

VOCATIONAL COURSE - Basic Instrumentation Skills -I		
Programme: <i>Vocational Course</i>		Year: I Semester: I Vocational
Subject: Physics		
Course Code:	Course Title: Basic Instrumentation Skills -I	
Credits: 03		Vocational (Experiments/hands on training)
Max. Marks: 100 External Exam: 75 Internal Assessment: 25		Min. Passing Marks: 33
Total No. of Lectures-Tutorials-Practical (in hours per week): 3-0-0		
Unit	Topic	No. of Lectures
Unit I	Errors and Mechanical Tools : Instruments accuracy, precision, sensitivity, resolution, range, least count of different instruments , Errors in measurements, Types of errors. Hand tools and their Uses: Identification, specifications, uses and maintenance of commonly used hand tools: Tweezers Screwdriver (Combination Set), Pliers, Wire Cutters, Wire Strippers, Crimping Tools, Sockets & Hex drivers, Clamps, Rotary Tools: Grinders, Portable Drill Machine, Small Hand Saws.	15
Unit II	Electrical & Electronics Cables and Connector Different type of electrical cables and their Specifications. Types of wires & cables, Standard wire gauge (SWG), Practice on different type of cable joint, Testing phase , neutral and Earth by tester and multi-meter and test lamp.	10
Unit III	Domestic Wiring Introduction and explanation of electrical wiring systems, cleat wiring, casing & Capping, house wiring, specification and types, rating & material, Demonstration & Practice on connecting common electrical accessories in circuits and testing them in series board., Testing & replacement of different types of fuses, switches, plug, sockets. Identification of different wiring materials and their specification, Removing of insulation from assorted wires and cable, Making a switch board with electrical accessories, Making Extension board.	20

Suggested Reading

1. B L Theraja : A text book in Electrical Technology
2. S. Salivahanan& N. S.Kumar : Electronic Devices and Circuits, , 3rd Edn
3. Shashi Bhushan Sinha, Handbook of Repair and Maintenance of Domestic Electronics Appliances hand book.
4. M. Lotia, Modern Basic Electrical & House Wiring Servicing

VOCATIONAL COURSE - Basic Instrumentation Skills -II		
Programme: Vocational Course		Year: I Semester: II Vocational
Subject: Physics		
Course Code:	Course Title: Basic Instrumentation Skills -II	
Credits: 03		Vocational (Experiments/hands on training)
Max. Marks: 100 External Exam: 75 Internal Assessment: 25		Min. Passing Marks: 33
Total No. of Lectures-Tutorials-Practical (in hours per week): 3-0-0		
Unit	Topic	No. of Lectures
Unit I	Batteries and Maintenance: Types of Batteries, Primary Cell, Secondary Cell, Wet charged, Dry-charged, Low maintenance, Construction of Battery, Case Cover plates, Separator, Cells, Electrolyte, Principles of Batteries, Lead Acid battery, Electrochemical reaction, Measure the voltages of the given cells/battery using analog/ digital multimeter, Charge and discharge the battery through load resistor, Maintain the secondary cells, Measure the specific gravity of the electrolyte using hydrometer.	20
Unit II	Testing of Batteries: Testing Factor affecting charging, Cause of battery failure, diagnosis and testing, visual inspection, Heavy load test Professional, Test a battery and verify whether the battery is ready for use or needs recharging.	10
Unit III	Soldering : Solders, flux and soldering technique. 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. Soldering/ De-soldering and Various Switches, Practice soldering on different electronic components, small transformer, Practice de-soldering	15

Suggested Reading

1. B L Theraja : A text book in Electrical Technology
2. M G Say : Performance and design of AC machines
3. S. Salivahanan & N. S.Kumar : Electronic Devices and Circuits, , 3rd Edn
4. Shashi Bhushan Sinha, Handbook of Repair and Maintenance of Domestic Electronics Appliances hand book.
5. M. Lotia, Modern Basic Electrical & House Wiring Servicing

VOCATIONAL COURSE - Basic Instrumentation Skills -III		
Programme: <i>Vocational course</i>		Year: II Semester: III Vocational
Subject: Physics		
Course Code:	Course Title: Basic Instrumentation Skills -III	
Credits: 03		Vocational (Experiments/hands on training)
Max. Marks: 100 External Exam: 75 Internal Assessment: 25		Min. Passing Marks: 33
Total No. of Lectures-Tutorials-Practical (in hours per week): 3-0-0		
Unit	Topic	No. of Lectures
Unit I	Multimeter Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity.	20
Unit II	Digital Multimeter Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/frequency counter, time-base stability, accuracy and resolution.	10
Unit III	Electronic Voltmeter Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter, AC millivoltmeter: Type of AC millivoltmeters, Block diagram ac milli -voltmeter, specifications and their significance.	15

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4. Shashi Bhushan Sinha, Handbook of Repair and Maintenance of Domestic Electronics Appliances hand book.

VOCATIONAL COURSE - Basic Instrumentation Skills -IV		
Programme: <i>Vocational Course</i>		Year: II Semester: IV Vocational
Subject: Physics		
Course Code:	Course Title: Basic Instrumentation Skills -IV	
Credits: 03		Vocational (Experiments/hands on training)
Max. Marks: 100 External Exam: 75 Internal Assessment: 25		Min. Passing Marks: 33
Total No. of Lectures-Tutorials-Practical (in hours per week): 3-0-0		
Unit	Topic	No. of Lectures
Unit I	Cathode Ray Oscilloscope: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only—no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.	20
Unit II	Signal and pulse Generators Block diagram, explanation and specifications of low frequency signal generator and pulse generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.	10
Unit III	Impedance Bridges Block diagram of bridge. Working principles of basic (balancing) RLC bridge, Specifications of RLC bridge, Block diagram and working principle as of a Q-meter, Digital LCR bridges.	15

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