**Gyan Ganga Polytechnic,Heengakheri(Kurukshetra)**

# Electrical Engineering Department

**Lesson plan**

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| **Name of Faculty** | | | | **Manish Kumar** | |
| **Discipline** | | | | **Electrical Engineering** | |
| **Semester** | | | | **5th** | |
| **Subject** | | | | **Electrical Machines-II** | |
| **Lesson Plan Duration** | | | | **September 2022 to Jan 2023** | |
| **Work load [Theory + Practical] Per Week** | | | | **[05+02]** | |
| **Week** | **Day** | **Theory Topic/ Assignment/ Test** | **No.** | | **Practical** |
| **1st** | **1** | Unit1: Introduction Synchronous Machines | **1** | | Demonstration of revolving field set up by a 3-phase wound stator |
| **2** | Constructional features of synchronous  machine |
| **3** | Generation of three phase emf |
| **4** | Production of rotating magnetic field in a three  phase winding |
| **5** | Revision/ Review of above Topics |  | |  |
| **2nd** | **1** | Concept of distribution and coil span factor | **2** | | To plot relationship between no load terminal voltage and excitation current in a synchronous  generator at constant speed |
| **2** | Drive Emf equation, synchronous speed |
| **3** | Armature reaction at unity, lag and lead power  factor |
| **4** | Voltage regulation using synchronous  impedance method |
| **5** | Revision/ Review of Topics |  | |  |
| **3rd** | **1** | Need and necessary conditions of parallel  operation of alternators | **3** | | Determination of the relationship between the voltage and load current of an alternator,  keeping excitation and speed |
| **2** | Operation of synchronous machine as a motor  –its starting methods |
| **3** | Effect of change in excitation of a synchronous  motor |
| **4** | Concept and Cause of hunting and its  prevention |
| **5** | Revision/ Review of above Topics |  | |  |
| **4th** | **1** | Rating and cooling of synchronous machines | **4** | | Revision/ file checking |
| **2** | Applications of synchronous machines (as an  alternator, as a synchronous condenser) |
| **3** | Revision of important topics |
| **4** | Assignment / Class test |
| **5** | Revision/ Review of above Topics |  | |  |
| **5th** | **1** | Problem solution/ test check | **5** | | Determination of the regulation and efficiency of alternator from the open circuit and short  circuit test |
| **2** | Unit2: Introduction to Induction Motors |
| **3** | constructional features of squirrel cage and slip  ring 3-phase induction Motors |
| **4** | Principle of operation, slip and its significance |
| **5** | Revision/ Review of above Topics |  | |  |
|  | **1** | Locking of rotor and stator fields |  | |  |

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| **6th** | **2** | Rotor resistance, inductance | **6** | Synchronization of polyphase alternators and load sharing |
| **3** | Emf Equation and current relations |
| **4** | Relationship between copper loss and motor  slip |
| **5** | Revision/ Review of above Topics |  |  |
| **7th** | **1** | Power flow diagram of an induction motor | **7** | Determination of the effect of variation of excitation on performance of a synchronous motor |
| **2** | Factors determining the torque, Torque-slip  curve, stable and unstable zones |
| **3** | Effect of rotor resistance upon the torque slip  relationship |
| **4** | Double cage rotor motor and its applications |
| **5** | Revision/ Review of above Topics |  |  |
| **8th** | **1** | Starting of 3-phase induction motors, DOL | **8** | Study of ISI/BIS code for 3- phase induction motors |
| **2** | Star-delta, auto transformer starting |
| **3** | Causes of low power factor of induction motors |
| **4** | Testing of 3-phase induction motor on no load |
| **5** | Revision of Unit No-01 |  |  |
| **9th** | **1** | And blocked rotor test and to find efficiency | **9** | Revision/ file checking |
| **2** | Speed control of induction motor |
| **3** | Harmonics and its effects |
| **4** | cogging and crawling in Induction Motors |
| **5** | Revision of Unit No-01 |  |  |
| **10th** | **1** | Revision of important topics | **10** | Determination of efficiency by  (a) no load test and blocked rotor test on an induction motor |
| **2** | Assignment / Class test |
| **3** | Problem solution/ ClassTest check |
| **4** | Unit3: Fractional Kilo Watt (FKW) Motors |
| **5** | And its description |  |  |
| **11th** | **1** | Single phase induction motors | **11** | Determination of effect of rotor resistance on torque speed curve of an induction motor |
| **2** | Construction characteristics and applications |
| **3** | Nature of field produced in single phase  induction motor |
| **4** | Split phase induction motors |
| **5** | Type of Induction Motor |
| **12th** | **1** | Capacitors start and run |
| **2** | Shaded pole, Reluctance start motor | **12** | Revision/ file checking |
| **3** | Alternating current series motor and universal  motors |
| **4** | 1-phase synchronous motor Reluctance type |
| **5** | Brief description about Synchronous Motor |  |  |
| **13th** | **1** | Hysteresis motor | **13** | To study the effect of a capacitor on the single phase induction motor to reverse the  direction of rotation. |
| **2** | Revision of important topics |
| **3** | Assignment / Class test |
| **4** | Problem solution/ test check |
| **5** | Revision of important topics |  |  |
|  | **1** | Unit4:Special Purpose Machines |  |  |

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| **14th** | **2** | Construction and working principle of linear  induction motor | **14** | Quiz /viva-voice related to electrical machine |
| **3** | stepper motor |
| **4** | Servomotor |
| **5** | Revision of important topics |  |  |
| **15th** | **1** | submersible motor | **15** | Quiz /viva-voice related to electrical machine |
| **2** | introduction to energy efficient motors |
| **3** | Assignment / Class test |
| **4** | Problem solution/ test check |
| **5** | Revision/Review/Test of old HSBTE Papers |  |  |

# Gyan Ganga Polytechnic Heengakheri(Kurukshetra)

# Electrical Engineering Department

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| **Lesson plan** | | | | | | | |
| **Name of Faculty** | | | | | **Manish Kumar** |  | |
| **Discipline** | | | | | **Electrical Engineering** |
| **Semester** | | | | | **5th semester** |
| **Subject** | | | | | **Electrical Power- I** |
| **Lesson Plan Duration** | | | | | **From September 2022 to**  **January 2023** |
| **Work load (Theory + Practical ) Per Week** | | | | | **(04+00)** |
|  | | | | | |
| **Week** | | **Day** | | **Topics** | | | |
| **1st** | | 1 | | Unit1-Introduction to Power Generation | | | |
| 2 | | Main resources of energy, conventional and non-conventional | | | |
| 3 | | Different types of power stations, thermal power plant | | | |
| 4 | | Hydro Power plant Flow diagrams and operation | | | |
| **2nd** | | 1 | | Gas power plant Flow diagrams and operation | | | |
| 2 | | diesel power station Flow diagrams and operation | | | |
| 3 | | nuclear power Plant Flow diagrams and operation | | | |
| 4 | | comparison of the generating stations on the basis of running cost, site, starting,  maintenance | | | |
|  | | 1 | | Revision/Assignment/ Class Test | | | |
| **3rd** | | 2 | | Unit2: Introduction to Economics of Generation | | | |
| 3 | | Fixed and running cost, load estimation, load curves | | | |
| 4 | | Demand factor, load factor, diversity factor | | | |
| **4th** | | 1 | | Power factor and their effect on cost of generation | | | |
| 2 | | Simple problems based on above relations | | | |
| 3 | | Revision/Assignment/ Class Test | | | |
| 4 | | Base load and peak load power stations | | | |
| **5th** | | 1 | | inter-connection of power stations and its advantages | | | |
| 2 | | Concept of regional and national grid | | | |
| 3 | | Revision/Assignment/ Class Test | | | |
| 4 | | Revision/Assignment/ Class Test | | | |
| **6th** | | 1 | | Unit3: Introduction to Transmission Systems | | | |
| 2 | | Layout of transmission system, selection of voltage for H.T and L.T lines | | | |
| 3 | | advantages of high voltage for Transmission of power in both AC and | | | |
| 4 | | Comparison of different systems: AC versus DC for power transmission, | | | |
| **7th** | | 1 | | material and sizes from standard tables | | | |
| 2 | | Constructional features of transmission lines | | | |
| 3 | | Types of supports | | | |
| 4 | | Types of insulators | | | |
| **8th** | | 1 | | Types of conductors, Selection of insulators | | | |
| 2 | | conductors, earth wire and their accessories | | | |
| 3 | | Transposition of conductors and string efficiency of suspension type  insulators, Bundle Conductors | | | |
| 4 | | Mechanical features of line | | | |
| **9th** | | 1 | | Importance of sag, calculation of sag, | | | |
| 2 | | effects of wind and ice related problems | | | |
| 3 | | Indian electricity rules pertaining to clearance | | | |
| 4 | | Electrical features of line: Calculation of resistance, inductance and capacitance | | | |
| **10th** | | 1 | | A.C. transmission line, voltage regulation, and concept of corona.  Effects of corona and remedial measures | | | |
| 2 | | Transmission Losses | | | |
| 3 | | Revision/Assignment/ Class Test | | | |
| 4 | | Revision/Assignment/ Class Test | | | |
| **11th** | | 1 | | Unit 4: Distribution System Layout of HT and LT distribution system | | | |
| 2 | | constructional feature of distribution lines and their erection | | | |
| 3 | | LT feeders and service mains | | | |
| 4 | | Simple problems on AC radial distribution system | | | |
| **12th** | | 1 | | Determination of size of conductor | | | |
| 2 | | Preparation of estimates of HT and LT lines | | | |
| 3 | | Constructional features of LT (400 V), HT (II kV) underground cables | | | |
| 4 | | Advantages and disadvantages of underground system with respect to overhead system. | | | |
| **13th** | | 1 | | Calculation of losses in distribution system | | | |
| 2 | | Faults in underground cables-determine fault location by | | | |
|  | | 3 | | Murray Loop Test, Varley Loop Test | | | |
| 4 | | Revision/Assignment/ Class Test | | | |
| **14th** | | 1 | | Revision/Problem solution/ Class Test | | | |
| 2 | | Unit 5: Substations: Brief idea about substations | | | |
| 3 | | Outdoor grid sub-station 220/132 KV, 66/33 KV outdoor  substations | | | |
| 4 | | Pole mounted substations and indoor substation | | | |
| **15th** | | 1 | | Layout of 33/11 distribution substation and various auxiliaries | | | |
| 2 | | Layout of kV/400V distribution substation and various auxiliaries | | | |
| 3 | | Revision/Assignment/ Class Test | | | |
| 4 | | Unit 6: power factor, reasons and disadvantages of low power factor | | | |
| **16th** | | 1 | | Methods for improvement of power factor using capacitor banks, VAR Static  Compensator (SVC) | | | |
| 2 | | Revision and problem solution | | | |
| 3 | | Revision/Review/Test of old HSBTE Papers | | | |
| 4 | | Revision/Review/Test of old HSBTE Papers | | | |

# Gyan Ganga Polytechnic Heengakheri(Kurukshetra)

# Electrical Engineering Department

Lesson Plan

Name of the Faculty:

Discipline: Electrical Engineering Semester: 5th

Subject: Utilization of Electrical Energy

**Lesson Plan Duration: 15 weeks** (**From September 2022 to January 2023**)

|  |  |  |
| --- | --- | --- |
| **Week** | **Day** | **Topic** |
| 1 | 1 | Introduction Of The Subject, Its Need, Applications |
| 2 | Nature Of Light, Visibility Spectrum Curve Of Relative Sensitivity Of Human Eye  And Wave Length Of Light |
| 3 | Definition: Luminous Flux, Solid Angle, Luminous Intensity |
| 4 | Illumination, Luminous Efficiency, Depreciation Factor, Coefficient Of Utilization |
| 5 | Space To Height Ratio, Reflection Factor, Glare, Shadow, Lux |
| 2 | 1 | Laws Of Illumination - Simple Numericals |
| 2 | Different Type Of Lamps, Construction And Working Of Incandescent And Discharge Lamps - Their Characteristics, Fittings Required For Filament Lamp |
| 3 | Mercury Vapour Sodium Lamp, Fluorescent Lamp, Halogen Lamp, Neon Lamp |
| 4 | Compact Filament Lamp(Cfl), Led Lamp, Comparison Of Incandescent, Fluorescent, CFL & LED |
| 5 | Calculation Of Number Of Light Points For Interior Illumination, |
| 3 | 1 | Calculation Of Illumination At Different Points, Considerations Involved In  Simple Design Problems |
| 2 | Illumination Schemes; Indoor And Outdoor Illumination Levels |
|  | 3 | Main Requirements Of Proper Lighting; Absence Of Glare, Contrast And Shadow |
| 4 | Awareness About Time Switches, Street Lighting, Flood Lighting |
| 5 | Monument Lighting And Decorative Lighting, Light Characteristics Etc. |
| 4 | 1 | Advantages Of Electrical Heating, Resistance Heating - Direct Resistance Heating |
| 2 | Indirect Resistance Heating, Electric Ovens, Their Temperature Range |
| 3 | Properties Of Resistance Heating Elements, Domestic Water Heaters |
| 4 | Other Heating Appliances, Thermostat Control Circuit |
| 5 | Induction Heating; Principle Of Core Type Induction Furnace, Their Construction  And Applications |
| 5 | 1 | Principle Of Coreless Type Induction Furnace, Their Construction And  Applications |
| 2 | Electric Arc Heating; Direct And Indirect Arc Heating |
| 3 | Construction, Working And Applications Of Arc Furnace |
| 4 | Dielectric Heating, Applications In Various Industrial Fields |
| 5 | Infra-Red Heating And Its Applications |
| 6 | 1 | Microwave Heating And Its Applications |
| 2 | Solar Heating |
| 3 | Calculation Of Resistance Heating Elements |
| 4 | Advantages Of Electric Welding, Principles Of Resistance Welding |
| 5 | Spot, Projection And Seam Welding |
| 7 | 1 | Butt Welding, Welding Equipment |
| 2 | Principle Of Arc Production, Electric Arc Welding, Characteristics Of Arc |
| 3 | Carbon Arc And Metal Arc Welding |
| 4 | Hydrogen Arc Welding Method And Their Applications |
| 5 | Power Supply Requirement. Advantages Of Using Coated Electrodes |
| 8 | 1 | Comparison Between Ac And Dc Arc Welding |
| 2 | Welding Control Circuits, Welding Of Aluminum And Copper |
| 3 | Introduction To Electro Deposition, Need Of Electro-Deposition |
| 4 | Laws Of Electrolysis |
| 5 | Process Of Electro-Deposition - Clearing, Operation, Depositionof Metals,  Polishing And Buffing |
| 9 | 1 | Equipment And Accessories For Electroplating |
| 2 | Factors Affecting Electro-Deposition |
| 3 | Principle Of Galvanizing And Its Applications, Principles Of Anodizing And Its  Applications |
| 4 | Electroplating Of Non-Conducting Materials |
| 5 | Manufacture Of Chemicals By Electrolytic Process |
| 10 | 1 | Power Supplies For Electroplating |
| 2 | Principle Of Air Conditioning, Vapour Pressure, Refrigeration Cycle, Eco-Friendly  Refrigerants |
| 3 | Electrical Circuits Used In Refrigeration |
| 4 | Electrical Circuits Used In Air Conditioning |
| 5 | Electrical Circuits Used In Water Coolers. |
| 11 | 1 | Advantages Of Electric Drives, Characteristics Of Different Mechanical Loads |
| 2 | Types Of Motors Used As Electric Drive |
|  | 3 | Electric Braking - Plugging |
| 4 | Electric Braking - Rheostatic Braking |
| 5 | Electric Braking - Regenerative Braking |
| 12 | 1 | General Idea About The Methods Of Power Transfer By Direct Coupling And Belt  Drive |
| 2 | Gears, Chain Drives Etc. |
| 3 | Examples Of Selection Of Motors For Different Types Of Domestic Loads |
| 4 | Selection Of Drive For Applications Such As General, Workshop, Textile Mill,  Papermill |
| 5 | Selection Of Drive For Applications Such As Steel Mill, Printing Press, Crane And  Lift Etc |
| 13 | 1 | . Application Of Flywheel, Specifications Of Commonly Used Motors E.G.  Squirrel Cage Motors, Slip Ring Induction Motors |
| 2 | Specifications Of Ac Series Motors, Fractional Kilo Watt(Fkw) Motors |
| 3 | Selection Of Motors For Domestic Appliances |
| 4 | Advantages Of Electric Traction Over Other Types Of Traction |
| 5 | Different Systems Of Electric Traction, Dc And Ac Systems, Diesel Electric  System |
| 14 | 1 | Types Of Services - Urban, Sub-Urban, And Main Line And Their Speed-Time  Curves |
| 2 | Different Accessories For Track Electrification; Such As Overhead Catenary Wire |
| 3 | Conductor Rail System, Current Collector-Pentagraph |
| 4 | Factors Affecting Scheduled Speed |
| 5 | Electrical Block Diagram Of An Electric Locomotive With Description Of Various  Equipment And Accessories Used |
| 15 | 1 | Types Of Motors Used For Electric Traction |
| 2 | Power Supply Arrangements |
| 3 | Starting And Braking Of Electric Locomotives |
| 4 | Introduction To Emu And Metro Railways |
| 5 | Train Lighting Scheme |

# Gyan Ganga Polytechnic Heengakheri (Kurukshetra)

# Electrical Engineering Department

**LESSON PLAN**

Name of the Faculty:

Discipline: Electrical Engineering Semester: 5th

Subject: Utilization of Electrical Energy

**Lesson Plan Duration: 15 weeks** (**From September 2022 to January 2023**)

# Work load (Lecture/Practical) per week: 05/02

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Theory** | | **Practical** | |
| **Lecture day** | **Topic** | **Practic al day** | **Topic** |
| 1st | 1 | What is PLC, concept of  PLC | 1st | Components/ subcomponents of a PLC and learning functions of different modules of a PLC system |
| 2 | Building blocks of PLC |
| 3 | Functions of various blocks of PLC |
| 4 | Limitations of relays, Advantages of PLCs over electromagnetic relays |
|  | 5 | Revision and class test |
| 2nd | 1 | Different programming languages, | 2nd | Practical steps in programming a PLC using hand held programmer |
| 2 | PLC manufacturers and applications of PLC |
| 3 | Basic operation of PLC- |
| 4 | Principles of PLC |
|  | 5 | Revision and class test |
| 3rd | 1 | Architectural details of Processor-Part-I | 3rd | Practical steps in programming a PLC using computer interfacing |
| 2 | Architectural details of  Processor-Part-II |
| 3 | Memory Structures |
| 4 | Input/output structures |
|  | 5 | Revision and class test |
| 4th | 1 | Programming Terminals of PLC | 4th | Introduction to step 5programming language, ladder diagram concepts, instruction list syntax |
| 2 | Power supply to PLC |
| 3 | Basic instructions for  latch |
| 4 | Master control self holding |

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|  |  | relays |  |  |
|  | 5 | Revision and class test |
| 5th | 1 | Timer instructions-ON and OFF delay | 5th | Basic logic operations, AND, Or, NOT functions |
| 2 | Retentive timers, resetting of timers |
| 3 | Counter instructions like up counter, down counter, resetting of  counters |
| 4 | Arithmetic Instructions (ADD,SUB,DIV,MUL etc.) |
|  | 5 | Revision and class test |
| 6th | 1 | MOV instruction, RTC (Real Time Clock function) | 6th | Logic control systems with time response as applied to clamping operation |
| 2 | Comparison instructions like equal, not equal, greater, greater than equal, less than, less  than equal |
| 3 | Programming on Basic instructions |
| 4 | Programming on Timer instructions |
|  | 5 | Revision and class test |
| 7th | 1 | Programming on Counter instructions | 7th | Sequence control system in lifting a device for packaging and counting |
| 2 | Programming on Sequencer instructions |
| 3 | Programming on comparison instructions |
| 4 | Revision of Ladder  diagram Programming |
|  | 5 | Revision and class test |
| 8th | 1 | Assembly line, Packaging, Process control | 8th | Use of PLC for Door Bell operation |
| 2 | Car parking, Doorbell operation, Traffic light control |
| 3 | Microwave oven, Washing machine, Motor in forward  and reverse direction |
| 4 | Star delta, DOL Starter, paint industry ,filling of bottles, room Automation |
|  | 5 | Revision and class test |

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| 9th | 1 | Microcontroller -Overview | 9th | Use of PLC for Traffic light system |
| 2 | Block diagram and architecture of  Microcontroller |
| 3 | Overview of MCS-51 |
| 4 | 8051 -Pin details |
|  | 5 | Revision and class test |
| 10th | 1 | Input port structures | 10th | Use of PLC for Packing process control |
| 2 | Output port structures |
| 3 | Memory organisation |
| 4 | Special function registers |
|  | 5 | Revision and class test |
| 11th | 1 | Revision of Microcontroller | 11th | Use of PLC for Car parking system |
| 2 | Instruction set of MCS-51 |
| 3 | Addressing modes |
| 4 | Timer operation |
|  | 5 | Revision and class test |
| 12th | 1 | Serial port operation and communication | 12th | Familiarization with the study of architecture of 8085 kit, basic sub systems and input output connectors, function keys |
| 2 | Interrupts and its types |
| 3 | Assemblers operations & compilers |
| 4 | Assembler directives |
|  | 5 | Revision and class test |
| 13th | 1 | keypad interfacing | 13th | Familiarization of Microcontroller 8051 kit |
| 2 | 7- segment interface, LCD |
| 3 | Stepper motor interfacing |
| 4 | A/D, D/A interfacing |
|  | 5 | Revision and class test |
| 14th | 1 | RTC interfacing | 14th | Testing of general input/output on microcontroller board |
| 2 | Introduction of PIC Micro controllers |
| 3 | Features of PIC 16C84 |
| 4 | Architecture of PIC 16C84 |
|  | 5 | Revision and class test |
| 15th | 1 | Applications of microcontrollers | 15th | Development of Electrical, Instrumentation applications using 8051 microcontroller |
| 2 | Radio control system |
| 3 | Revision of complete syllabus |
| 4 | Revision and class test |
| 5 | Discussion of previous year HSBTE question  papers |

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| Gyan Ganga Polytechnic Heengakheri(Kurukshetra)Electrical Engineering Department **Lesson Plan** | | | | | |
| **Name of Faculty** | | | Er. Krishan Popli | | |
| **Discipline** | | | Electrical Engineering | | |
| **Semester** | | | 5th | | |
| **Subject** | | | Instrumentation | | |
| **Duration** | | | (From Sep2022 to Jan 2023) Theory : 04, Practical : 02 | | |
| **Week** | | **Theory** | | **Practical** | |
|  | **Lecture**  **Day** | **Topic (Including Assignment/ Test)** | | **Practical**  **Day** | **Topic** |
| 1st | Day 1 | **1 Measurements** | | Day 1 | To measure the level of a liquid using a transducer |
| Day 2 | Importance of measurement, Basic  measuring systems | |
| Day 3 | Advantages and limitations of each  measuring systems | |
| Day 4 | Generalized measurement system, signal  conditioning | |
| 2nd | Day 1 | Display devices | | Day 1 | To measure temperature using a thermo-couple |
| Day 2 | Revision | |
| Day 3 | **2 Transducers** | |
| Day 4 | Theory, construction and use of various  transducers | |
| 3rd | Day 1 | Resistance | | Day 1 | Practice /Checking |
| Day 2 | Inductance | |
| Day 3 | Capacitance | |
| Day 4 | Electromagnetic | |
| 4th | Day 1 | piezo electric type | | Day 1 | Study and use of digital temperature controller |
| Day 2 | Revision | |
| Day 3 | **3 Measurement of Displacement and**  **Strain** | |
| Day 4 | Displacement Measuring Devices: | |
| 5th | Day 1 | wire wound potentiometer | | Day 1 | Use of themistor in ON/OFF transducer |
| Day 2 | LVDT, strain gauges | |
| Day 3 | and their different types such as inductance  type, | |
| Day 4 | resistive type | |
| 6th | Day 1 | Wire and foil type etc. | | Day 1 | Practice /Checking |
| Day 2 | Gauge factor, gauge materials | |
| Day 3 | And their selections, sources of errors  and its compensations. | |
| Day 4 | Use of electrical strain gauges | |
| 7th | Day 1 | Strain gauge bridges and amplifiers. | | Day 1 | Study of variable capacitive transducer |
| Day 2 | Revision | |
| Day 3 | **4Force and Torque Measurement:** | |
| Day 4 | Different types of force measuring devices  and their principles, | |
| 8th | Day 1 | Load measurements by using elastic  Transducers | | Day 1 | Draw the characteristics of a potentiometer |
| Day 2 | and electrical strain gauges | |
| Day 3 | Load cells | |
| Day 4 | Proving rings | |
| 9th | Day 1 | Measurements of torque by brake | | Day 1 | Practice /Checking |
| Day 2 | Dynamometer | |
|  | Day 3 | Electrical strain gauges, | |  |  |
| Day 4 | Speed measurements; | |
| 10th | Day 1 | different methods, devices | | Day 1 | To measure linear displacement using LVDT |
| Day 2 | Revision | |
| Day 3 | **5Pressure Measurement** | |
| Day 4 | Bourdon pressure gauges | |
| 11th | Day 1 | Electrical pressure pickups and their  principle, | | Day 1 | To study the use of electrical strain gauge |
| Day 2 | Construction and applications | |
| Day 3 | Use of pressure cells. | |
| Day 4 | Revision | |
| 12th | Day 1 | **6Flow Measurement:** | |
| Day 2 | Basic principles of magnetic | | Day 1 | Practice /Checking |
| Day 3 | Ultrasonic flow meters | |
| Day 4 | Revision | |
| 13th | Day 1 | **7Measurement of Temperature:** | | Day 1 | To study weighing machine using load cell |
| Day 2 | Bimetallic thermometer | |
| Day 3 | Pressure thermometers | |
| Day 4 | Thermoelectric thermometers,  resistance thermometers, | |
| 14th | Day 1 | Thermocouple, | | Day 1 | To study pH meter |
| Day 2 | Thermisters | |
| Day 3 | Pyrometer, errors in temperature  measurements in rapidly moving fluids | |
| Day 4 | Temperature recorders | |
| 15th | Day 1 | Revision | | Day 1 | Practice /Checking |
| Day 2 | **8 Measurement of other non- electrical quantities** | |
| Day 3 | such as humidity | |
| Day 4 | pH level and | |
| 16th | Day 1 | Vibrations | | Day 1 | Internal practical |
| Day 2 | Revision of Hsbte old Paper | |
| Day 3 | Revision of Hsbte old Paper | |
| Day 4 | Revision of Hsbte old Paper | |