16 Apparent power, active power, reactive power and true power in AC circuits – single phase            1.17 Line voltage, phase voltage and line current / phase current in 'Y' and delta connection            1.18 Apparent power, active power, reactive power and true power in three phase AC circuit</p>	<b>40</b>	
<b>2</b>	<p><b>TECHNICAL DRAWING II</b></p> <p>Draw diagrams of following</p> <p>2.1 Installation layout for building            2.2 Bell circuit            2.3 Magnetic lines of forces            2.4 DDC generators (series, shunt, compound)            2.5 DC motors (series, shunt, compound)            2.6 Development of sine waves            2.7 Representation of I and V in Ohmic load            2.8 Construction of power curve            2.9 Representation of I and V in Inductive load            2.10 Power curve in inductive load            2.11 Power curve of RL load            2.12 Three phase distribution system            2.13 Charging and discharging of a capacitor            2.14 Capacitor and RC circuit curve I, V and power            2.15 RLC circuit diagram            2.16 Energy meter / diagram</p>		<b>40</b>

	2.17 Single phase transformer 2.18 Three phase transformer 2.19 Security (system component) CCTV installation		
<b>3</b>	<b>BASIC ELECTRONICS</b> 3.1 Resistors and its types (w.r.t construction) 3.2 Capacitor and their applications 3.3 Inductors and their applications 3.4 Introduction to semi conductors 3.5 PN junction Diode 3.6 Rectification 3.7 Zener diode <ul style="list-style-type: none"> <li>• Characteristics of Zener diode</li> <li>• Zener diode as a voltage regulator</li> </ul> 3.8 Transistor and its types (PNP and NPN) 3.9 Biasing configuration of transistors 3.10 Transistor as a switch 3.11 Transistor as an amplifier 3.12 FET 3.13 SCR and its applications 3.14 DIAC and its applications 3.15 TRIAC and its applications 3.16 Oscilloscope and its use 3.17 Functional generator 3.18 Bi-stable multivibrator (flip-flop) 3.19 Photo electric devices (LED, LDR, Photo transistor etc.) 3.20 Opto-coupler <b>LABORATORY EXPERIMENT</b> 3.1.1 Measurements of equivalent resistance in series and parallel circuits 3.1.2 Connecting Capacitors in series and Parallel 3.1.3 Use of LCR meter 3.1.4 Measurement of inductance 3.1.5 Testing of PN junction Diode with multimeter 3.1.6 VI characteristics of PN junction diode 3.1.7 Connecting zener diode as voltage regulator 3.1.8 Connecting transistors in common base and drawing its input output characteristics (PNP and NPN) 3.1.9 Connecting transistors in common emitter and drawing its input output characteristics (PNP and NPN) 3.1.10 Use of transistor as a switch 3.1.11 Use of transistor as an amplifier	<b>40</b>	<b>90</b>

	3.1.12 Making Darlington pair 3.1.13 Testing of FET 3.1.14 Triggering methods of SCR 3.1.15 Use of Opto -coupler		
<b>4</b>	<b>ELECTRIC CIRCUITS</b>  4.1 Concept of time constant 4.2 Energy stored in capacitors 4.3 RLC Series circuits 4.4 RLC Parallel circuit 4.5 Resistor in AC Circuit 4.6 Inductor in AC Circuit 4.7 Capacitor in AC Circuits 4.8 Power in AC Circuits 4.9 Concept of power factor 4.10 Apparent power and true power in AC single phase circuit (Series Resonance, Parallel Resonance) 4.11 Three phase AC circuits(Star-Delta) 4.12 Apparent, true and reactive power concept in 3 $\Phi$ 4.13 Construction and connections of transformer 4.14 Working principle of a transformer 4.15 Loses and efficiency of transformer 4.16 Auto transformer 4.17 Welding transformer single phase and three phase. 4.18 Instrument transformer, CTs and PTs 4.19 working of batteries and their types 4.20 Batteries in circuits <b>LABORATORY EXPERIMENT</b> 4.1.1 Capacitor in A.C and DC 4.1.2 Series resonance 4.1.3 Parallel resonance 4.1.4 Extension of measuring instruments 4.1.5 Voltage and current fault correction 4.1.6 Electric power 4.1.7 Electric energy 4.1.8 Force on current carrying conductor 4.1.9 Single phase transformer (working, construction and ratio) 4.1.10 To find Cu loses of transformer 4.1.11 To find the iron loses of transformer 4.1.12 To find the regulation of transformer with the use of resistance load, inductive load and capacitive load	<b>20</b>	<b>90</b>

	<p>4.1.13 Three phase transformer as star to delta connection</p> <p>4.1.14 Three phase transformer as delta to star connected</p> <p>4.1.15 Three phase transformer as star to star connected</p> <p>4.1.16 Three phase transformer as delta to delta connected</p> <p>4.1.17 Use of hydrometer for checking specific gravity</p> <p>4.1.18 Series and parallel connection of batteries</p> <p>4.1.19 Measurement of power factor</p> <p>4.1.20 Measurement of voltage and current in three phase Circuits</p>		
<b>5</b>	<p><b>ELECTRICAL INSTALLATION, REPAIR AND MAINTENANCE (PRACTICAL)</b></p> <p><b>5.1 Domestic wiring</b></p> <p>5.1.1 IEE Regulation related to wiring, installation and protection</p> <p>5.1.2 For given installations</p> <ul style="list-style-type: none"> <li>• Reading of Drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires in P.V.C pipe</li> <li>• Stripping of wire and making electric connections</li> <li>• Checking of function</li> </ul> <p>5.1.3 Kitchen installation</p> <ul style="list-style-type: none"> <li>• Identification of two way switch</li> <li>• Reading of drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires in P.V.C pipe</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function</li> </ul> <p>5.1.4 Sleeping room installation</p> <ul style="list-style-type: none"> <li>• Identification of intermediate switch</li> <li>• Reading of drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires in P.V.C pipe</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function.</li> </ul>	<b>14</b>	<b>316</b>
	<p>5.1.5 Trembler ball installation</p> <ul style="list-style-type: none"> <li>• Identification and use of Trembler Bell</li> <li>• Reading of drawing</li> </ul>		



	<ul style="list-style-type: none"> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires in P.V.C pipe</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function.</li> </ul> <p>5.1.6 Bell indicator circuit</p> <ul style="list-style-type: none"> <li>• Function of bell Indicator</li> <li>• Reading of drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires in P.V.C pipe</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function of A.C &amp; D.C alarm</li> <li>• Visual indication on panel</li> </ul> <p>5.1.7 Fluorescent lamps with two ballasts</p> <ul style="list-style-type: none"> <li>• Identification of fluorescent tube</li> <li>• Identification and use of choke</li> <li>• Identification and use of holders</li> <li>• Identification and use of starter</li> <li>• Reading of drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires in P.V.C pipe / channel</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function.</li> </ul> <p>5.1.8 Installation and repair of energy saver</p> <p>5.1.9 Installation of intercom set</p> <ul style="list-style-type: none"> <li>• Function of cradle switch</li> <li>• Function of receiver and micro phone.</li> <li>• Reading of drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of cable</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function</li> </ul> <p>5.1.9 Installation of test board</p>		
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	<ul style="list-style-type: none"> <li>• Reading of drawing</li> <li>• Marking according to drawing</li> <li>• Fixing of components</li> <li>• Laying of wires</li> <li>• Stripping of wire and making electric connections</li> <li>• Connecting with supply and checking the function</li> </ul> <p>5.1.11 Installation of working station</p> <ul style="list-style-type: none"> <li>• Introduction of F.I switch</li> <li>• Introduction of contactor</li> <li>• Introduction of emergency switch and installation</li> <li>• Installation of voltmeter and Ammeter</li> <li>• Installation of indicator and sockets</li> </ul> <p>5.1.12 Installation of security systems</p> <p><b>5.2 Industrial wiring</b></p> <p>5.2.1 Single phase motor on-off by drum switch</p> <ul style="list-style-type: none"> <li>• Introduction of contact</li> <li>• Identification of protection switch</li> <li>• Identification using in motor</li> <li>• Identification of drum switch</li> <li>• Use of drum switch</li> <li>• Fixing of components</li> <li>• Laying of wire</li> <li>• Making of connection</li> <li>• Checking the function</li> </ul> <p>5.2.2 Single phase motor reversing by drum switch</p> <ul style="list-style-type: none"> <li>• Identification and use of single phase reversing drum switch</li> <li>• Fixing of components</li> <li>• Laying of wire</li> <li>• Making of connection</li> <li>• Connecting of supply and checking the function</li> </ul> <p>5.2.3 Three phase motor on-off by drum switch</p> <p>5.2.4 Three phase motor reversing by drum switch</p> <p>5.2.5 Three phase two speed motor controlled by drum switch</p> <p>5.2.6 Three phase motor on-off by contactor</p> <ul style="list-style-type: none"> <li>• Identification and working</li> <li>• Principle of magnetic contactor and uses.</li> <li>• Identification and working principle of thermal over load relay</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Fixing of components</li> </ul> <p>5.2.7 Three phase motor reversing by contactor</p> <ul style="list-style-type: none"> <li>• Identification and working</li> <li>• Principle of magnetic contactor and uses</li> <li>• Identification and working</li> <li>• Principle of thermal over load relay.</li> <li>• Fixing of component</li> <li>• Understanding of control and power</li> <li>• Circuit diagram</li> <li>• Laying of wires and connection</li> <li>• Testing and operating the motor</li> </ul> <p>5.2.8 Three Phase Motor Star Delta By Drum Switch</p> <p>5.2.9 Three Phase Motor Star Delta Manual Starter (By Contactor)</p> <p>5.2.10 Three Phase Motor Star Delta Automatic Starter (By Contactor)</p> <p>5.2.11 Three Phase Motor Star Delta Reversing</p> <p>5.2.12 Three Phase Motor Two Speed By Contactor</p> <p>5.2.13 Three Phase Motor Two Direction By Contactor</p> <p><b>5.3 Repair of Household Appliances</b></p> <p>5.3.1 Electric iron</p> <ul style="list-style-type: none"> <li>• Identification and using series lamp</li> <li>• Checking open wire in 3-pin shoe.</li> <li>• Checking and repairing of wire, loose connection</li> <li>• Dismantling of iron and checking and testing heating element</li> <li>• Removing / Fixing heating element</li> <li>• Checking of thermostat</li> <li>• Removing of fault</li> <li>• Assembling of iron</li> </ul> <p>5.3.2 Electric fan</p> <ul style="list-style-type: none"> <li>• Checking and replacing burnt out cable</li> <li>• Identification and using of capacitor</li> <li>• Checking of capacitor</li> <li>• Checking of winding for open circuit</li> <li>• Dismantling of fan</li> <li>• Oiling and greasing of bushes and bearings</li> <li>• Replacing of bearings / bushes</li> <li>• Assembling of fan</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Checking and testing of fan</li> </ul> <p>5.3.3 Toaster and sandwich maker</p> <ul style="list-style-type: none"> <li>• Identification and using of toaster / sandwich maker</li> <li>• Checking the continuity for open circuit</li> <li>• Replacing burnt out cable</li> <li>• Dis-mantling checking and testing of heater elements</li> <li>• Removing / Fixing electric heater elements</li> <li>• Checking of thermostat</li> <li>• Tracing of fault</li> <li>• Removing of Fault</li> <li>• Assembling of toaster / sandwich maker</li> <li>• Checking and testing of toaster / sandwich maker</li> </ul> <p>5.3.4 Washing machine</p>		
<b>6</b>	<p><b>OCCUPATIONAL HEALTH &amp; SAFETY ENVIRONMENT (OHSE)</b></p> <p>6.1 Features of Health and Safety Legislations and Regulations</p> <p>6.2 Identification and control of hazards at workplace</p> <p>6.3 Carryout risk assessment and identify control measures</p> <p>6.4 Methods used for reporting and recording accidents and incidents</p>	<b>10</b>	<b>20</b>
<b>7</b>	<p><b>Functional English</b></p> <p>Detail of contents are given at the end of whole course</p>	<b>20</b>	<b>20</b>
<b>8</b>	<p><b>IT- Fundamental</b></p> <p>Detail of contents are given at the end of whole course</p>	<b>16</b>	<b>64</b>
<b>Total</b>		<b>160</b>	<b>640</b>

<b>SEMESTER- 3</b>			
<b>Sr. #</b>	<b>Detail of Topics</b>	<b>Theory Hrs.</b>	<b>Practical Hrs.</b>
<b>1</b>	<p><b>TROUBLES OF ELECTRICAL EQUIPMENTS</b></p> <p>1.1 Induction motor troubles and remedies  1.1.1 Winding faults  1.1.2 Operating faults</p> <p>1.2 Synchronous motor troubles and remedies  1.2.1 Operating faults  1.2.2 Exciter troubles and remedies</p> <p>1.3 Maintenance of DC generator and motors  1.3.1 Common causes of troubles in DC motors and generators  1.3.2 Commutating and inter poles troubles and their remedies.  1.3.3 Locating neutral and commutating plane</p> <p>1.4 Troubles of transformers and their remedies  1.4.1 Testing of transformer for copper loses  1.4.2 Testing of transformer for iron loses  1.4.3 Testing moisture and its draying methods</p> <p>1.5 Troubles of air and oil circuit breakers  1.5.1 Servicing of oil circuit breakers  1.5.2 Servicing of air circuit breakers</p> <p>1.6 Maintenance and troubles of relays  1.6.1 Induction type relays and their adjustment  1.6.2 Testing of relays  1.6.3 Symptoms, causes and remedies of faults</p> <p>1.7 Industrial motor controls  1.7.1 Study and maintenance methods of across the line starter  1.7.2 Study and Maintenance of speed controllers</p> <p>1.8 Determination and location of cable faults  1.8.1 Study the types of cable faults and methods of their testing  1.8.2 Determination of types of faults  1.8.3 Classification of instruments  1.8.4 Tone test for locating ground and short circuits in multiple conductor cables</p> <p>1.9 Maintenance of storage batteries  1.9.1 Manually cycled batteries, system governed batteries and floated batteries.  1.9.2 Methods of charging –Equalizing charge  1.9.3 Renewal of electrolyte</p>	<b>20</b>	

<p><b>2</b></p>	<p><b>ELECTRICAL PRINCIPLES AND APPLICATIONS - II</b></p> <p>2.1 Introduction to synchronous motor  2.2 Working principle of a synchronous motor  2.3 Synchronous speed and motor characteristics  2.4 Over, level and under excitation of the field.  2.5 Power factor improvement by synchronous motor  2.6 Three phase half-wave rectifiers  2.7 Solid state DC motor drive systems  2.8 Single phase half wave diode motor drive system  2.9 Single phase half wave Thyristers drive system  2.10 Three phase half wave Thyristers drive system  2.11 Choppers  2.12 An elementary motor speed regulator  2.13 Basic Metadyne Generator  2.14 Principle of Amplidyne  2.15 Low Pass, Band Pass, High Pass Filters  2.16 Op-Amplifier pin configuration  2.17 Op-Amp inverting amplifier  2.18 Op-Amp non-inverting amplifier</p> <p><b>LABORATORY EXPERIMENTS</b></p> <p>2.1.1 Study physical construction of a synchronous motor  2.1.2 Operating of synchronous motor in different modes  2.1.3 Study speed, torque characteristics of motor  2.1.4 Study how power factor is improved by motor  2.1.5 Development of three phase half wave diode rectifier in Lab.  2.1.6 Development of three phase half wave Thyristers rectifiers  2.1.7 Study of single phase have wave motor drive system in Lab.  2.1.8 Developing an electronic fan regulator  2.1.9 Studying single phase Thyristors drive system in lab  2.1.10 Study of a chopper in the lab and its development  2.1.11 Study of an elementary motor speed regulator  2.1.12 Study of Amplidyne and Metadyne in the lab  2.1.13 Study the configuration of an Op-Amp and its data sheet  2.1.14 Study the output of an inverting amplifier  2.1.15 Study the output characteristics of a non inverting Amplifier</p>	<p><b>40</b></p>	<p><b>136</b></p>
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<p><b>3</b></p>	<p><b>Electrical Instruments &amp; Measurements</b></p> <p>3.1 Physical Quantities and their Effects  3.2 Working Principle of a Galvanometer  3.3 Construction of an Ampere Meter  3.4 Concept of moving torque, controlling torque and damping Torque  3.5 Extension of range of an ampere meter  3.6 Construction and working principle of a Voltmeter  3.7 Extension of Range of a Voltmeter  3.8 Construction of a Wheat Stone Bridge  3.9 Construction of an OHM Meter and their types  3.10 Introduction to Function Generator  3.11 Construction of CRT  3.12 Construction and Working of an Oscilloscope  3.13 Construction and working principles of a clamp on meter  3.14 Analog and Digital AVO Meters  3.15 Concept of parallax, stroboscopic effect</p> <p><b>LABORATORY EXPERIMENT</b></p> <p>3.1.1 Measurement of internal resistance of Galvanometer  3.1.2 Measurement full scale deflection voltage of Galvanometer  3.1.3 Study of physical change by heating in metals  3.1.4 Use of galvanometer as an Ampere Meter  3.1.5 Extension of range of an ampere meter  3.1.6 Use of galvanometer as a Voltmeter  3.1.7 Extension of Range of a Voltmeter  3.1.8 Construction of a Wheat Stone Bridge  3.1.9 Use of Wheat Stone Bridge as an OHM Meter  3.1.10 Study of waves using Function Generator  3.1.11 Use of an Oscilloscope  3.1.12 Use of a clamp on meter  3.1.13 Analog and Digital AVO Meters  3.1.14 Developing stroboscopic effect in lab  3.1.15 Study of symbols related to instruments (international)</p>	<p><b>20</b></p>	<p><b>90</b></p>
<p><b>4</b></p>	<p><b>DEVELOPMENT OF PCB</b></p> <p>4.1 Introduction to printed circuit boards  4.2 Types of PCBs  4.3 Manual development procedure of PCB  4.4 Introduction of Auto CAD Software(Electrical)  4.5 Methods for developing circuits using software  4.6 Developing screen for screen printing  4.7 Etching of PCB</p>	<p><b>20</b></p>	

	4.8 Drilling on PCB 4.9 Placing of components and Soldering		
	<b>LABORATORY EXPERIMENT</b> 4.1 Installation of Auto CAD software 4.2 Designing practice of circuits using AutoCAD Software 4.2 Developing print on the PCB (Using different methods) 4.3 Developing screen for screen printing 4.4 Etching of PCB 4.5 Drilling on PCB 4.6 Placing of components and Soldering		<b>90</b>
<b>5</b>	<b>EARTHING, PROTECTIVE DEVICES AND FAULTS</b> 5.1 Types of faults in electrical and electronic circuits <ul style="list-style-type: none"> <li>• Grounding Faults</li> <li>• Short Circuits</li> <li>• Leakage Fault</li> </ul> 5.2 Fault finding using <ul style="list-style-type: none"> <li>• Test lamp</li> <li>• Multimeter</li> <li>• Clamp on meter</li> </ul> 5.3 Differentiating the control circuits and power circuits in given circuit diagram 5.4 Physical Study of earthing and protection circuits of a commercial building (Visit) 5.5 Measurement of earthing resistance 5.6 Preparation of ground for earthing 5.7 Installation of Earth electrode and earth conductor 5.8 Installation of lightning arrestors 5.9 Fuses, their types and ratings 5.10 Selection of fuses	<b>24</b>	<b>60</b>
<b>6</b>	<b>Functional English</b> Detail of contents are given at the end of whole course	<b>20</b>	<b>20</b>
<b>7</b>	<b>IT Fundamental</b> Detail of contents are given at the end of whole course	<b>16</b>	<b>64</b>
<b>Total</b>		<b>160</b>	<b>640</b>



<b>SEMESTER -4</b>			
<b>Sr. #</b>	<b>Detail of Topics</b>	<b>Theory Hrs.</b>	<b>Practical Hrs.</b>
<b>1</b>	<p><b>DIGITAL LOGICS AND CIRCUITS</b></p> <p>1.1 Understanding logic gates            1.2 Arithmetic logic circuits            1.3 Combinational logic circuits</p> <ul style="list-style-type: none"> <li>• Adders</li> <li>• Decoders</li> <li>• Multiplexes</li> <li>• Encoders</li> </ul> <p>1.4 Latches and flip flops            1.5 Memories and their types            1.6 Registers and Counters            1.7 D/A and A/D convertors</p> <p><b>LABORATORY EXPERIMENTS</b></p> <p>1.1.1 Use of voltage regulators            1.1.2 Verification of truth tables using logic gates            1.1.3 Verification of Boolean function using logic gates            1.1.4 Construction and verification of Combinational logic circuits</p> <ul style="list-style-type: none"> <li>• Adders</li> <li>• Encoders and Decoders</li> <li>• Multiplexes and de-multiplexers</li> </ul> <p>1.1.5 Verification of outputs of JK- flip flops            1.1.6 Construction of BCD Counter            1.1.7 7 segment display / decoder driver            1.1.8 Introduction to microcontrollers and its programming</p>	<b>20</b>	<b>60</b>
<b>2</b>	<p><b>DISTRIBUTION OF POWER SUPPLY</b></p> <p>2.1 Need of the supply system            2.2 Distribution system            2.3 Components of distribution system            2.4 Transmission systems            2.5 Protection techniques used in electrical supply systems (switch gears etc)</p> <p><b>LABORATORY EXPERIMENTS</b></p> <p>2.1.1 Study of different types of insulators used in power lines            2.1.2 Installation of street light poles            2.1.3 Visit of Grid Station            2.1.4 Visit of sub station            2.1.5 Study of simulation model</p>	<b>20</b>	<b>60</b>

<p><b>3</b></p>	<p><b>ILLUMINATION</b></p> <p>3.1 Luminous flux and lumen</p> <ul style="list-style-type: none"> <li>• Candle power</li> <li>• Luminous intensity</li> <li>• Candela</li> <li>• Illumination</li> <li>• Luminance</li> </ul> <p>3.2 Properties of good illuminations</p> <p>3.3 Mean horizontal candle power</p> <p>3.4 Illumination levels</p> <p>3.5 Working of fluorescent lamps</p> <ul style="list-style-type: none"> <li>• Filament lamps (Incandescent lamp) and its types</li> <li>• Electric discharge lamp</li> </ul> <p><b>LABORATORY EXPERIMENT</b></p> <p>3.1.1 Introduction and Use of Lux meter</p> <p>3.1.2 Study of change in intensity of light w.r.t change in electric power</p> <p>3.1.3 Study of different types of lamps and their circuits</p> <p>3.1.4 Development, repair and maintenance of fluorescent lamp circuits (inductive and electronics)</p>	<p><b>20</b></p>	<p><b>60</b></p>
<p><b>4</b></p>	<p><b>INDUSTRIAL ELECTRONICS</b></p> <p>4.1 Elements of power Electronics</p> <p>4.2 Power Diodes</p> <p>4.3 Power SCR</p> <p>4.4 IGBTs</p> <p>4.5 Converters</p> <p>4.6 Boost Converters</p> <p>4.7 Bug converters</p> <p>4.8 Four Quadrant switch</p> <p>4.9 Voltage stabilizers</p> <p>4.10 High voltage regulators</p> <p>4.11 UPS</p> <p><b>LABORATORY EXPERIMENT</b></p> <p>4.1.1 Lab study the characteristics of Power Diodes</p> <p>4.1.2 Lab study the characteristics of IGBTs</p> <p>4.1.3 Lab Study of Converters circuits</p> <p>4.1.4 Lab study of Boost Converters circuit</p> <p>4.1.5 Lab study Bug converters circuit</p>	<p><b>32</b></p>	<p><b>60</b></p>

	<p>4.1.6 Lab study Single Quadrant switch</p> <p>4.1.7 Lab study of Four Quadrant switch</p> <p>4.1.8 Construction of Voltage stabilizers</p> <p>4.1.9 Lab study of High voltage regulators</p> <p>4.1.10 Assembling of UPS</p>		
<b>5</b>	<p><b>PROGRAMMABLE LOGIC CONTROL (PLC)</b></p> <p>5.1 Architecture of microprocessors and microcontrollers</p> <p>5.2 Basic concepts of PLCs:</p> <ul style="list-style-type: none"> <li>• What is PLC</li> <li>• Hard wire programming</li> <li>• Programming with PLC</li> </ul> <p>5.3 Distinguish b/w permanent wire and free Programming system</p> <ul style="list-style-type: none"> <li>• Advantage and disadvantage</li> <li>• Programming instruction</li> </ul> <p>5.4 Types of memory:</p> <ul style="list-style-type: none"> <li>• RAM programming and deletion</li> <li>• ROM programming and deletion</li> <li>• PROM programming and deletion</li> <li>• EPROM programming and deletion</li> <li>• EEPROM programming and deletion</li> </ul> <p>5.5 Working principle of PLC</p> <ul style="list-style-type: none"> <li>• Construction</li> <li>• Physical dimension</li> <li>• Technical data</li> <li>• Specification</li> </ul> <p>5.6 Types of PLC</p> <ul style="list-style-type: none"> <li>• Identification different types of PLC and their Components</li> </ul> <p><b>LABORATORY EXPERIMENTS</b></p> <p>5.1.1 Programming language</p> <ul style="list-style-type: none"> <li>• Elementary logic circuit</li> <li>• OR gate</li> <li>• AND gate</li> <li>• NOR gate</li> <li>• NAND gate</li> </ul> <p>5.1.2 Step by step</p> <ul style="list-style-type: none"> <li>• Programming with AND gate</li> <li>• Programming with OR gate</li> <li>• Programming with NAND gate</li> <li>• Programming with NOR gate</li> </ul>	<b>36</b>	<b>60</b>

	<p>5.1.3 Programming of the simple control circuit</p> <ul style="list-style-type: none"> <li>• Programming of ON. OFF circuit</li> <li>• Programming of reverse/forward circuit</li> <li>• Programming of Y - <math>\Delta</math> Circuit</li> </ul> <p>5.1.4 Programming marker</p> <ul style="list-style-type: none"> <li>• Using different marker in different types of circuit</li> <li>• Using marker to create internal function</li> <li>• AND before OR gate</li> <li>• OR before AND gates</li> </ul> <p>5.1.5 Programming time delay function</p> <ul style="list-style-type: none"> <li>• Delay on making</li> <li>• Delay on breaking</li> <li>• Pulse circuit</li> </ul> <p>5.1.6 Communication with PLC</p> <ul style="list-style-type: none"> <li>• Program input / output</li> <li>• Program run</li> <li>• Monitor mode</li> <li>• Input / output test</li> <li>• Program storage</li> </ul> <p>5.1.7 Counting function:</p> <ul style="list-style-type: none"> <li>• Introduction to counter function</li> <li>• Types of count up and count down counter</li> <li>• No. of counters available in software.</li> </ul> <p>5.1.8 Time function:</p> <ul style="list-style-type: none"> <li>• Introduction to time function</li> <li>• Time of timer, e.g.</li> <li>• Time delay ON, Time delay OFF</li> <li>• Use of timers</li> <li>• No. of timer available in software</li> <li>• Parametric of main command line</li> <li>• Relevant exercises</li> </ul> <p>5.1.9 Jump function:</p> <ul style="list-style-type: none"> <li>• Introduction of jump function</li> <li>• Use of jump function</li> <li>• No. of jump available in software</li> <li>• Command of jump function</li> </ul>		
<b>6</b>	<b>FINAL PROJECT</b>		<b>140</b>
	<p>6.1 Introduction to standard procedure for the project</p> <p>6.2 Need and selection of Project</p> <p>6.3 Development of the project</p>		

	6.4 Presentation of the Project		
<b>7</b>	<b>Functional English</b> Detail of contents are given at the end of whole course	<b>20</b>	<b>20</b>
<b>8</b>	<b>IT- Fundamental</b> Detail of contents are given at the end of whole course	<b>16</b>	<b>64</b>
<b>Total</b>		<b>160</b>	<b>640</b>

**LIST OF TOOLS, EQUIPMENT & MACHINERY**

<b>Sr. #</b>	<b>Description of Item</b>	<b>Quantity (Nos.)</b>
1	Screw Driver 4", 6", 8"	25
2	Neon phase tester light duty pocket size	25
3	Insulated pliers with side cutter	25
4	Insulated long nose pliers with side cutter	25
5	Insulated wire cutter	25
6	High insulation rubber hand gloves	5
7	Knives	25
8	Chisels 6", 12"	10
9	Hammers 200 grams	25
10	Hack saws	25
11	Electric soldering iron 150 watt	10
12	Bradawl	25
13	Philips screw driver No 1, 2, and 3.	25
14	Measuring tap 3m	25
15	Steel foot rule.	25
16	Files (Flat) 250 x 1, 200 x 2	25
17	Files (Triangular) 150 x 2	25
18	Files (Half round) 200 x 2	25
19	Files (Round) 200 x 1	25
20	Files (Raps cut) 150	25
21	Bench Vice 5"	25
22	Tri square 150 x 100 mm	25
23	Vernier caliper 150 mm	25
24	Center punch	25
25	Hammer 500 grams	10
25	Scriber	25
27	Rubber hammer	10
28	Vice clamps	25
29	Insulation Remover 150 mm	25
30	Bearing puller	2
31	Farmer chisels 8".	10
32	Wooden saw 300 mm	10
33	Test boy	25
34	Volt meter (Panel type 4" x 4") 0-300V- AC 50 HZ	25
35	Ammeter (Panel type 4" x 4") 0-300V- AC 50 HZ	25
36	Multi-meter A.C / D.C (Digital)	25
37	Tong tester	2

38	Hand Electric drill machine with hammering 0-13 mm	2
39	Pedestal drill machine	2
40	Jigsaw machine portable	1
41	Scissor 6"	5
42	Single phase energy meter 220V /10-20A	2
43	Three phase energy meter 30 A	2
44	Dust brush / File brush	25
45	Magnetic Contactors 2 + 2	50
46	Volts / 10 A	2
37	Single Phase Motor	2
48	Three Phase Motor	25
49	Drum Switch ON / OFF, REV / FOR, Star / Delta	10
50	Overload Relay 0.5 – 3.0 Amp	25
51	Motor Protection Switch Three Phase	10
52	Frequency Meter 50 / 60 Hz	2
53	Multi Speed Three Phase Motor 2 Speed	01
54	/ Single Direction	01
55	Multi Speed Three Phase Motor 2 Speed / Two Direction	10
56	Solar Cells 3V 100MA	10
57	PCB Fabrication Kits	10
58	Copper Laminated Sheet	10
59	Silk Screen	10
60	Base Lamination	10
61	PCB Designing Software(or CAD, PCB Designer, Circuit Maker, etc)	
62	ICs 555 Operational Amplifier	2
63	ICs 74 Series	2
64	ICs 40 Series	2
65	Brad board	10
66	Connecting Wires	
67	Power Supply Adapters (3-12 V variable, 500 MA)	5
68	Single Phase Training Transformer 2KVA	1
69	Three Phase Training Transformer 2KVA	1
70	Assembly kit for motor construction	4
71	Assembly kit for transformer construction	4
72	Electric Arc Welding equipment including transformer, cables, accessories, etc.	4 Sets
73	Gas Welding equipment including oxygen cylinders, acetylene cylinders, gas lines and accessories	4 Sets
74	Videos/DVDs on different welding techniques including SMAW,GMAW,TIG and MIG	1 Set
75	VAR meter single phase	5 each

76	VAR meter 3p	5 each
77	Power factor meter single phase	5 each
78	Power factor meter three phase	5 each
79	Test bench for motor B.H.P	5 each
80	Model universal motor 220V AC/DL ½ KW	5 each
81	Wound rotor motor 3 k watts	5 each
82	Resisters/inductors bank of wound rotor motor starter	5 each
83	Shaded roll single phase inductor motor ¼ KW	5 each
84	Capacitor start capacitor run single phase motor	5 each
85	Coil/winding formatting machine power & manual	5 each
86	Electric bell indicator	5 each
87	Electroscope	5 each
88	Ebonite rod	25
89	Glam rod	25
90	Silk piece	25
91	Cat skin piece	25
92	Bar type permanent magnets	6
93	U-shaped permanent magnets	6
94	Magnetic company (large size)	6
95	Pieces of conducting material (i) Copper (ii) aluminum (iii) iron (iv)zinc (v) carbon	25 each
96	Pieces of insulating material (i) glam sheets (ii) mica sheets	25 each
97	Eureka wire (resistive material)	6 rolls
98	Manganin wire	6 rolls
99	Tungsten wire	6 rolls
100	Constantan wire	6 rolls
101	Rheostats	6
102	Galvanometer	6
103	PVC pipe ½"	10 meters
104	PVC pipe ¾"	10 meters
105	Bends, elbows, tees, cross, for ½", ¾" piping	
106	Junction box 3 way, 4 way, (PVC) ½", ¾"	25 each
107	Saddles PVC for ½", ¾"	15 each
108	Wooden screws ½", ¾", 1", 1 ½", 2 ½", 3"	25 each
109	Wooden boards 800m*1200mm for wiring exercise	25 each
110	Perforated boards for industrial wiring	
111	Electrical insulation tape rolls	25 each
112	Single roll switches (piano type)	25 each
113	Two way switch, piano type	25 each
114	Intermediate switch	25 Nos



115	Impulse switch	25 each
116	2 pin socket 5A	25 each
117	3 pin socket 5A/universal socket	25 each
118	3 pin socket 15A	25 each
119	PVC boxes for 1 hole, 2 hole, 3 hole, 5 hole, 8 sockets	25 each
120	Plastic/ Bakelite sheets for mounting the switches and sockets 1, 2, 3, 5, 8 holes.	25 each
121	Bulb holder PVC	25 each
122	Bulb holder loran	25 each
123	Fuses, fuse holders, (rewire able) 1A, 5A, 10A, 16A	25 each
124	HRC fuses complete filling a. Bottle type cartridge b. 6A, 10A, 16A, 20A, 30A	25 each
125	Circuit breaker, single phase, 1A, 3A, 10A, 30A	25 each
126	Circuit breaker 3 cp, 30A	25 each
127	Earth leakage protector	25 each
128	Nails. Steel 1", 1 1/2", 2"	25 each
129	Machine Drill sets (complete sets (1mm dia- 13mm dia)	1set
130	Masonry Drill bit set	2sets
131	Fish wire	1 roll
132	Ceramic Components	25 each
133	Phase Sequence Meter	02
134	Hand vice	06
135	Electronic timers with adjustable time (0-15 minutes)	12
136	Thermal overload current relays readings Ranges 0-1 amp 3-5 amp 5-10 amp 5-16 amp	12 each
137	Megger meter/insulation tester	05

**List of Components (Passive & Active)**

<b>Sr. #</b>	<b>Description of Item</b>	<b>Quantity required (Nos.)</b>
1	Resistor 0.5 Watt 1,10, 15,22,33,47,68,100,105,150, 475 & 7500 Ohms	50 Each
2	Resistor 1 Watt 1,1.5, 2.2, 2.7, 3.3, 4.7, 5.6, 22 & 47 Ohms	50 Each
3	Resistor 2 Watt 0.1, 0.2,10, 33, 38, 47,56,100,150, 220, 330, 390, 470, 560 & 820 Ohms	50 Each
4	Variable Resistors 1, 4.7, 10, 47, 100 & 470 Ohms	10 Each
5	Zener Diodes ZPD 3.3, 4.7, 6.2 & 10	10 Each
6	Diodes Si (1A / 1000V)	10
7	Diodes Ge (15A / 90V)	05
8	Transformer step down having N1= 1600 Turns, N2= 525 + 525 Turns	05
9	Transformer 1 to 1	05
10	Relay 21 Volt	05
11	Coil having inductance 33, 100 & 220 milli Henry	05 Each
12	Capacitors 0.1,0.2, 0.47, 1, 2.2, 4.7, 10, 22, 47, 100, 220, 470 & 2200 micro farad 40 Volts	05 Each
13	Transistors BC 52, BC 107, BC 140 & BC 160	05 Each
14	Micro Switch 12V, 1A	10
15	Lamp with holders 12V, 1A	10
16	Operational amplifier	05
17	IC Adapter BCY3055	05
18	Thyristor 220 V / 1 A	05
19	Triac 220 V / 1 A	05
20	Diac 33 V / 1 A	05
21	NTC	05
22	PTC	05
23	VDR	05

LIST OF CONSUMABLES		
Sr. #	Description of Items	Quantity (No.)
1	Single pole switch (piano type)	120
2	Two way switch (Piano type)	120
3	Lamp holder	180
4	Multi circuit switch	48
5	Bell push button (Piano type)	120
6	Trembler bell (buzzer)	48
7	Fuse-10 A	120
8	Two pole Main switch 15 A	60
9	Circuit breaker 10A	60
10	Distribution Board	120
11	Win board (size 1200 x 800mm)	360
12	PVC pipe ½ inch	1000 ft.
13	PVC junction box 4 way ½ inch	144
14	PVC saddle ½ inch	360
15	Round block plastic 4 inch	360
16	Wooden screws ½ inch	10 pkt.
17	Wooden screw ¾ inch	10 pkt.
18	Wooden screw 1 inch	10 pkt.
19	Wooden screw 1 ½ inch	10 pkt.
20	Wooden screw 2 inch	10 pkt.
21	PVC bend ½ inch	120 dozen
22	Wire PVC 3/.029	10 coil
23	Wire PVC 1/.044	15 coil
24	Cable 4 core 1/.044	2 coil
25	Cable 4 core 3/.029	2 coil
26	Clock switch/ time switch	4

27	Two pin sockets (piano type)	60
28	3 pin sockets (concealed)	60
29	Two pin plug	24
30	Power plug 15A	20
31	Connector bar 6A	02 box
32	Bulb 100W	24
33	Bulb 200 W	12
34	Insulation tape $\frac{3}{4}$ inch (Nitto)	24
35	Wooden board 10inch x 12 inch	48
36	Wooden board 7 x 4 inch	48
37	Wooden board 4 x 4 inch	60
38	Colored Chalk	06 pkt.
39	White board markers	10

# **FUNCTIONAL ENGLISH**

**SCHEME OF STUDIES**

**Functional English**  
(For Two Year Courses)

**1<sup>st</sup> Semester**

<b>Sr. No.</b>	<b>Main Topics</b>	<b>Theory Hours</b>	<b>Practical Hours</b>	<b>Total Hours</b>
1.	Alphabets	2	3	5
2.	Consonants, Vowel and Syllable	3	2	5
3.	Sentence Structure	5	2	7
4.	Types of Sentences	6	2	8
5.	Fundamental usages	2	6	8
6.	Vocabulary of daily use	2	5	7
<b>Total</b>		<b>20</b>	<b>20</b>	<b>40</b>

**2<sup>nd</sup> Semester**

<b>Sr. No.</b>	<b>Main Topics</b>	<b>Theory Hours</b>	<b>Practical Hours</b>	<b>Total Hours</b>
1.	Sentence Pattern	2	2	4
2.	Forms of Verbs	3	5	8
3.	Parts of Speech (Noun, Pronoun, Adjective)	6	2	8
4.	Concept of Tenses (Indefinite and Continuous)	4	4	8
5.	Application Writing	3	2	5
6.	Translation	2	5	7
<b>Total</b>		<b>20</b>	<b>20</b>	<b>40</b>

**3<sup>rd</sup> Semester**

Sr. No.	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Parts of Speech (Verbs, Adverb, Preposition)	4	2	6
2.	Tenses (Perfect Tense, Perfect continuous)	3	3	6
3.	Change of Voice	4	4	8
4.	Letter Writing	2	2	4
5.	Interviews	4	4	8
6.	Communication Skill	3	5	8
<b>Total</b>		<b>20</b>	<b>20</b>	<b>40</b>

**4<sup>th</sup> Semester**

Sr. No.	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Part of Speech (Interjection, Conjunction)	4	2	6
2.	Use of Articles	2	1	3
3.	Change of Voice	5	4	9
4.	Layout of Application	2	2	4
5.	Dialogues	2	4	6
6.	Composition	5	5	10
<b>Total</b>		<b>20</b>	<b>20</b>	<b>40</b>

**Detail of Course Contents****1<sup>st</sup> Semester**

<b>Sr. No.</b>	<b>Detail of Topics</b>	<b>Theory Hours</b>	<b>Practical Hours</b>
<b>1</b>	<b>Alphabets</b> 1.1 Capital Letter / Small Letter	2	3
<b>2</b>	<b>Consonants and vowel and Syllable</b> 2.1 Consonants and Vowels 2.2 Semi-vowels 2.3 Syllable	3	2
<b>3</b>	<b>Sentence Structure</b> 3.1 Alphabets 3.2 Words 3.3 Phrases 3.4 Clauses 3.5 Sentences	5	2
<b>4</b>	4.1 <b>Type of Sentence</b> 4.1.1 Simple 4.1.2 Compound 4.1.3 Complex 4.2 <b>Kinds of Sentence</b> 4.2.1 According to meaning / construction)	6	2
<b>5</b>	<b>Fundamental usages.</b> 5.1 Use of this, That, These, Those 5.2 Use of Has, Have, Had 5.3 Use of There	2	6
<b>6</b>	<b>Vocabulary of Daily Usages</b>	2	5
<b>Total</b>		<b>20</b>	<b>20</b>



**2<sup>nd</sup> Semester**

<b>Sr. No.</b>	<b>Detail of Topics</b>	<b>Theory Hours</b>	<b>Practical Hours</b>
<b>1</b>	<b>Sentence pattern (exercises)</b> 1.1 Exercises 1.2 Use of is, are, am, was, were 1.3 Use of Should, Can, Could	2	2
<b>2</b>	<b>Forms of Verb</b>	3	5
<b>3</b>	<b>Parts of speech</b> 2.1 Noun and its kinds 2.2 Pronoun and its kinds 2.3 Adjective and its kinds	6	2
<b>4</b>	<b>Concept of tenses (Indefinites &amp; Continuous)</b> 3.1 Present continuous 3.2 Past continuous 3.3 Future continuous 3.4 Present Indefinite 3.5 Past Indefinite 3.6 Future Indefinite	4	4
<b>5</b>	<b>Application writing</b> To principal for 4.1 Sick Leave 4.2 Fee concession 4.3 Urgent Piece of work 4.4 Character Certificate 4.5 Scholarship	3	2
<b>6</b>	<b>Translation</b>	2	5
	<b>Total</b>	<b>20</b>	<b>20</b>

### 3<sup>rd</sup> Semester

Sr. No.	Detail of Topics	Theory Hours	Practical Hours
1	<b>Parts of Speech (Verb, Adverb, Preposition)</b> 1.1 Verb and its kinds 1.2 Adverb and its kinds 1.3 Preposition, and its kinds (with samples and exercises)	4	2
2	<b>Tenses: Perfect, Perfect Continuous tenses</b> 2.1 Present Perfect 2.2 Past Perfect 2.3 Future Perfect 2.4 Present Perfect Continuous 2.5 Past Perfect Continuous 2.6 Future Perfect Continuous	3	3
3	<b>Change of voice:</b> 3.1 Indefinite 3.2 Continuous	4	4
4	<b>Letter Writing</b> Letter to 4.1 Father 4.2 Brother 4.3 Uncle 4.4 Friend	4	
5	<b>Interviews</b>	4	4
6	<b>Communication in Writing</b> 5.1 Form of sentence as per tenses 5.2 Form of paragraph 5.3 Proper voice with correct pronunciation 5.4 Describe the situation 5.5 Dialogues	3	5
<b>Total</b>		<b>20</b>	<b>20</b>

### 4<sup>th</sup> Semester

S.No.	Detail of Topics	Theory Hours	Practical Hours
1	<b>Parts of Speech (Interjection &amp; Conjunction)</b> 1.1 The conjunction and its kinds 1.2 Interjection (examples with exercises)	4	2
2	<b>Use of Articles</b> 2.1 The articles and its kinds (examples with exercise)	2	1
3	<b>Change of voice</b> 3.1 Present Perfect 3.2 Past Perfect 3.3 Future Perfect 3.4 Different Usages	5	4
4	<b>Layout of application</b> 4.1 Job Application	2	2
5	<b>Dialogues</b>	2	4
6	<b>Composition</b> 6.1 Paragraph Writing 6.2 Narrative Essays	5	5
<b>Total</b>		<b>20</b>	<b>20</b>

## **LIST OF PRACTICAL**

- Practice of Alphabets
- Practice of Consonant, Vowel and Syllable
- Practice of Vocabulary of Daily use
- Practice of Parts of Speech
- Practice of Application and Letter Writing
- Fundamental exercises with their drill
- Group Discussions
- Practice of Form of Verbs
- Interviews
- Dialogues
- Role play

# **I.T. FUNDAMENTALS**

**SCHEME OF STUDIES****I.T. Fundamentals**  
(For Two Years Course)**1st Semester**

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Introduction to Computers	6	24	30
2.	Introduction to Auto-CAD	5	28	33
3.	Internet & Electronic Mail	5	12	17
<b><u>Total</u></b>		<b>16</b>	<b>64</b>	<b>80</b>

**2nd Semester**

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Auto CAD – II	12	54	66
2.	Internet Surfing, browsing and downloading	4	10	14
<b><u>Total</u></b>		<b>16</b>	<b>64</b>	<b>80</b>

**3rd Semester**

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Microsoft Word – Basics	4	14	18
2.	Introduction to Basics of MS Outlook	4	14	18
3.	Auto CAD (2D)	8	36	44
<b><u>Total</u></b>		<b>16</b>	<b>64</b>	<b>80</b>

**4th Semester**

S.No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Auto CAD – (2D & 3D)	12	50	62
2.	MS Outlook – Part II	4	14	18
<b><u>Total</u></b>		<b>16</b>	<b>64</b>	<b>80</b>

**DETAIL OF COURSE CONTENTS****I.T. Fundamentals**

(For Two Years Course)

**1<sup>st</sup> Semester**

<b>S. No</b>	<b>Detail of Topics</b>	<b>Theory Hours</b>	<b>Practical Hours</b>
<b>1</b>	<p><b>Introduction to Computer:</b></p> <p>1.1 What is a computer- Definition, functions and general features?</p> <p>1.2 What is Hardware –</p> <p>1.2.1 Computer parts and units</p> <p>1.2.1.1 Input Unit - Keyboard, Mouse etc.</p> <p>1.2.1.2 Central Processing Unit</p> <p>1.2.1.3 Output Unit</p> <p>1.3 What is Software –</p> <p>1.3.1 Electronic Parts of a Pc it is</p> <p>1.3.1.1 Software and Its types</p> <p>1.3.1.2 System Software, Application software and its functions</p> <p>1.4 Working with windows Operating System</p> <p>1.4.1 How does windows desktops work?</p> <p>1.4.2 Setting desktop, background and wall papers etc.</p> <p>1.4.3 Viewing directories – List of files and folders different styles.</p> <p>1.4.4 Customizing Taskbar</p> <p>1.5 What are the Icons, Shortcuts and another graphics?</p> <p>1.5.1 How to see computer contents on different drives etc.</p> <p>1.5.2 Exploring the storage, managing and arranging the user data.</p> <p>1.5.3 Knowing the most important files/ folders of the operating system.</p>	<b>6</b>	<b>24</b>
<b>2</b>	<b>Introduction to Auto-CAD</b>	<b>05</b>	<b>28</b>



	<p>2.1 What is Auto-CAD meant for?  2.1.1 Definition, functions and general features?</p> <p><b>2.2 AutoCAD Interface</b></p> <p><b>2.3 Draw Commands</b></p> <p>2.3.1 Line command  2.3.2 Polygon command  2.3.3 Rectangle command  2.3.4 Circle command  2.3.5 Ellipse command</p> <p><b>2.4 Edit Commands</b></p> <p>2.4.1 Erase command  2.4.2 Copy command  2.4.3 Mirror command  2.4.4 Offset command  2.4.5 Extend command  2.4.6 Array command  2.4.7 Move command  2.4.8 Rotate command  2.4.9 Scale command  2.4.10 Trim command  2.4.11 Chamfer command  2.4.12 Fillet command</p> <p><b>2.5 Coordinate Entry</b></p> <p>2.5.1 X,Y,Z, coordinate entry system  2.5.2 Angular measurement  2.5.3 Absolute Coordinate entry  2.5.4 Relative coordinate entry  2.5.5 Polar coordinate entry</p>		
<b>3</b>	<p><b>Emailing and Internet Surfing</b></p> <p>3.1 How to go to Internet, what is required for an internet connection etc.  3.2 Using Internet Explorer.  3.3 What is web browsing?</p> <p>3.4 How to use email? How to search on web?  Etc.</p>	<b>05</b>	<b>12</b>

	3.5 How to make new email account, login and logout an email account etc.?		
	3.6 Downloading and uploading attachments etc.		
<b>Total</b>		<b>16</b>	<b>64</b>

**2<sup>nd</sup> Semester**

S. No	Detail of Topics	Theory Hours	Practical Hours
1	<p data-bbox="331 363 516 394"><b>JTO CAD - II</b></p> <p data-bbox="345 447 540 478"><b>1.2 Osnap</b></p> <p data-bbox="443 485 667 516">1.2.1 Endpoint</p> <p data-bbox="443 522 703 554">1.2.2 Intersection</p> <p data-bbox="443 560 647 592">1.2.3 Nearest</p> <p data-bbox="443 598 659 630">1.2.4 Midpoint</p> <p data-bbox="443 636 656 667">1.2.5 Tangent</p> <p data-bbox="443 674 634 705">1.2.6 Center</p> <p data-bbox="443 711 704 743">1.2.7 Free Osnap</p> <p data-bbox="345 783 769 814"><b>1.3 Qnew/Open/Save/Exit</b></p> <p data-bbox="443 821 618 852">1.3.1 Qnew</p> <p data-bbox="443 858 615 890">1.3.2 Open</p> <p data-bbox="443 896 610 928">1.3.3 Save</p> <p data-bbox="443 934 591 966">1.3.4 Exit</p> <p data-bbox="345 1005 542 1037"><b>1.4 Layers</b></p> <p data-bbox="443 1043 777 1075">1.4.1 Create new layer</p> <p data-bbox="443 1081 789 1113">1.4.2 Assign layer color</p> <p data-bbox="443 1119 829 1150">1.4.3 Assign layer linetype</p> <p data-bbox="345 1190 651 1222"><b>1.5 Dimensioning</b></p> <p data-bbox="443 1228 789 1260">1.5.1 Using dimensions</p> <p data-bbox="345 1308 704 1339"><b>1.6 Text in a Drawing</b></p> <p data-bbox="443 1346 610 1377">1.6.1 Dtext</p> <p data-bbox="443 1383 634 1415">1.6.2 DDedit</p> <p data-bbox="345 1463 711 1495"><b>1.7 Zoom Commands</b></p> <p data-bbox="443 1501 740 1533">1.7.1 Zoom realtime</p> <p data-bbox="443 1539 732 1570">1.7.2 Zoom window</p> <p data-bbox="443 1577 748 1608">1.7.3 Zoom previous</p> <p data-bbox="443 1614 659 1646">1.7.4 Zoom all</p> <p data-bbox="443 1652 716 1684">1.7.5 Pan realtime</p> <p data-bbox="345 1724 667 1755"><b>1.8 Plot Command</b></p> <p data-bbox="345 1761 526 1793"><b>1.9 Ortho</b></p> <p data-bbox="345 1799 565 1831"><b>1.10 Esc Key</b></p>	12	54

	<b>1.11 How Commands Work</b> 1.11.1 Typical Drawing Setup 1.11.2 Ortho command 1.11.3 Snap command 1.11.4 Units command 1.11.5 Limits command 1.11.6 Zoom all 1.11.7 Set Layers 1.11.8 Ltscale command 1.11.9 Text Style command 1.11.10 LWT command  <b>1.12 Undo/Redo</b> <b>1.13 Putting It All Together</b> <b>1.14 Keyboard Functions</b>		
<b>2</b>	<b>Internet Surfing, browsing and downloading</b>  2.1 How to access a website. 2.2 Advance use of Internet Explorer. 2.3 Web browsing, exploring Internet. 2.4 Attaching files with email. 2.5 Searching on Internet.	<b>04</b>	<b>10</b>
<b>Total</b>		<b>16</b>	<b>64</b>

### 3<sup>rd</sup> Semester

S. No	Detail of Topics	Theory Hours	Practical Hours
<b>1</b>	<b>Microsoft Word – Basics</b>  1.1 Opening Microsoft Word 1.1.1. Working in a first file. 1.1.2. Applying Paragraph Formatting 1.1.3. Checking paragraph formats 1.1.4. Duplicating paragraph formats  1.2 Removing paragraph formats 1.2.1 Using line breaks 1.2.2 Aligning Paragraphs 1.2.3 Click and Type: Inserting Paragraphs 1.2.4 Adjusting Line and Paragraph Spacing 1.2.5 Adjusting paragraph spacing	<b>04</b>	<b>14</b>

	<p>1.2.6 Adjusting line spacing</p> <p>1.3 Setting Tabs</p> <p>1.3.1 Setting tabs using the ruler</p> <p>1.3.2 Changing or clearing a tab stop using the ruler</p> <p>1.3.3 Setting tabs using the Tabs dialog box</p> <p>1.3.4 Changing and clearing tabs using the Tabs dialog box</p> <p>1.3.5 Changing the default tab stops</p> <p>1.4 Proper way of typing correct and speedy - getting familiar with the keys</p> <p>1.4.1 Where to type in computer? How to save a file? How to get it back? Where to find your saved work?</p> <p>1.4.2 Getting different lessons of typing.</p> <p>1.4.3 Having typing drill.</p> <p>1.4.4 Formatting in MS Word Bold, Italic, page setup, setting shades and colors.</p> <p>1.5 Working with saved work, opening and moving files.</p> <p>1.6 How to get it printed?</p>		
<b>2</b>	<p><b>Introduction to Basics of MS Outlook</b></p> <p>2.1 <b>What is MS Outlook meant for?</b></p> <p>2.1.1 Definition, functions and general features?</p> <p>2.1.2 Getting know MS Outlook</p> <p>2.2 <b>MS Outlook – Getting it on Work</b></p> <p>2.2.1 Getting familiar with the Screen</p> <p>2.3 <b>Using the Navigation Pane</b></p> <p>2.3.1 A Tree View</p> <p>2.3.2 Folder-Only view</p> <p>2.3.3 Folder view for Calendar</p> <p>2.3.4 Folder List view</p> <p>2.4 <b>Using Smart grouping</b></p> <p>2.5 <b>Outlook Configuration Basics</b></p>	<b>04</b>	<b>14</b>

	<p>2.5.1 Setting up Profiles  2.5.2 Using Multiple Profiles  2.5.3 Adding Address Books  2.5.4 Using an Existing Personal Store  2.5.5 Controlling your Startup Folder</p> <p><b>2.6 The Reading Pane</b>  <b>2.7 Getting Help with Outlook</b></p>		
<b>3</b>	<p><b>Auto CAD (2D)</b></p> <p>3.1 Creating Objects; by 'Draw tool Bar', by using coordinate system, curved objects, point objects (point styles &amp; sizes)</p> <p>3.2 Modifying objects: Copy, erase, cut to clipboard, move, rotate, mirror, array, trim &amp; extend lines, fillet &amp; chamfer edges, offsetting objects, scale &amp; stretch etc.</p> <p>3.3 Dimension; Type &amp; style, creating and editing dimensions.</p> <p>3.4 Regions, boundaries, hatching and gradient</p> <p>3.5 Layers; with color &amp; line type and modification in properties, freeze, lock and off options.</p> <p>3.6 Properties, Hyperlink &amp; Area.</p> <p>3.7 Plotting; setting layout, page setup, paper size, Print area, plot scale &amp; drawing orientation etc.</p> <p>3.8 Architectural drafting (2D)</p> <p>3.8.1 Introduction of plans, elevation &amp; selection</p> <p>3.8.2 Drafting setup; line type &amp; weight, layer, color and drawing layout</p> <p>3.8.3 Instruction to draw plan, elevations &amp; section of a single room.</p> <p>3.8.4 Instruction to draw detailed drawings of residential unit (Plan Elevation, Section &amp; Lay out plan)</p>	<b>08</b>	<b>36</b>
<b>Total</b>		<b>16</b>	<b>64</b>

**4th Semester**

S. No	Detail of Topics	Theory Hours	Practical Hours
1	<p><b>1.1 Auto CAD (2D &amp; 3D)</b></p> <p>1.1.1 Text style and size, symbols and design library (Templates of fixtures and furniture)</p> <p>1.1.2 Bath and Kitchen interior set up.</p> <p>1.1.3 Stain Case; Type &amp; Design</p> <p>1.1.4 Frame Structure; Instruction to draw architectural &amp; structural drawings of a frame structure commercial Building</p> <p>1.1.5 Cross drainage structure; instruction to draw detailed drawing of a culvert and culvert and two span bridge</p> <p><b>1.2 3D Modeling</b></p> <p>1.2.1 3D solid modeling and mesh</p> <p>1.2.2 Creating and editing basic 3D solid; rotating, arraying, mirroring, trimming, chamfering, filtering, sectioning and slicing solids and editing faces of solids.</p> <p>1.2.3 Rendering and its features; lights &amp; shadows</p> <p>1.2.4 Text and dimensioning in 3D views</p> <p>1.2.5 Pictorial drawings of 3D objects ; isometric, oblique &amp; perspective views</p> <p>1.2.6 3D views of building components; kitchen, bath &amp; stair, bedroom, balcony &amp; terrace etc.</p> <p>Perspective view of residential &amp; commercial</p>	12	50

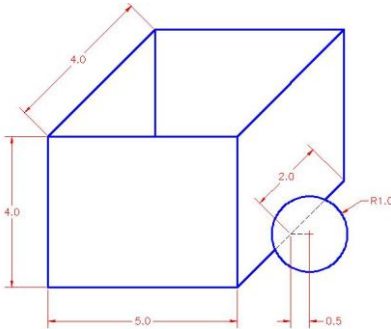
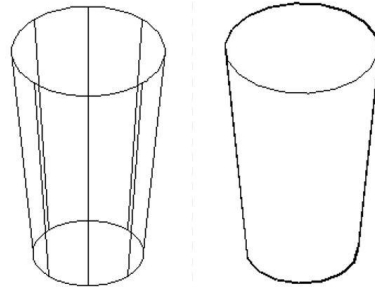
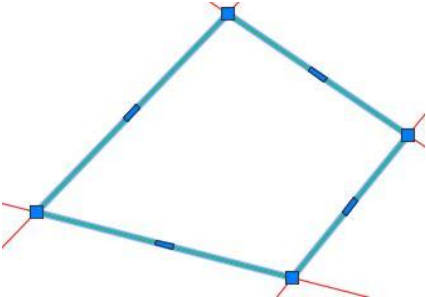
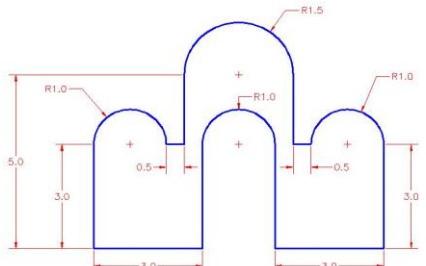
	building; flat roof & sloppy roof type		
<b>2</b>	<p><b>MS Power Point – II</b></p> <p><b>2.1 Adding Animation, Sound, and Movies</b></p> <p>2.1.1 Animating Slide Elements  2.1.2 Adding Transition Effects  2.1.3 Inserting, Playing, and Modifying Sounds  2.1.4 Sidebar: Recording a Narration  2.1.5 Inserting, Playing, and Modifying Movies</p> <p><b>2.2 Reviewing and Sharing a Presentation</b></p> <p>2.2.1 Previewing and Printing a Presentation  2.2.2 Restricting Access to a Presentation  2.2.3 Inserting Review Comments in a Presentation  2.2.4 Using a Document Workspace  2.2.5 Sidebar: Sending a Presentation as an E-Mail Message Attachment  2.2.6 Finalizing a Presentation  2.2.7 Sidebar: Attaching a Digital Signature  2.2.8 Sidebar: Information Rights Management</p> <p><b>2.3 Creating Your Own Presentation Elements</b></p> <p>2.3.1 Creating Theme Colors and Fonts  2.3.2 Viewing and Changing a Presentation's Master Slides  2.3.3 Creating a Slide Layout  2.3.4 Saving a Custom Design Template</p> <p><b>2.4 Delivering a Presentation Electronically</b></p> <p>2.4.1 Adapting a Presentation for Different Audiences  2.4.2 Rehearsing a Presentation  2.4.3 Sidebar: Creating a Self-Running Presentation  2.4.4 Preparing Speaker Notes and Handouts  2.4.5 Preparing a Presentation for Travel  2.4.6 Showing a Presentation</p>	<b>04</b>	<b>14</b>



	2.4.7 Sidebar: Using Two Monitors		
<b>Total</b>		<b>16</b>	<b>64</b>

## LIST OF PRACTICALS

S. No.	Name of Practical
1	Turn On/Off and setting of power supply
2	Accessing the Desktop
3	Using of Icons and Shortcuts
4	Setting / customizing the desktop
5	Viewing the contents of computer – Directory
6	Setting the view of a folder
7	Copying, Deleting and Moving Files in a folder
8	Working with different Applications
9	Explain by demonstrating the following; Managing other object properties: color, line-type, and line-weight.
10	Copy layers and other named objects with Design Center.
11	Type coordinates at the keyboard for any object of your choice.
12	Demonstrate the snapping to object features, how does it work?
13	Practice to install Auto cad, create, copy, rename, save & delete files
14	Practice of drafting setting; specifying units, selecting drawing size, setting grids, snaps, ortho & object snaps, setting layout, text style and height etc.
15	Practice to draw construction line, ray, polyline, spline, multi-lines
16	Practice to prepare A4 A3 A2 A1 size typical drawing layout templates
17	Practice to draw simple geometrical shapes by using “Draw Tool Bar” (rectangle, circle, polygon)
18	Practice to apply co-ordinate system (absolute, relative and polar) to draw different objects and shapes by line commands
19	Practice to draw arcs by specifying three points and by using start point and chord length.
20	Using Internet
21	Opening Email, making new account
22	Sending Receiving Emails
23	Downloading and uploading attachments etc.
24	Practice to draw ellipses by using point & distances and using start and end angles.
25	Practice to use the modify tool bar commands (cut, copy, paste, erase, move, rotate, break, extend and offset etc.) on the already drawn objects
26	Draw orthographic views of different wooden blocks.
27	Practice to change the properties of objects

28	Practice to calculate areas & perimeters of different objects, view & plots.
29	Draw the following in Auto CAD 
30	Draw the following in Auto CAD 
31	Draw the following in Auto CAD 
32	Draw the following in Auto CAD 
33	Draw the following in Auto CAD

34	<p>Draw the following in Auto CAD</p>
35	<p>Draw the following in Auto CAD</p>
36	Practice of making mirror and array of the drawn objects.
37	Practice to resize the objects; stretching, scaling and extending etc.
38	Practice to create regions using boundaries and hatch area in different patterns.
39	Create a library of blocks/symbols/templates of fixtures, furniture, features etc. used in civil engineering drawings
40	Practice to use dimension tool bar for creating dimensions & editing dimensions of already drawn objects & orthographic views.

41	Practice to create appropriate layers with different colours for simple objects/plans and edit any layer, line type & line weight etc.
42	Practice of plotting; creating different layout templates, moving or copying plan/objects, selecting page size, plot area, scale and print it.
43	Draw plan elevation & section of single room with the help of manually developed detailed drawings
44	Draw plan elevation & section of two rooms with verandah with the help of the given line plan.
45	Draw plan elevation and section of simple story residence (Two rooms, bath, kit and verandah) with the help of already manually developed detailed drawing of the same
46	Draw plan elevations & sections of a single story residence unit (two beds) in layer with the help of given line plan and sketches
47	Draw plan elevation and section of double story residential unit (10 Marla) in layers with the help of line plans & sketches
48	Practice to insert symbols of fixtures and furniture from design library in the above drawn plans to specific position at different scales and rotations.
49	Practice to enter text in drawing by using different style and impart text from MS office
50	Draw site plan, location plan for different plots (10 Marla, 1Kanal, 2Kanal) in different localities
51	Draw land scape plan for plots of different sizes by using hatching command etc.
52	Practice to calculate the plot areas, covered areas, open areas etc. of already developed CAD plans

### **LIST OF LABS**

➤ **Computer Lab**

### **EMPLOYABILITY OF PASS-OUTS**

After the successful completion of the course, the learners acquire the requisite competencies to find job / employment in the following sectors / organizations:

- Industry (all types)
- Repairing Workshop
- Hospitals
- Railways
- PWD / MES
- Telecommunication
- Electrical Power Generation & Distribution Networks
- Construction (Housing & Infrastructure)
- Technical Institutions
- Establishments such as WAPDA, PAEC, SPD Organizations, etc.,

The pass-outs can also start their own workshops, individually or cooperatively thus creating earning opportunities for themselves but also to create jobs for the others. They may like to benefit from many initiatives announced by the governments to promote self employment amongst the skilled youth.

## REFERENCE BOOKS

The books prescribed here cover most of the syllabi pertaining to a number of subjects in the G-II Electrician course, the teachers / instructors are, however, advised to consult other books and manuals, specially the latest editions, available in the Institutes' library or the local book stores.

They may like to use internet facility to get relevant materials to prepare their lectures and to facilitate laboratory work.

Sr. No.	Title of the Book	Name of the Author(s)	Name of the Publisher
1.	Ibtadai Electrical Engineering	Aagun Nulesh Paririzshen	National Book Foundation
2.	Electrical Engineering Basic Technology	Heinrich Hubscher, J.Klaus, W.Pfliger, S.Appelt	GTZ
3.	Electrical Technology	Edward Hughes	Longman Group
4.	Electrical Power Engineering Proficiency course	Ernest Herman Heinrich Hubscher	GTZ
5.	Basic Electronics for Technicians	Homer Schumacher	Wiley
6.	Electrical Wiring: Industrial	Robert Smith	Prentice Hall
7.	Electrical Wiring: Residential	Ray Mulin	Jonas and Sons
8.	Guide to Electrical Power Systems	E. Haraway	Nelson
9	Electrician Manual	M Nasrullah, H M Naeem, Shahid Maqsood	TEVTA

## **MINIMUM QUALIFICATION OF INSTRUCTOR**

B.Sc Elect. Engineering / B. Tech. / B. Tech (Honors) in Electrical Tech.

OR

Three year Diploma of Associate Engineering in Elect. Tech. with two year field experience.

OR

Matric with science / Matric tech with Two year trade proficiency Certificate along with six-year experience field experience.