

7. TRADE SYLLABUS

SYLLABUS FOR ELECTRONICS MECHANIC TRADE			
FIRST YEAR			
Duration	Reference Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
Professional Skill 65 Hrs; Professional Knowledge 10 Hrs	Perform basic workshop operations using suitable tools for fitting, riveting, drilling etc. observing suitable care & safety following safety precautions. (Mapped NOS: ELE/N1002)	Trade and Orientation <ol style="list-style-type: none"> 1. Visit to various sections of the institute and identify location of various installations. (05 Hrs.) 2. Identify safety signs for danger, warning, caution & personal safety message. (03 Hrs.) 3. Use of personal protective equipment (PPE). (05 Hrs.) 4. Practice elementary first aid. (05 Hrs.) 5. Preventive measures for electrical accidents & steps to be taken in such accidents. (02 Hrs.) 6. Use of Fire extinguishers. (05 Hrs.) 	Familiarization with the working of Industrial Training Institute system. Importance of safety and precautions to be taken in the industry/shop floor. Introduction to PPEs. Introduction to First Aid. Response to emergencies e.g. power failure, fire, and system failure. Importance of housekeeping & good shop floor practices. Occupational Safety & Health: Health, Safety and Environment guidelines, legislations & regulations as applicable. (05 Hrs.)
		Hand tools and their uses <ol style="list-style-type: none"> 7. Identify the different hand tools. (05 Hrs.) 8. Selection of proper tools for operation and precautions in operation. (05 Hrs.) 9. Care & maintenance of trade tools. (05 Hrs.) 10. Practice safety precautions while working in fitting jobs. (10 Hrs.) 	Identification, specifications, uses and maintenance of commonly used hand tools. State the correct shape of files for filing different profiles. Riveting of tags and lugs, cutting and bending of sheet metals, chassis and cabinets. (05 Hrs.)

		<p>11. Workshop practice on filing and hacks awing. (05 Hrs.)</p> <p>12. Practice simple fitting and drilling. (10 Hrs.)</p>	
Professional Skill 50 Hrs; Professional Knowledge 15 Hrs	Select and perform electrical/ electronic measurement of single range meters and calibrate the instrument. ELE/N9401	<p>Basics of AC and Electrical Cables</p> <p>13. Identify the Phase, Neutral and Earth on power socket, use a testers to monitor AC power. (02 Hrs.)</p> <p>14. Construct a test lamp and use it to check mains healthiness. (03 Hrs.)</p> <p>15. Measure the voltage between phase and ground and rectify earthing. (04 Hrs.)</p> <p>16. Identify and test different AC mains cables. (03 Hrs.)</p> <p>17. Prepare terminations, skin the electrical wires /cables using wire stripper and cutter. (03 Hrs.)</p> <p>18. Measure the gauge of the wire using SWG and outside micrometer. (03 Hrs.)</p> <p>19. Refer table and find current carrying capacity of wires. (02 Hrs.)</p> <p>20. Crimp the lugs to wire end. (03 Hrs.)</p> <p>21. Measure AC and DC voltages using multi meter. (03 Hrs.)</p>	<p>Basic terms such as electric charges, Potential difference, Voltage, Current, Resistance. Basics of AC & DC.</p> <p>Various terms such as +ve cycle, -ve cycle, Frequency, Time period, RMS, Peak, Instantaneous value.</p> <p>Single phase and Three phase supply.</p> <p>Terms like Line and Phase voltage/ currents.</p> <p>Insulators, conductors and semiconductor properties.</p> <p>Different type of electrical cables and their Specifications.</p> <p>Types of wires & cables, standard wire gauge (SWG).</p> <p>Classification of cables according to gauge (core size), number of conductors, material, insulation strength, flexibility etc.</p> <p>(08 Hrs.)</p>
		<p>22. Identify the type of meters by dial and scale marking/ symbols. (03</p>	<p>Single range meters</p> <p>Introduction to electrical and electronic measuring</p>

		<p>Hrs.)</p> <p>23. Demonstrate various analog measuring Instruments. (04 Hrs.)</p> <p>24. Find the minimum and maximum measurable range of the meter. (03 Hrs.)</p> <p>25. Carryout mechanical zero setting of a meter. (04 Hrs.)</p> <p>26. Check the continuity of wires, meter probes and fuse etc. (05 Hrs.)</p> <p>27. Measure voltage and current using clamp meter. (05 Hrs.)</p>	<p>instruments.</p> <p>Basic principle and parts of simple meters.</p> <p>Specifications, symbols used in dial and their meaning. (07 Hrs.)</p>
<p>Professional Skill 25 Hrs; Professional Knowledge 06 Hrs</p>	<p>Test & service different batteries used in electronic applications and record the data to estimate repair cost.</p> <p>(Mapped NOS: ELE/N7001)</p>	<p>Cells & Batteries</p> <p>28. Identify the +ve and -ve terminals of the battery. (02 Hrs.)</p> <p>29. Identify the rated output voltage and Ah capacity of given battery. (01 Hrs.)</p> <p>30. Measure the voltages of the given cells/battery using analog/ digital multimeter. (03 Hrs.)</p> <p>31. Charge and discharge the battery through load resistor. (05 Hrs.)</p> <p>32. Maintain the secondary Battery. (05 Hrs.)</p> <p>33. Measure the specific gravity of the electrolyte using hydrometer. (03 Hrs.)</p> <p>34. Test a battery and verify whether the battery is ready for use or needs</p>	<p>Cells & Batteries</p> <p>Construction, types of primary and secondary cells/battery. Materials used, Specification of cells and batteries.</p> <p>Charging process, efficiency, life of cell/battery.</p> <p>Selection of cells / Batteries etc.</p> <p>Use of Hydrometer.</p> <p>Types of electrolytes used in cells and batteries.</p> <p>Series/ parallel connection of batteries and purpose of such connections. (06 Hrs.)</p>

		recharging. (06 Hrs.)	
Professional Skill 60 Hrs; Professional Knowledge 10 Hrs	Measure AC/DC using proper measuring instruments and compare the data using standard parameter. ELE/N9402	AC & DC measurements 35. Use the multi meter to measure the various functions (AC V, DC V, DC I, AC I, R). (10 Hrs.) 36. Identify the different types of meter for measuring AC & DC parameters. (10 Hrs.) 37. Identify the different controls on the CRO/DSO front panel and observe the function of each control. (14 Hrs.) 38. Measure DC voltage, AC voltage, time period using CRO/DSO sine wave parameters. (14 Hrs.) 39. Identify the different controls on the function generator front panel and observe the function of each control. (12 Hrs.)	Introduction to electrical measuring instruments. Importance and classification of meters. MC and MI meters. Characteristics of meters and errors in meters. Multi meter, use of meters in different circuits. Care and maintenance of meters. Use of CRO/DSO, Function generator, LCR meter (10 Hrs.)
Professional Skill 25 Hrs; Professional Knowledge 09 Hrs	Measure the various parameters by DSO and execute the result with standard one. ELE/N9403	Digital Storage Oscilloscope 40. Identify the different front panel control of a DSO. (05 Hrs.) 41. Measure the Amplitude, Frequency and time period of typical electronic signals using DSO. (06 Hrs.) 42. Take a print of a signal from DSO by connecting it to a printer and tally with applied signal. (07 Hrs.) 43. Construct and test function generator using IC 8038. (07 Hrs.)	Advantages and features of DSO. Block diagram of Digital storage oscilloscope (DSO)/CRO and applications. Applications of digital CRO. Block diagram of function generator. Differentiate a CRO with DSO. (09 Hrs.)

<p>Professional Skill 25 Hrs; Professional Knowledge 05 Hrs</p>	<p>Plan and execute soldering & de-soldering of various electrical components like Switches, PCB & Transformers for electronic circuits.</p> <p>(Mapped NOS: ELE/N7812)</p>	<p>Soldering/ De-soldering and Various Switches</p> <p>44. Practice soldering on different electronic components, small transformer and lugs. (04 Hrs.)</p> <p>45. Practice soldering on IC bases and PCBs. (04 Hrs.)</p> <p>46. Practice de-soldering using pump and wick. (04 Hrs.)</p> <p>47. Join the broken PCB track and test. (04 Hrs.)</p> <p>48. Identify and use SPST, SPDT, DPST, DPDT, tumbler, push button, toggle, piano switches used in electronic industries. (04 Hrs.)</p> <p>49. Make a panel board using different types of switches for a given application. (05 Hrs.)</p>	<p>Different types of soldering guns, related to Temperature and wattages, types of tips. Solder materials and their grading. Use of flux and other materials. Selection of soldering gun for specific requirement. Soldering and De-soldering stations and their specifications. Different switches, their specification and usage. (05 Hrs.)</p>
<p>Professional Skill 100 Hrs; Professional Knowledge 25 Hrs</p>	<p>Test various electronic components using proper measuring instruments and compare the data using standard parameter.</p> <p>(Mapped NOS: ELE/N5804)</p>	<p>Active and Passive Components</p> <p>50. Identify the different types of active electronic components. (06 Hrs.)</p> <p>51. Measure the resistor value by colour code and verify the same by measuring with multimeter. (06 Hrs.)</p> <p>52. Identify resistors by their appearance and check physical defects. (06 Hrs.)</p> <p>53. Identify the power rating of carbon resistors by their size. (06 Hrs.)</p> <p>54. Practice on measurement of parameters in</p>	<p>Ohm's law and Kirchhoff's Law. Resistors; types of resistors, their construction & specific use, color-coding, power rating. Equivalent Resistance of series parallel circuits. Distribution of V & I in series parallel circuits. Principles of induction, inductive reactance. Types of inductors, construction, specifications, applications and energy storage concept.</p>

		<p>combinational electrical circuit by applying Ohm's Law for different resistor values and voltage sources. (06 Hrs.)</p> <p>55. Measurement of current and voltage in electrical circuits to verify Kirchhoff's Law. (06 Hrs.)</p> <p>56. Verify laws of series and parallel circuits with voltage source in different combinations. (06 Hrs.)</p> <p>57. Measure the resistance, Voltage, Current through series and parallel connected networks using multi meter. (06 Hrs.)</p> <p>58. Identify different inductors and measure the values using LCR meter. (06 Hrs.)</p> <p>59. Identify the different capacitors and measure capacitance of various capacitors using LCR meter. (06 Hrs.)</p> <p>60. Identify and test the circuit breaker and other protecting devices. (06 Hrs.)</p> <p>61. Dismantle and identify the different parts of a relay. (06 Hrs.)</p> <p>62. Connect a timer relay in a circuit and test for its working. (06 Hrs.)</p> <p>63. Connect a contactor in a circuit and test for its working. (06 Hrs.)</p>	<p>Self and Mutual induction. Behaviour of inductor at low and high frequencies. Series and parallel combination, Q factor. Capacitance and Capacitive Reactance, Impedance. Types of capacitors, construction, specifications and applications. Dielectric constant. Significance of Series parallel connection of capacitors. Capacitor behaviour with AC and DC. Concept of Time constant of a RC circuit. Concept of Resonance and its application in series and parallel circuit. Properties of magnets and their materials, preparation of artificial magnets, significance of electromagnetism, types of cores. Relays, types, construction and specifications etc (25 Hrs.)</p>
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<p>Professional Skill 60 Hrs; Professional Knowledge 10 Hrs</p>	<p>Assemble simple electronic power supply circuit and test for functioning.</p> <p>(Mapped NOS: ELE/N5804)</p>	<p>Power Supply Circuits</p> <p>67. Test the given diode using multi meter and determine forward to reverse resistance ratio. (05 Hrs.)</p> <p>68. Measure the voltage and current through a diode in a circuit and verify its forward characteristic. (05 Hrs.)</p> <p>69. Identify different types of transformers and test. (05 Hrs.)</p> <p>70. Identify the primary and secondary transformer windings and test the polarity. (05 Hrs.)</p> <p>71. Construct and test a half wave, full wave and Bridge rectifier circuit. (05 Hrs.)</p> <p>72. Measure ripple voltage, ripple frequency and ripple factor of rectifiers for different load and filter capacitors. (05 Hrs.)</p> <p>73. Construct and test Zener based voltage regulator circuit. (05 Hrs.)</p> <p>74. Calculate the percentage</p>	<p>Semiconductor materials, components, PN Junction, Forward and Reverse biasing of diodes.</p> <p>Forward current and Reverse voltage.</p> <p>Packing styles of diodes.</p> <p>Different diodes, Rectifier configurations, their efficiencies, Filter components and their role in reducing ripple.</p> <p>Working principles of Zener diode, varactor diode, their specifications and applications.</p> <p>Working principle of a Transformer, construction, Specifications and types of cores used.</p> <p>Step-up, Step down and isolation transformers with applications. Losses in Transformers. (07 Hrs.)</p>

		regulation of regulated power supply. (05 Hrs.)	
		<p>IC Regulators</p> <p>75. Construct and test a +12V fixed voltage regulator. (05 Hrs.)</p> <p>76. Identify the different types of fixed +ve and – ve regulator ICs and the different current ratings (78/79 series). (04 Hrs.)</p> <p>77. Observe the output voltage of different IC 723 metal/ plastic type. (04 Hrs.)</p> <p>78. Construct and test a 1.2V – 30V variable output regulated power supply using IC LM317T. (05 Hrs.)</p>	<p>Regulated Power supply using 78XX series, 79XX series.</p> <p>Op-amp regulator, 723 regulator, (Transistorized & IC based).</p> <p>Voltage regulation, error correction and amplification etc. (03 Hrs.)</p>
Professional Skill 90 Hrs; Professional Knowledge 15 Hrs	Construct, test and verify the input/output characteristics of various analog circuits. ELE/N9404	<p>Transistor</p> <p>79. Identify different transistors with respect to different package type, B-E-C pins, power, switching transistor, heat sinks etc. (06 Hrs.)</p> <p>80. Test the condition of a given transistor using ohm-meter. (06 Hrs.)</p> <p>81. Construct and test a transistor based switching circuit to control a relay (use Relays of different coil voltages and Transistors of different β) (06hrs)</p>	<p>Construction, working of a PNP and NPN Transistors, purpose of E, B & C Terminals.</p> <p>Significance of α, β and relationship of a Transistor.</p> <p>Need for Biasing of Transistor.</p> <p>VBE, VCB, VCE, IC, IB, Junction Temperature, junction capacitance, frequency of operation.</p> <p>Transistor applications as switch and amplifier.</p> <p>Transistor input and output characteristics.</p> <p>Transistor power ratings & packaging styles and use of different heat sinks. (5 Hrs.)</p>
		Amplifier	Different types of biasing,

		<p>82. Construct and test fixed-bias, emitter-bias and voltage divider-bias transistor amplifier. (06 Hrs.)</p> <p>83. Construct and Test a common emitter amplifier with and without bypass capacitors. (06 Hrs.)</p> <p>84. Construct and Test common collector/emitter follower amplifier. (06 Hrs.)</p> <p>85. Construct and test a two stage RC Coupled amplifier. (06 Hrs.)</p>	<p>various configurations of transistor (C-B, C-E & C-C), their characteristics and applications.</p> <p>Transistor biasing circuits and stabilization Techniques.</p> <p>Classification of amplifiers according to frequency, mode of operation and methods of coupling.</p> <p>Voltage amplifiers - voltage gain, loading effect.</p> <p>Single stage CE amplifier and CC amplifier.</p> <p>Emitter follower circuit and its advantages.</p> <p>RC coupled amplifier, Distinguish between voltage and power amplifier, Alpha, beta, voltage gain, Concept of dB dBm. Feedback and its types. (5 Hrs.)</p>
		<p>Oscillators</p> <p>86. Demonstrate Colpitts oscillator, Hartley oscillator circuits and compare the output frequency of the oscillator by CRO. (06 Hrs.)</p> <p>87. Construct and test a RC phase shift oscillator circuits. (06 Hrs.)</p> <p>88. Construct and test a crystal oscillator circuits. (06 Hrs.)</p> <p>89. Demonstrate Astable, monostable, bistable circuits using transistors. (06 Hrs.)</p>	<p>Introduction to positive feedback and requisites of an oscillator.</p> <p>Study of Colpitts, Hartley, Crystal and RC oscillators.</p> <p>Types of multi vibrators and study of circuit diagrams. (03 Hrs.)</p>

		<p>Wave shaping circuits</p> <p>90. Construct and test shunt clipper. (06 Hrs.)</p> <p>91. Construct and test series and dual clipper circuit using diodes. (06 Hrs.)</p> <p>92. Construct and test clamper circuit using diodes. (06 Hrs.)</p> <p>93. Construct and test Zener diode as a peak clipper. (06 Hrs.)</p>	<p>Diode shunt clipper circuits, Clamping / limiting circuits and Zener diode as peak clipper, uses their applications. (02 Hrs.)</p>
Professional Skill 80 Hrs; Professional Knowledge 20 Hrs	Plan and construct different power electronic circuits and analyse the circuit functioning. ELE/N1201	<p>Power Electronic Components</p> <p>94. Identify different power electronic components, their specification and terminals. (05 Hrs)</p> <p>95. Construct and test a FET Amplifier. (15 Hrs)</p> <p>96. Construct a test circuit of SCR using UJT triggering. (15 Hrs)</p> <p>97. Construct a simple dimmer circuit using TRIAC. (10 Hrs)</p> <p>98. Construct UJT based free running oscillator and change its frequency. (15 Hrs)</p>	<p>Construction of FET & JFET, difference with BJT. Purpose of Gate, Drain and source terminals and voltage / current relations between them and Impedances between various terminals. Heat Sink- Uses & purpose. Suitability of FET amplifiers in measuring device applications. Working of different power electronic components such as SCR, TRIAC, DIAC and UJT. (12 Hrs.)</p>
		<p>MOSFET & IGBT</p> <p>99. Identify various Power MOSFET by its number and test by using multimeter. (05 Hrs)</p> <p>100. Construct MOSFET test circuit with a small load. (05 Hrs)</p> <p>101. Identify IGBTs by their numbers and test by using multimeter. (05 Hrs)</p>	<p>MOSFET, Power MOSFET and IGBT, their types, characteristics, switching speed, power ratings and protection.</p> <p>Differentiate FET with MOSFET.</p> <p>Differentiate Transistor with</p>

		102. Construct IGBT test circuit with a small load. (05 Hrs)	IGBT. (08 Hrs.)
Professional Skill 50 Hrs; Professional Knowledge 06 Hrs	Select the appropriate opto electronics components and verify the characteristics in different circuit. ELE/N6102	Opto Electronics 103. Test LEDs with DC supply and measure voltage drop and current using multimeter. (11 Hrs.) 104. Construct a circuit to test photo voltaic cell. (13 Hrs.) 105. Construct a circuit to switch a lamp load using photo diode. (13 Hrs.) 106. Construct a circuit to switch a lamp load using photo transistor. (13 Hrs.)	Working and application of LED, IR LEDs, Photo diode, photo transistor, their characteristics and applications. Optical sensor, opto-couplers, circuits with opto isolators. Characteristics of LASER diodes. (06 Hrs.)
Professional Skill 80 Hrs; Professional Knowledge 15 Hrs	Assemble, test and troubleshoot various digital circuits. (Mapped NOS: ELE/N1201)	Basic Gates 107. Verify the truth tables of all Logic Gate ICs by connecting switches and LEDs. (05 Hrs.) 108. Construct and verify the truth table of all the gates using NAND and NOR gates. (05 Hrs.) 109. Use digital IC tester to test the various digital ICs (TTL and CMOS). (05 Hrs.)	Introduction to Digital Electronics. Difference between analog and digital signals. Number systems (Decimal, binary, octal, Hexadecimal). BCD code, ASCII code and code conversions. Various Logic Gates and their truth tables. (05 Hrs.)
		Combinational Circuits 110. Construct Half Adder circuit using ICs and verify the truth table. (07 Hrs.) 111. Construct Full adder with two Half adder circuit using ICs and verify the truth table. (07 Hrs.)	Combinational logic circuits such as Half Adder, Full adder, Parallel Binary adders, 2-bit and four bit full adders. Magnitude comparators. Half adder, full adder ICs and their applications for implementing arithmetic

		<p>112. Construct the adder cum subtractor circuit and verify the result. (07 Hrs.)</p> <p>113. Construct and Test a 2 to 4 Decoder. (07 Hrs.)</p> <p>114. Construct and Test a 4 to 2 Encoder. (07 Hrs.)</p> <p>115. Construct and Test a 4 to 1 Multiplexer. (05 Hrs.)</p> <p>116. Construct and Test a 1 to 4 De Multiplexer. (05 Hrs.)</p>	<p>operations.</p> <p>Concept of encoder and decoder. Basic Binary Decoder and four bit binary decoders.</p> <p>Need for multiplexing of data. 1:4 line Multiplexer / Demultiplexer. (07 Hrs.)</p>
		<p>Flip Flops</p> <p>117. Identify different Flip-Flop (ICs) by the number printed on them. (05 Hrs.)</p> <p>118. Construct and test four bit latch using 7475. (05 Hrs.)</p> <p>119. Construct and test R-S flip-flop using IC7400 with clock and without clock pulse. (05 Hrs.)</p> <p>120. Verify the truth tables of Flip-Flop ICs (RS, D, T, JK, MSJK) by connecting switches and LEDs. (05 Hrs.)</p>	<p>Introduction to Flip-Flop. S-R Latch, Gated S-R Latch, D-Latch.</p> <p>Flip-Flop: Basic RS Flip Flop, edge triggered D Flip Flop, JK Flip Flop, T Flip Flop.</p> <p>Master-Slave flip flops and Timing diagrams.</p> <p>Basic flip flop applications like data storage, data transfer and frequency division. (03 Hrs.)</p>
<p>Professional Skill 50 Hrs;</p> <p>Professional Knowledge 04 Hrs</p>	<p>Simulate and analyze the analog and digital circuits using Electronic simulator software.</p> <p>(Mapped NOS: ELE/N6102)</p>	<p>Electronic circuit simulator</p> <p>121. Prepare simple digital and electronic circuits using the software. (13 Hrs.)</p> <p>122. Simulate and test the prepared digital and analog circuits. (13 Hrs.)</p> <p>123. Convert the prepared circuit into a layout</p>	<p>Study the library components available in the circuit simulation software.</p> <p>Various resources of the software. (04 Hrs.)</p>

		<p>diagram. (12 Hrs.)</p> <p>124. Prepare simple, power electronic and domestic electronic circuit using simulation software. (12 Hrs.)</p>	
<p>Professional Skill 80 Hrs;</p> <p>Professional Knowledge 15 Hrs</p>	<p>Construct and test different circuits using ICs 741operational amplifiers & ICs 555 linear integrated circuits and execute the result. ELE/N9405</p>	<p>Op – Amp & Timer 555 Applications</p> <p>125. Use analog IC tester to test the various analog ICs. (06 Hrs.)</p> <p>126. Construct and test various Op-Amp circuits Inverting, Non-inverting and Summing Amplifiers. (06 Hrs.)</p> <p>127. Construct and test Differentiator and Integrator. (06 Hrs.)</p> <p>128. Construct and test a zero crossing detector. (06 Hrs.)</p> <p>129. Construct and test Instrumentation amplifier. (06 Hrs.)</p> <p>130. Construct and test a Binary weighted and R-2R Ladder type Digital-to-Analog Converters. (08 Hrs.)</p> <p>131. Construct and test Astable timer circuit using IC 555. (08 Hrs.)</p> <p>132. Construct and test mono stable timer circuit using IC 555. (08 Hrs.)</p> <p>133. Construct and test VCO (V to F Converter) using IC 555. (08 Hrs.)</p> <p>134. Construct and test 555</p>	<p>Block diagram and Working of Op-Amp, importance, Ideal characteristics, advantages and applications.</p> <p>Schematic diagram of 741, symbol.</p> <p>Non-inverting voltage amplifier, inverting voltage amplifier, summing amplifier, Comparator, zero cross detector, differentiator, integrator and instrumentation amplifier, other popular Op-Amps.</p> <p>Block diagram of 555, functional description w.r.t. different configurations of 555 such as monostable, astable and VCO operations for various application. (15 Hrs.)</p>

		timers as pulse width modulator. (08 Hrs.)	
ENGINEERING DRAWING: 40 Hrs.			
Professional Knowledge ED -40 Hrs.	Read and apply engineering drawing for different application in the field of work. CSC/N9401	<p><u>ENGINEERING DRAWING:</u></p> <p>Introduction to Engineering Drawing and Drawing Instrument –</p> <ul style="list-style-type: none"> • Conventions • Sizes and layout of drawings sheets • Title Block, its position and content • Drawing Instrument <p>Free hand drawing of–</p> <ul style="list-style-type: none"> • Geometrical figures and blocks with dimension • Transferring measurement from the given object to the free hand sketches. • Free hand drawing of hand tools. <p>Drawing of Geometrical figures:</p> <ul style="list-style-type: none"> • Angle, Triangle, Circle, Rectangle, Square, Parallelogram. • Lettering & Numbering – Single Stroke <p>Symbolic representation–</p> <ul style="list-style-type: none"> • Different Electronic symbols used in the related trades <p>Reading of Electronic Circuit Diagram. Reading of Electronic Layout drawing.</p> <p>Material Science</p> <p>Types metals, types of ferrous and non ferrous metals. Introduction of iron and cast iron.</p>	
WORKSHOP CALCULATION & SCIENCE: 35 Hrs			
Professional Knowledge WCS -35 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. CSC/N9402	<p><u>WORKSHOP CALCULATION & SCIENCE:</u></p> <p>Unit, Fractions</p> <p>Classification of unit system Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion. Factors, HCF, LCM and problems. Fractions - Addition, subtraction, multiplication & division. Decimal fractions - Addition, subtraction, multiplication & division. Solving problems by using calculator.</p> <p>Square root, Ratio and Proportions, Percentage</p> <p>Square and square root. Simple problems using calculator. Applications of pythagoras theorem and related problems. Ratio and proportion.</p> <p>Ratio and proportion - Direct and indirect proportions Percentage Percentage - Changing percentage to decimal and fraction.</p>	

		<p>Material Science Types metals, types of ferrous and non ferrous metals. Introduction of iron and cast iron.</p> <p>Heat & Temperature and Pressure Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals. Scales of temperature, celsius, fahrenheit, kelvin and conversion between scales of temperature.</p> <p>Basic Electricity Introduction and uses of electricity, molecule, atom, how electricity is produced, electric current AC,DC their comparison, voltage, resistance and their units Conductor, insulator, types of connections - series and parallel. Ohm's law, relation between V.I.R & related problems. Electrical power, energy and their units, calculation with assignments. Magnetic induction, self and mutual inductance and EMF generation Electrical power, HP, energy and units of electrical energy</p> <p>Trigonometry Measurement of angles Trigonometrical ratios Trigonometrical tables</p>
<p>Project work / Industrial visit</p> <p>Broad Areas:</p> <ol style="list-style-type: none"> a) Delayed automatic power on circuit. b) Neon flasher circuit using IC 741 c) UJT act as a relaxation oscillator d) Up/down synchronous decade counter e) Portable continuity cum capacitor tester 		