**Govt. Polytechnic Chhapar**

 **Electrical Engineering Department**

 **Lesson Plan**

|  |  |
| --- | --- |
| **Name of Faculty** | **Mrs. Mukesh** |
| **Discipline** | **Electrical Engineering** |
| **Semester** | **4th** |
| **Subject** | **Electrical Measuring Instruments and Instrumentation**  |
| **Lesson Plan Duration** | **From March 2022 to June 2022** |
| **Work load [Theory + Practical] Per Week** | **[04+02]** |

|  |  |  |
| --- | --- | --- |
| **Week** | **Day** | **Topic** |
| 1 | 1. | Introduction to subject |
| 2. | Concept of measurement and instruments |
| 3. | Concept of measurement of electrical quantities and instruments for theirmeasurements |
| 4. | Revision |
| 2 | 5. | Sources of error, Types of electrical measuring instruments – indicating type |
| 6. | integrating and recording type instruments |
| 7. | Essentials of indicating instruments – deflecting controlling and damping torque |
| 8. | Revision |
| 3 | 9. | Concept of ammeter and voltmeters and difference between them, |
| 10. | Construction and working principles of moving Iron instruments |
| 11. | Construction and working principles of moving coil instruments, |
| 12. | Revision |
| 4 | 13. | Merits and demerits of these instruments, sources of error and application ofthese instruments |
| 14. | Construction, working principle of dynamometer type wattmeter, merits anddemerits |
| 15. | Digital wattmeters |
| 16. | Revision |
| 5 | 17. | Construction, working principle, merits and demerits of single-phase energymeters |
| 18. | Construction, working principle, merits and demerits of three-phase energymeters |
| 19. | Errors and their compensation, Simple numerical problems |
| 20. | Revision |
| 6 | 21. | Construction and working principle of maximum demand indicators |
| 22. | Digital energy meter (diagram, construction and application) |
| 23. | Construction, working principle and application of Meggar |
| 24. | Revision |
| 7 | 25. | Earth tester (Analog and Digital) |
| 26. | Multimeter, Frequency meter (dynamometer type) |
| 27. | Single phase power factor meter (Electrodynamometer type). |
| 28. | Revision |
| 8 | 29. | Working principle of synchroscope and phase sequence indicator, tong tester(Clamp-on meter) |
| 30. | Construction, working and applications of CT and PT |
| 31. | Cathode Ray Oscilloscope: Block diagram, working principle of CRO |
| 32. | Revision |
| 9 | 33. | Various controls. Applications of CRO |
| 34. | Digital multi-meter (only block diagram) and Applications |
| 35. | Study of LCR meters and their applications |

|  |  |  |
| --- | --- | --- |
|  | 36. | Revision |
| 10 | 37. | Power Measurements in 3-phase circuits by Two wattmeter method in balancedcircuits |
| 38. | Power Measurements in 3-phase circuits by Two wattmeter method inunbalanced circuits |
| 39. | Simple problems |
| 40. | Revision |
| 11 | 41. | Simple problems |
| 42. | Power Measurements in 3-phase circuits by Three wattmeter method |
| 43. | Introduction, Types of Transducers (1 phase,3 phase) |
| 44. | Revision |
| 12 | 45. | Introduction, Types of Transducers (1 phase,3 phase) continue |
| 46. | Basic concept of pressure measurement, |
| 47. | flow measurement |
| 48. | Revision |
| 13 | 49. | level measurement |
| 50. | displacement measurement using transducers |
| 51. | Different types of thermometers |
| 52. | Revision |
| 14 | 53. | Thermocouple |
| 54. | Resistance temperature detector and their construction, principle and working. |
| 55. | Thermal Imager Camera (Concept) |
| 56. | Revision |
| 15 | 57. | Revision |
| 58. | Revision |
| 59. | Revision |
| 60. | Revision |

Practical

|  |  |  |
| --- | --- | --- |
| **Week** | **Day** | **Topic** |
| 1. | 1. | Use of analog and digital multimeter for measurement of voltage, current(A.C/D.C) and resistance |
| 2. | 2. | Measurement of pressure by using LVDT |
| 3. | 3. | To measure the value of earth resistance using earth tester |
| 4. | 4. | To measure power, power factor in a single-phase circuit, using wattmeter andpower factor meter and to verify results with calculations |
| 5. | 5. | Revision |
| 6. | 6. | Measurement of power and power factor of a three-phase balanced load by two wattmeter method |
| 7. | 7. | Measurement of voltage and frequency of a sinusoidal signal using CRO and draw wave shape of signal |
| 8. | 8. | Measurement of power in a 3 phase circuit using CT, PT and 3-phase wattmeter |
| 9. | 9. | Use of LCR meter for measuring inductance, capacitance and resistance |
| 10. | 10. | To record all electrical quantities from the meters installed in the institutionpremises |
| 11. | 11. | To measure Energy at different Loads using Single Phase Digital Energy meter |
| 12. | 12. | Measurement of temperature by using thermister/Thermal Imager |
| 13. | 13. | Calibration of single phase and three-phase energy meter |
| 14. | 14. | Revision |
| 15. | 15. | Revision |