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| **Lesson Plan** |
| **Name of Faculty** | Sh. Satyender |
| **Discipline** | Electrical Engineering |
| **Semester** | 4th |
| **Subject** | Electrical measuring instruments and instrumentation |
| **Lesson Plan Duration** | 15 Week, Theory : 04, Practical : 02 |
| **Week** | **Theory** | **Practical** |
|  | **Lecture****Day** | **Topic (including Assignment/ Test)** | **Practical****Day** | **Topic** |
| 1st | Day 1 | **1: Introduction to Electrical Measuring Instruments**: | Day 1 | Use of analog and digital Multi meter for measurement of voltage, current (A.C/D.C) and resistance |
| Day 2 | Concept of measurement and instruments |
| Day 3 | Measurements, sources of error. |
| Day 4 | Types of electrical measuring instruments –indicating |
| 2nd | Day 1 | integrating and recording type instruments | Day 1 | Measurement of pressure by using LVDT |
| Day 2 | Essentials of indicating instruments –deflecting, controlling and |
| Day 3 | damping torque and its types |
| Day 4 | Revision / assignment |
| 3rd | Day 1 | Class test | Day 1 | Revision and checking |
| Day 2 | **2: Ammeters and Voltmeters,** difference |
| Day 3 | Construction and working principles ofmoving Iron-types |
| Day 4 | and moving coil instruments-types |
| 4th | Day 1 | Merits and demerits, sources of error | Day 1 | To measure the value of earth resistance using earth tester |
| Day 2 | and application of these instruments |
| Day 3 | Revision / assignment |
| Day 4 | Class test |
| 5th | Day 1 | **3:Wattmeters (Dynamometer Type)** | Day 1 | To measure power, power factor in a single-phase circuit, using wattmeter and power factor meter |
| Day 2 | Construction, working principle, merits anddemerits Digital wattmeter |
| Day 3 | Revision / assignment |
| Day 4 | Class test |
| 6th | Day 1 | **4: Energy meter Induction Type** | Day 1 | Revision and checking |
| Day 2 | Construction, working principle, merits anddemerits of single-phase |
| Day 3 | three-phase energy meters |
| Day 4 | Errors and their compensation |
| 7th | Day 1 | Simple numerical problems | Day 1 | Measurement of power and power factor of a three-phase balanced load by two wattmeter method |
| Day 2 | Construction and working principle of maximum demand indicators |
| Day 3 | Digital energy meter (diagram, construction and application) |
| Day 4 | Revision / assignment |
| 8th | Day 1 | **5: Miscellaneous Measuring Instruments** | Day 1 | Measurement of voltage and frequency of a sinusoidal signal using CRO and draw wave shape ofsignal |
| Day 2 | Construction, working principle andapplication of Meggar, |
| Day 3 | Earth tester(analog and digital) |
| Day 4 | Multimeter, Frequency meter (dynamometer type) single phase power factor meter(Electrodynamometer type |
| 9th | Day 1 | Working principle of synchroscope | Day 1 | Revision and checking |

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|  | Day 2 | phase sequence indicator |  |  |
| Day 3 | tong tester (Clamp-on meter) |
| Day 4 | Instrument Transformers: Construction,working and applications CT, PT |
| 10th | Day 1 | Revision / assignment | Day 1 | Measurement of power in a 3 phase circuit using CT, PT and 3-phase wattmeter |
| Day 2 | Class test |
| Day 3 | **6: Electronic Instruments introduction** |
| Day 4 | Cathode Ray Oscilloscope: Block diagram,working principle of CRO and |
| 11th | Day 1 | Its various controls. Applications of CRO. | Day 1 | Use of LCR meter for measuring inductance, capacitance and resistance |
| Day 2 | Digital multi-meter (only block diagram)and Applications |
| Day 3 | Revision / assignment |
| Day 4 | **7:Study of LCR meters** |
| 12th | Day 1 | and their applications |
| Day 2 | Revision / assignment | Day 1 | Revision and checking |
| Day 3 | **8: Power Measurements in 3-phase circuits by** |
| Day 4 | Two wattmeter method in balanced |
| 13th | Day 1 | unbalanced circuits and simple problems | Day 1 | To record all electrical quantities from the meters installed in the institution premises. |
| Day 2 | Three wattmeter method |
| Day 3 | Revision / assignment |
| Day 4 | **9:Transducers,** Introduction, Types ofTransducers (1 phase,3 phase) |
| 14th | Day 1 | Basic concept of pressure measurement | Day 1 | Measurement of temperature by using thermister/Thermal Imager |
| Day 2 | flow measurement |
| Day 3 | level measurement |
| Day 4 | displacement measurement using transducers |
| 15th | Day 1 | Revision / assignment | Day 1 | Revision and checking |
| Day 2 | **10: Measurement of Temperature**Different types of thermometers,thermocouple |
| Day 3 | resistance temperature detector and theirconstruction, principle and working |
| Day 4 | Thermal Imager Camera (Concept) |