# LIST OF EXPERIMENTS-ME

| SL NO | NAME OF LAB/ WORKSHOP | LIST OF EXPERIMENTS |
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| 1 | MECHANICAL ENGINEERING WORKSHOP | Study of mechanical tools, components and their applications |
| | | Exercises on Carpentry |
| | | Exercises on Smithy |
| | | Exercises on Foundry |
| | | Exercises on Sheet Metal Forming |
| | | Exercises on Arc Welding |
| | | Study of various quenching medium |
| | | Exercises on Filing |
| | | Demonstration and applications of Drilling Machine, Grinding Machine, Shaping Machine, Milling machine and Lathe |
| 2 | COMPUTER AIDED MACHINE DRAWING | Sketching of conventional representation of Riveted joints(Manual Drawing) |
| | | Sketching of conventional representation of welded joints(Manual Drawing) |
| | | Sketching of conventional representation of Bolts and Nuts (Manual Drawing) |
| | | Sketching of conventional representation of Foundation Bolts(Manual Drawing) |
| | | Preparation of production drawing of Cotter joint(Manual Drawing) |
| | | Preparation of production drawing of Knuckle joint(Manual Drawing) |
| | | Preparation of production drawing of Flange Coupling(CAD Drawing) |
| | | Preparation of production drawing of Flexible Coupling(CAD Drawing) |
| | | Preparation of production drawing of Oldham's Coupling(CAD Drawing) |
| | | Preparation of assembly drawing of Universal Joint(CAD Drawing) |
| | | Preparation of assembing drawing of Plummer Block(CAD Drawing) |
| | | Preparation of assembly drawing of Ram's Bottom Safety Valve(CAD Drawing) |
| 3 | FM & HM LAB | Determination of coefficient of discharge and calibration of Notches. |
| | | Determination of coefficient of discharge and calibration of Orifice meter. |
| | | Determination of coefficient of discharge and calibration of Venturi meter. |
| | | Determination of hydraulic coefficients of orifices. |
| | | Determination of Chezy's constant and Darcy's coefficient on pipe friction apparatus. |
| | | Experiments on hydraulic ram. |
| | | Reynolds experiment |
| | | Bernoulli's experiment. |
| | | Determination of metacentric height and radius of gyration of floating bodies |
| | | Performance test on positive displacement pumps. |
| | | Performance test on centrifugal pumps, determination of operating point and efficiency |
| | | Performance test on gear pump. |
| | | Performance test on Impulse turbines. |
| | | Performance test on reaction turbines (Francis and Kaplan Turbines). |
| | | Speed variation test on Impulse turbine. |
| 4 | MACHINE TOOLS LAB-I | STUDY OF LATHE TOOLS |
| | | EXERCISES ON CENTRE LATHE(FACING, TURNING, THREAD CUTTING etc.) |
| | | EXERCISES ON DRILLING MACHINE (DRILLING, BORING, REAMING, TAPPING ETC) |
| | | EXERCISES ON SHAPING MACHINE (PREPARATION OF FLAT SURFACE, GROOVES, SLOTS ETC) |
| | | EXERCISES ON SLOTTING MACHINE(PREPARATION OF FLAT SURFACE, GROOVES, SLOTS ETC) |
| | | EXERCISES ON GEAR CUTTING OPERATION |
| | | EXERCISES ON CYLINDRICAL GRINDING |
| | | EXERCISES ON TOOL GRINDING |
| | | MEASUREMENT OF CUTTING FORCES IN TURNING PROCESS |
| | | EFFECT OF QUENCHING MEDIUM ON HARDNESS OF THE MATERIALS |
| | | MEASUREMENT OF CUTTING TEMPERATURE IN TURNING PROCESS |
| | | MICROSTRUCTURE PREPARATION OF VARIOUS METALS |
| 5 | MACHINE TOOLS LAB-II | MEASUREMENT OF ANGLE USING SINE BAR |
| | | DETERMINATION OF SPEED OF A ROTATING BODY USING STROBOSCOPE |
| | | CALIBRATION OF LOAD CELL |
| | | CALIBRATION OF MICROMETER |
| | | CALIBRATION OF VERNIER CALIPER |
| | | VIBRATION MEASUREMENT |
| | | CNC PROGRAMMING AND EXPERIMENT |
| | | MEASUREMENT OF STRAIN USING STRAIN GAUGE |
| | | MEASUREMENT OF SCREW THREAD PARAMETER USING PROFILE PROJECTOR |
| | | MEASUREMENT OF SCREW THREAD PARAMETER USING TOOL MAKERS MICROSCOPE |
| | | DETERMINE ANGLES OF SINGLE POINT CUTTING TOOL USING TOOL MAKERS MICROSCOPE |
| | | CALIBRATION OF LVDT |
| | | MEASUREMENT OF GEAR PARAMETERS USING PROFILE PROJECTOR |
| | | Conduct load test on four stroke Diesel Multi cylinder engine with rope brake dynamometer. |
| | | Conduct load test on four stroke Diesel single cylinder engine with rope brake dynamometer. |
| | | Conduct load test on four stroke Diesel single cylinder engine with eddy current dynamometer. |
| | | Conduct volumetric efficiency test on four stroke diesel single cylinder engine. |
| | | Conduct load test on four stroke petrol single cylinder engine with electrical loading dynamometer. |

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| 6 | THERMAL ENGINEERING LAB- I | Conduct test using Pensky Marten closed cup flash point apparatus to determine the flash and fire point of the given oil. |
| | | Conduct test to determine the viscosity of given oil using Redwood Viscometer. |
| | | Conduct cooling curve test on a four stroke diesel twin cylinder engine |
| | | Conduct Morse's test on four stroke petrol multi cylinder engine. |
| | | Conduct heat balance test. |
| | | Morse Test on Multi cylinder Petrol Engine |
| | | Valve Timing Diagram for Single Cylinder Diesel Engine |
| | | Retardation Test on Multi-Cylinder Diesel Engine |
| 7 | COMPUTER AIDED DESIGN & ANALYSIS LAB | Creating 3D part model of Bolts and Nuts |
| | | Creating 3D part model of Flange Coupling |
| | | Creating 3D assembly model of Socket and spigot joint |
| | | Creating 3D assembly model of Knuckle Joint |
| | | Creating 3D assembly models of Plummer block |
| | | Creating 3D assembly model of Screw jack |
| | | Static analysis on Simply Supported Beam with a point load |
| | | Stress analysis of Cantilever Beam with a point load |
| | | Static analysis on Simply Supported Beam with Uniformly distributed load |
| | | Static analysis on a rectangular plate with a circular hole |
| | | Conductive heat transfer analysis on 2-D plate |
| | | Conductive and convective heat transfer analysis in furnace wall |
| | | Laminar Flow Analyses in a 2-D Duct |
| 8 | THERMAL ENGINEERING LAB- II | Determination of LMTD and effectiveness of parallel flow,counter flow and cross flow heat exchangers |
| | | Measurement of unsteady state conduction heat transfer |
| | | Determination of heat transfer coefficients in free convection |
| | | Determination of heat transfer coefficients in forced convection |
| | | Determination of thermal conductivity of solids (composite wall) |
| | | Determination of emissivity of a specimen |
| | | Determination of Stefan Boltzman Constant |
| | | Study and performance test on Refrigeration equipment(Refrigeration test rig) |
| | | Study and performance test on Air conditioning equipment(Air conditioning test rig) |
| | | Performance study on Heat pipe |
| | | Calibation of Thermocouples |
| | | Calibration of Pressure Guage |
| 9 | MECHANICAL ENGINEERING LAB | Study and performance test on Refrigeration equipment(Refrigeration test rig) |
| | | Study and performance test on Air conditioning equipment(Air conditioning test rig) |
| | | Performance study on Heat pipe |
| | | Determination of efficiency of a blower |
| | | Determination of efficiency of an air compressor |
| | | Determination of natural frequency of free vibrations(Free vibration apparatus) |
| | | Determination of natural frequency of free vibrations(Forced vibration apparatus) |
| | | Determination of critical speed of shafts |
| | | Experimental verification of Dunkerley's principle |
| | | Experiment to demonstrate static balancing and dynamic balancing |
| | | Experiment to determine the Gyroscopic couple and it's effects |
| | | Determination of performance characteristics of a spring loaded Governor( Universal Governor apparatus) |
| | | Preparation and Metallographic examination of a material specimen |
| 10 | COMPUTER INTEGRATED MANUFACTURING LAB-1 | Exercises on 2D Modelling |
| | | Exercises on 3D Solid Modeling |
| | | Exercises on Assembly of 3D Models. |
| | | Exercises on Simulation of 3D Models |
| | | Exercises on Structural Analysis |
| | | Exercises on ANOVA |
| 11 | COMPUTER INTEGRATED MANUFACTURING LAB-2 | Excercise on CAM Express Software |
| | | Automation using Hydraulics |
| | | Automation using pnematics |
| | | PLC Programming and Implementation |
| | | Exercises on CNC programming |

# LIST OF EXPERIMENTS-CE

| SL NO | NAME OF LAB/WORKSHOP | LIST OF EXPERIMENTS |
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| 1 | CIVIL WORKSHOP | 1. CALCULATE THE AREA OF A BUILT-UP SPACE AND A SMALL PARCEL OF LAND- USE STANDARD MEASURING TAPE AND DIGITAL DISTANCE MEASURING DEVICES EXERCISE<br>2. (A) USE SCREW GAUGE AND VERNIER CALLIPER TO MEASURE THE DIAMETER OF A STEEL ROD AND THICKNESS OF A FLAT BAR<br>(B) TRANSFER THE LEVEL FROM ONE POINT TO ANOTHER USING A WATER LEVEL<br>(C) SET OUT A ONE ROOM BUILDING WITH A GIVEN PLAN AND MEASURING TAPE EXERCISE<br>3. FIND THE LEVEL DIFFERENCE BETWEEN ANY TWO POINTS USING DUMPY LEVEL EXERCISE<br>4. (A) CONSTRUCT A 1 1/2 THICK BRICK WALL OF 50 CM HEIGHT AND 60 CM LENGTH USING ENGLISH BOND. USE SPIRIT LEVEL TO ASSESS THE TILT OF WALLS.<br>(B) ESTIMATE THE NUMBER OF DIFFERENT TYPES OF BUILDING BLOCKS TO CONSTRUCT THIS WALL.<br>5. (A) INTRODUCE THE STUDENTS TO PLUMBING TOOLS, DIFFERENT TYPES OF PIPES, TYPE OF CONNECTIONS, TRAPS, VALVES, FIXTURES AND SANITARY FITTINGS.<br>(B) DEMONSTRATED A SMALL RAINWATER HARVESTING INSTALLATION IN THE CAMPUS |
| 2 | SURVEY LAB | 1. INTRODUCTION TO CONVENTIONAL SURVEYING<br>A. CHAIN SURVEYING B. COMPASS SURVEYING<br>LEVELLING<br>2. SIMPLE LEVELING<br>3. DIFFERENTIAL LEVELLING<br>4. FLY LEVELLING<br>THEODOLITE SURVEYING<br>5. DISTANCE BETWEEN ACCESSIBLE POINTS (HORIZONTAL ANGLE)<br>6. DISTANCE BETWEEN INACCESSIBLE POINTS (HORIZONTAL ANGLE)<br>7. LEVEL DIFFERENCE BETWEEN POINTS (VERTICAL ANGLE)<br>8. TANGENTIAL TACHEOMETRY (VERTICAL ANGLE)<br>9. HEIGHT OF BUILDING (VERTICAL ANGLE)<br>TOTAL STATION SURVEY<br>10. HEIGHTS AND DISTANCES<br>11. AREA COMPUTATION<br>12. STUDY OF INSTRUMENTS<br>A. AUTOMATIC LEVEL<br>B. DIGITAL LEVEL<br>C. HANDHELD GPS |

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| 3 | MATERIAL TESTING LAB - I | CONDUCTING UNIAXIAL TENSION TEST ON ROD SPECIMENS<br>2. STUDY ON STRESS-STRAIN CHARACTERISTICS OF TOR STEEL BY CONDUCTING UNIAXIAL TENSION TEST ON ROD SPECIMENS<br>3. STUDY ON ESTIMATION OF SHEAR CAPACITY OF MILD STEEL SPECIMEN BY CONDUCTING A DOUBLE SHEAR TEST ON ROD SPECIMEN.<br>4. STUDY ON FLEXURAL BEHAVIOUR OF STEEL BY CONDUCTION OF TEST ON RSJ (I CROSS SECTION)<br>5. STUDY ON TORSIONAL BEHAVIOUR AND ESTIMATION OF MODULUS OF RIGIDITY OF STEEL BY CONDUCTING TORSION TEST ON ROD SPECIMENS<br>6. STUDY ON ESTIMATION OF MODULUS OF RIGIDITY OF STEEL AND BRASS / COPPER MATERIALS UTILIZING THE PRINCIPLES OF TORSIONAL VIBRATIONS.<br>7. STUDY ON ESTIMATION OF TOUGHNESS PROPERTIES OF STEEL SPECIMENS BY CONDUCTING<br>(A) IZOD &(B) CHARPY IMPACT TESTS.<br>8. STUDY ON ESTIMATION OF HARDNESS PROPERTIES OF ENGINEERING MATERIALS SUCH AS BRASS, ALUMINIUM, COPPER, STEEL ETC.BY PERFORMING BRINELL HARDNESS TEST<br>9. STUDY ON ESTIMATION OF MODULUS OF RIGIDITY OF STEEL BY PERFORMING TENSION TESTS ON SPRING SPECIMENS.<br>10. STUDY ON ESTIMATION OF MODULUS OF RIGIDITY OF STEEL BY PERFORMING COMPRESSION TESTS ON SPRING SPECIMENS<br>11. STUDY ON FLEXURAL BEHAVIOUR OF TIMBER MATERIAL BY PERFORMING TESTS ON BEAM SPECIMENS.<br>12. EXPERIMENT ON VERIFICATION OF MAXWELL'S RECIPROCAL |
| 4 | MATERIAL TESTING LAB - II | 1. TESTING OF CEMENT: FINENESS, NORMAL CONSISTENCY,INITIAL & FINAL SETTING TIME<br>2. TESTING OF CEMENT: SPECIFIC GRAVITY AND COMPRESSIVE STRENGTH<br>3. STUDY ON SOUNDNESS OF CEMENT<br>4. TESTING OF COARSE AND FINE AGGREGATE: SIEVE ANALYSIS<br>5. TESTING OF COARSE AND FINE AGGREGATE: WATER ABSORPTION, BULK DENSITY, VOID RATIO, POROSITY AND SPECIFIC GRAVITY<br>6. TEST ON BULKING OF SAND<br>7. TESTS ON FRESH CONCRETE :MEASUREMENT OF WORKABILITY OF CONCRETE BY SLUMP CONE TEST AND COMPACTING FACTOR TEST<br>8. STUDY ON WORKABILITY OF CONCRETE BY VEE-BEE TEST AND FLOW TEST.<br>9. CONCRETE MIX DESIGN BY IS CODE METHOD AND CASTING OF CUBES, CYLINDERS WITH DESIGNED CONCRETE MIXES.<br>10. TESTS ON HARDENED PROPERTIES OF CONCRETE: COMPRESSIVE, SPLIT AND FLEXURAL STRENGTH.<br>11. TESTS ON HARDENED PROPERTIES OF CONCRETE: MODULUS OF ELASTICITY OF CONCRETE<br>12. TESTS ON BRICK, FLOOR AND ROOF TILES AS PER IS CODAL PROVISION. |

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| 5 | GEOTECHNICAL ENGINEERING LAB | ESTIMATION OF PHYSICAL AND INDEX PROPERTIES OF THE GIVEN SOIL: AFTER PERFORMING THE SET OF EXPERIMENTS, STUDENTS ARE EXPECTED TO INFER THE RESULTS OF THE EXPERIMENTS IN THEIR ENGINEERING BEHAVIOR.<br>1. DETERMINATION OF WATER CONTENT AND SPECIFIC GRAVITY<br>2. SIEVE ANALYSIS<br>3. HYDROMETER/PIPETTE ANALYSIS<br>4. ATTERBERG LIMITS (LIQUID LIMIT, PLASTIC LIMITAND SHRINKAGE LIMIT)<br>5. SWELLING TEST CIVIL ENGINEERING<br>6. FIELD DENSITY DETERMINATION<br>PART B<br>DETERMINATION OF ENGINEERING PROPERTIES OF THE GIVEN SOIL: STUDENTS SHOULD BE FAMILIARIZING WITH THE TESTS TO BE PERFORMED TO DETERMINE THE ENGINEERING PROPERTIES OF THE GIVEN SOIL AND INTERPRET THE RESULTS FOR FIELD APPLICATION.<br>7. PERMEABILITY TEST<br>8. STANDARD PROCTOR COMPACTION TEST<br>9. HEAVY COMPACTION<br>10. CALIFORNIA BEARING RATIO TEST<br>11. DIRECT SHEAR TEST<br>12. UNCONFINED COMPRESSION TEST<br>13. CONSOLIDATION TEST<br>STUDY/DEMONSTRATION<br>14. TRIAXIAL TEST |
| 6 | CIVIL ENGINEERING PLANNING AND DRAFTING LAB | 2. DRAW SECTIONAL DETAILS AND ELEVATION OF GLAZEDWINDOWS AND VENTILATORS IN WOOD.<br>3. DRAW SECTIONAL DETAILS , DETAILING ON FIXING ARRANGEMENT AND ELEVATION OF STEEL WINDOWS.<br>4. DRAW ELEVATION, SECTION AND DETAILING OF CONNECTION BETWEEN MEMBERS, ARRANGEMENT FOR FIXINGAT THESUPPORT FOR STEEL ROOF TRUSS.<br>5. DRAW PLAN, SECTION AND ELEVATION OF DOG LEGGED STAIRCASE.<br>6. DRAW PLAN, SECTION AND ELEVATION OF SINGLE STORIED RESIDENTIAL BUILDINGS WITH FLAT ROOF.<br>7. DRAW PLAN, SECTION AND ELEVATION OF TWO STORIED RESIDENTIAL BUILDING.<br>8. DRAW PLAN , SECTION AND ELEVATION OF A COMMUNITY HALLHAVINGCORRUGATED GI SHEETROOF.<br>9. PREPARE A SITE PLAN AND SERVICE PLANAS PER LATEST BUILDINGRULES (KPBR OR KMBR)<br>10. PREPARE DETAILED DRAWING ON BUILDING SERVICES (FOR SINGLE AND TWO STORIED BUILDINGS ONLY)AND ON-SITE WASTEWATER DISPOSAL SYSTEMS LIKE SEPTIC TANK AND SOAK PIT. .<br>11. DRAW PLAN, SECTION AND ELEVATION OF A PUBLIC BUILDINGS–OFFICE COMPLEX, PUBLIC HEALTH CENTRE, POST OFFICE, BANK ETC<br>12. DRAW PLAN, SECTION AND ELEVATION OF A INDUSTRIAL BUILDING WITHCORRUGATED GI STEEL ROOF AND PEB BASED WALLING ELEMENTS. |

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| 7 | CIVIL ENGINEERING SOFTWAREWARE LAB | STANDARD SOFTWARE USED IN THE INDUSTRY.<br>EXERCISE 1: ANALYSIS AND DESIGN OF CONTINUOUS AND CANTILEVER BEAMS EXERCISE 2; ANALYSIS AND DESIGN OF PLANE TRUSS AND FRAMES<br>EXERCISE 3:ANALYSIS AND DESIGN OF MULTI-STORIED RCC FRAMED STRUCTURES.<br>2. PREPARATION OF STRUCTURAL DRAWINGS OF SLABS AND BEAMS<br>EXERCISE 4:DETAILED STRUCTURAL DRAWING OF ONE WAY / TWO WAY AND CONTINUOUS SLABS.<br>EXERCISE 5: DETAILED STRUCTURAL DRAWING OF SINGLY REINFORCED / DOUBLE REINFORCED BEAMS.<br>EXERCISE 6: DETAILED STRUCTURAL DRAWING OF CONTINUOUS / FLANGED BEAMS. EXERCISE 7: DETAILED STRUCTURAL DRAWING OF FOUNDATION UNITS – ISOLATED AND COMBINED FOOTING (RECTANGULAR)<br>3. USE OF BUILDING INFORMATION MODELLING TOOLS INTRODUCTION TO BIM PROCESS AND DESCRIBE THE WORKFLOW IN USING BIM IN THE BUILDING LIFECYCLE<br>EXERCISE 8: PREPARATION OF BUILDING MODEL FROM A GIVEN ARCHITECTURAL DRAWING OF A RESIDENTIAL UNIT AND PERFORM MODEL BASED COST ESTIMATION EXERCISE 9:CREATE A SCHEDULE AND IMPORT IT INTO THE 4D MODELLING ENVIRONMENT, SO THAT EACH ACTIVITY IN THE SCHEDULE CAN BE LINKED TO AN OBJECT IN THE MODEL.<br>EXERCISE 10:DEVELOP SCHEDULES FOR THE CONSTRUCTION OF SLABS, WALLS, COLUMNS, BEAMS AND WINDOWS OF A SECTION OF A |
| 8 | TRANSPORTATION ENGINEERING LAB | TEST ON SOIL<br>1. CALIFORNIA BEARING RATIO TEST (SOAKED/UNSOAKED SPECIMEN)<br>TEST ON COARSE AGGREGATE<br>2. SPECIFIC GRAVITY AND WATER ABSORPTION TEST<br>3. AGGREGATE IMPACT TEST<br>4. LOS ANGELES ABRASION TEST<br>5. AGGREGATE CRUSHING VALUE TEST<br>6. SHAPE TEST (ANGULARITY NUMBER, FLAKINESS INDEX, ELONGATION INDEX, COMBINED FLAKINESS AND ELONGATION INDEX)<br>7. STRIPPING VALUE OF ROAD AGGREGATES<br>TESTS ON BITUMEN<br>8. DETERMINATION OF GRADE OF BITUMEN BASED ON VISCOSITY<br>9. SOFTENING POINT<br>10. DUCTILITY OF BITUMEN<br>11. FLASH AND FIRE POINT OF BITUMEN<br>12. DESIGN OF BITUMINOUS MIX DESIGN OF BITUMINOUS MIX BY MARSHALL METHOD OF MIX DESIGN |
| 9 | ENVIRONMENTAL ENGINEERING LAB | 1. TO ANALYSE THE PHYSICAL CHARACTERISTICS VIZ. COLOUR, TURBIDITY, AND CONDUCTIVITY OF A GIVEN WATER SAMPLE AND TO DETERMINE ITS SUITABILITY FOR DRINKING PURPOSES<br>2. TO ANALYSE THE CHEMICAL CHARACTERISTICS OF A GIVEN WATER SAMPLE VIZ. PH, ACIDITY, ALKALINITY FOR ASSESSING ITS POTABILITY<br>3. TO ANALYSE THE CHEMICAL CHARACTERISTICS OF A GIVEN WATER SAMPLE VIZ. CHLORIDES AND SULPHATES CONTENT TO ASSESS ITS SUITABILITY FOR DRINKING PURPOSES AND BUILDING CONSTRUCTION<br>4. TO DETERMINE THE DISSOLVED OXYGEN CONTENT OF A GIVEN WATER SAMPLE FOR CHECKING ITS POTABILITY<br>5. TO DETERMINE THE AVAILABLE CHLORINE IN A SAMPLE OF BLEACHING POWDER<br>6. TO ANALYSE THE VARIOUS TYPES OF SOLIDS IN A GIVEN WATER SAMPLE<br>7. TO DETERMINE THE BOD OF A GIVEN WASTEWATER SAMPLE<br>8. TO DETERMINE THE COD OF A GIVEN WASTEWATER SAMPLE<br>9. TO DETERMINE THE OPTIMUM DOSAGE OF ALUM USING JAR TEST<br>10. TO DETERMINE THE NITRATES / PHOSPHATES IN A WATER SAMPLE<br>11. TO DETERMINE THE IRON CONTENT OF A WATER SAMPLE<br>12. TO DETERMINE THE MPN CONTENT IN A WATER SAMPLE AND ASSESS THE SUITABILITY FOR POTABILITY |

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| 10 | STRUCTURAL ENGINEERING DESIGN STUDIO | STAAD & STRAP:<br>LINEAR STATIC ANALYSIS, DESIGN & DETAILING OF CONTINUOUS BEAMS, PORTAL FRAMES, TRUSS (2D AND 3D), MULTI-STOREYED BUILDING. |
| 11 | COMPUTER APPLICATION LAB | SAP 2000:-<br>LINEAR STATIC ANALYSIS OF CONTINUOUS BEAMS, PORTAL FRAMES, TRUSS (2D AND 3D),<br>MULTI-STOREYED BUILDING.<br>ANSYS AND NISA:-<br>LINEAR STATIC ANALYSIS OF CONTINUOUS BEAMS, PORTAL FRAMES, TRUSS (2D<br>AND 3D), PLATES (PLANE STRESS AND PLANE STRAIN) |

# LIST OF EXPERIMENTS-EEE

| SL NO | NAME OF LAB/WORKSHOP | LIST OF EXPERIMENTS |
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| 1 | Electrical and Electronics Workshop | 1a) Demonstrate the precautionary steps adopted in case of Electrical shocks. b)Identify different types of cables, wires, switches, fuses, fuse carriers, MCB, ELCB and MCCB with ratings.<br>2.Wiring of Simple Light Circuit for Controlling Light/Fan Point(PVC Conduit wiring) 3.Wiring of light circuit using Two way switches . (Staircase wiring)<br>4.Wiring of Fluorescent lamps and Light sockets(6A) with a power circuit for controlling power device<br>5.Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, main switch and Energy meter.<br>6 a)Identify different types of batteries with their specifications. b)Demonstrate the Pipe and Plate Earthing Schemes using Charts/Site Visit. |
| 2 | Electrical Machines Lab I | 1. OCC on a dc shunt generator, determination of critical resistance, critical speed, additional resistance required in the field circuit<br>2. Load characteristics of DC Shunt generator<br>3. Load characteristics of DC Compound generator<br>4. Load test on DC Series motor<br>5. Load test on DC Shunt motor<br>6. Swinburne's Test on a DC Shunt Machine<br>7.Hopkinson's test on a pair of DC machines<br>8.Separation of losses in a DC shunt motor<br>9. Load test on single phase transformer<br>10. Sumpner's Test.<br>11. OC and SC test on single phase transformer<br>12.Separation of Constant losses of a Single Phase Transformer |

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| 3 | CIRCUITS AND MEASUREMENTS LAB | 1. Verification of Superposition theorem and Thevenin's theorem.<br>2. Determination of impedance, admittance and power factor in RLC series/ parallel<br>circuits.<br>3. 3-phase power measurement using one wattmeter and two-wattmeter methods, and<br>determination of reactive/apparent power drawn.<br>4. Resistance measurement using Kelvin's Double Bridge and Wheatstone's Bridge<br>5. Extension of instrument range by using Instrument transformers(CT and PT)<br>6. Calibration of ammeter, voltmeter, wattmeter using Potentiometers<br>7. Calibration of 1-phase Energy meter at various power factors (minimum 4 conditions)<br>8. Calibration of 3-phase Energy meter using standard wattmeter<br>9. Determination of B-H curve<br>10. Measurement of Self inductance, Mutual inductance and Coupling coefficient of a 1-<br>phase transformer<br>11. . Verification of loading effect in ammeters and voltmeters with current measurement<br>using Clamp on meter.. 12. calibration of 1 phase energy meter by phantom loading at adifferent power factors<br>13. Experiments/Simulation study:<br>(a) Measurement of energy using TOD meter<br>(b) Measurement of electrical variables using DSO |
| 4 | CONTROL & SIMULATION LAB | 1.Predetermination and verification of frequency response characteristics of Lag networks.<br>2.Predetermination and verification of frequency response characteristics of Lead networks.<br>3.Study of various types of synchros (TX, TR & TDX). Characteristics of transmitter, data transmission using TX-T R pair. Effect of TDX in data transmission.<br>4.Transfer Function of AC servomotor<br>5.MATLAB: Use of control system Tool box for the Time domain and frequency domain methods of system analysis and design<br>Step and impulse response of open loop and closed loop systems(MATLAB)<br>Step and frequency response of R-L-C circuit<br>Lag compensator design using Bode plot with MATLAB control system Tool box<br>Lead compensator design using Bode plot with MATLAB control system Tool box<br>SIMULINK: Simulation and control of real time systems using SIMULINK |

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| 5 | Power Electronics Lab | 1. Static characteristics of SCR<br><br>2. R and RC firing circuits<br><br>3. UJT Trigger circuit with Single phase controlled Rectifier<br>.<br>4. Line Synchronized Triggering Circuits<br><br>5. AC Voltage Controller using TRIAC<br><br>6. Single phase fully controlled SCR Bridge Circuit.<br><br>7.Chopper Controlled DC motor<br><br>8. Simulation of 1-phase fully-controlled and half –controlled rectifier fed separately excited DC motor.<br><br>9. Design and simulation of buck, boost and buck-boost converters<br><br>10. Simulation of Dual Converter – 4 quadrant operation – separately excited DC motor<br><br>11. Speed control of DC motor Drive |
| | MICROPROCESSOR & MICROCONTROLLER LAB | Embedded Systems<br>1.Introduction to 8085<br>2. Data Transfer in Different Addressing modes<br>3. Binary and BCD Arithmetic Operations<br>4. Largest/Smallest Number of An Array<br>5. Sorting an Array<br>6. Code Conversion<br>7. Introduction to 8051<br>8. Square Wave Generation Using 8051<br>9. LCD Display Interfacing With 8051 |
| 6 | POWER SYSTEMS LAB | 1. Y-Bus Formulation(Basic Programming):<br>2. Load Flow Analysis –Gauss-Siedel Method 3.Short Circuit Analysis – Symmetrical Faults and Unsymmetrical Faults<br>4. Transient Stability Analysis 5. Automatic Generation Control – Single Area, Two Area<br>6. Reactive Power Control 7. Plot the IV characteristics of a PV module and determine Maximum Power Point 8. Testing of dielectric strength of solid insulating materials<br>9 Testing of dielectric strength of air 10.Testing of CT and PT<br>11. Testing of transformer oil 12.Power factor improvement 13. Insulation Testing – LT & HT Cable<br>14. Earth Resistance |

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| 7 | Electrical Machines Lab II | Regulation of alternator by direct loading<br><br>Regulation of three phase alternator by emf and mmf methods<br><br>Regulation of alternator by Potier and ASA methods<br><br>Variation of starting torque with rotor resistance in slip-ring induction motors<br><br>Load test on three phase squirrel cage induction motor<br><br>Load test on three slip ring induction motor<br><br>No load and block rotor test on three phase induction motor<br>Performance characteristics of pole changing induction motor<br>V curve of a synchronous motor<br><br>Performance characteristics of induction generator<br><br>Equivalent circuit of single phase induction motor |
| 8 | ANALOG CIRCUITS LAB | 1)Measurement of current, voltage, frequencyand phase shift of signal in a RC network<br>using oscilloscope.<br>2. Clipping circuits usingdiodes.<br>3. Clamping circuits usingdiodes.<br>4. RC coupled amplifier using BJT in CE configuration-Measurement of gain, BW and<br>plotting of frequencyresponse.<br>5. Op-amp circuits – Design and set up of invertingand non-inverting amplifier, scale<br>changer, adder, integrator, and differentiator.<br>6. Op-amps circuits – Scale changer, adder, integrator, and differentiator.<br>7. Precision rectifierusingOp-amps.<br><br>8. Wein'sBridgeoscillator using Op-amps.<br>9. Waveform generation– Square, triangular andsaw tooth waveformgeneration<br>usingOPAMPs.<br>10. Basic comparator and Schmitt triggercircuits using Op-amp (Use comparator ICs such as<br>LM311).<br>11. Astable and Monostable circuit using555IC.<br>12. RC phase shift oscillator using Op-amp.<br>13. Introductionto circuit simulation using any circuit simulation software.(PSpice) |

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| 9 | Digital Electronics Lab | 1. Familiarisation of Logic Gates, Identification of typical logic ICs, Interpreting IC datasheets<br>2. Verification & Realisation of De Morgan's theorem.<br>3. Realisation of SOP & POS functions after K-map reduction.<br>4. Half adder & Full adder using gates.<br>5. 4-bit Adder/ Subtractor & BCD adder using IC 7483.<br>6. Realisation of 2-bit comparator using gates and study of four-bit comparator IC 7485.<br>7. BCD to decimal decoder and BCD to 7-segment decoder & display.<br>8. Study of multiplexer IC and realization of combinational circuits using multiplexers.<br>9. Realization of RS, T, D & JK flip flops using gates.<br>10. Study of flip flop ICs (7474 & 7476).<br>11. Realisation of ripple up and down counters and modulo-N counter using flip-flops.<br>12. Study of counter ICs (7490, 7493).<br>13. Design of synchronous up, down & modulo-N counters.<br>14. Realization of 4-bit serial IN serial OUT registers using flip flops.<br>15. Study of shift register IC 7495, ring counter and Johnsons counter.<br>16. VHDL implementation of full adder, 4 bit magnitude comparator |

# LIST OF EXPERIMENTS-ECE

| SL NO | AME OF LAB/WORKSHC | LIST OF EXPERIMENTS |
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| 1 | S12: ELECTRICAL AND ELECTRONICS WORKSHOP (2019 scheme) | 1.Familiarization of Electronic Components<br>2.Drawing of Electronic Circuit Diagrams Using BIS/IEEE Symbols and Introduction to EDA Tools. Interpret datasheets of discrete components and IC's<br>3.Familiarization of Testing Instruments and Commonly Used Tools<br>4.Testing of Electronic Components Using Multi-meters<br>5.Interconnection Methods and Soldering Practice using General Purpose PCB<br>6.Printed Circuit Boards and Processing Methods<br>7.Assembling of Electronic Circuits on General Purpose PCB |
| 2 | S3: SCIENTIFIC COMPUTING LAB (2019 scheme) | 1. Familarization of the Computing Tool<br>2. Familarization of Scientific Computing<br>3. Realization of Arrays and Matrices<br>4. Numerical Differentiation and Integration<br>5. Solution of Ordinary Differential Equations<br>6. Simple Data Visualization<br>7. Simple Data Analysis with Spreadsheets<br>8. Convergence of Fourier Series<br>9: Coin Toss and the Level Crossing Problem |
| 3 | S3: LOGIC DESIGN LAB (2019 scheme) | PART A<br>1.Realization of functions using basic and universal gates.<br>2.Design and realization of half/full adder and subtractor using basic and universal gates.<br>3.4 bit adder/subtractor and BCD adder using 7483.<br>4.Asynchronous counter: 3 bit up/down counter.<br>5.Ring and Johnson counter.<br>PART B<br>1.Realization of logic gates and familiarization of FPGAs.<br>2.Develop a verilog module for adders in 3 modelling styles.<br>3.Develop a verilog module for Mux and Demux.<br>4.Develop a verilog module for binary decade/Ring/Johnson counter.<br>5.Synchronous and Asynchronous counters in FPGA. |

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| 4 | S4:ANALOG CIRCUITS AND SIMULATION LAB (2019 scheme) | 1. RC integrating and differentiating circuits (Transient analysis with different inputs and frequency response)<br>2.Clipping and clamping circuits (Transients and transfer characteristics)<br>3.RC coupled CE amplifier - frequency response characteristics<br>4.Feedback amplifiers (current series, voltage series) - gain and frequency response<br>5.Low frequency oscillators –RC phase shift or Wien bridge<br>6.Power amplifiers (transformer less) - Class B and Class AB<br>7.Transistor series voltage regulator (load and line regulation)<br>**SIMULATION**<br>1.RC integrating and differentiating circuits (Transient analysis with different inputs and frequency response)<br>2.Clipping and clamping circuits (Transients and transfer characteristics)<br>3.RC coupled CE amplifier - frequency response characteristics<br>4.Feedback amplifiers (current series, voltage series) - gain and frequency response<br>5.Low frequency oscillators –RC phase shift or Wien bridge<br>6.Power amplifiers (transformer less) - Class B and Class AB<br>7.Transistor series voltage regulator (load and line regulation) |
| 5 | S4:MICROCONTROLLER LAB (2019 scheme) | PART –A (At least 6 experiments are mandatory)<br>These experiments shall be performed using 8051 trainer kit. The programs shall be written either in embedded C or in assembly language<br>1. Data transfer/exchange between specified memory locations.<br><br>2. Largest/smallest from a series.<br><br>3. Sorting (Ascending/Descending) of data.<br><br>4. Addition / subtraction / multiplication / division of 8/16 bit data.<br><br>5. Sum of a series of 8 bit data.<br><br>6. Square / cube / square root of 8 bit data.<br><br>PART –B (At least 4 experiments are mandatory)<br>Interfacing experiments shall be done using modern microcontrollers such as 8051 or ARM. The interfacing modules may be developed using Embedded C.<br><br>1. Time delay generation and relay interface.<br><br>2. Display (LED/Seven segments/LCD) and keyboard interface.<br><br>3. ADC interface. |

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| 6 | S5:ANALOG INTEGRATED CIRCUITS & SIMULATION LAB (2019 SCHEME) | I. Fundamentals of operational amplifiers and basic circuits<br><br>1. Familiarization of Operational amplifiers - Inverting and Non inverting amplifiers, frequency response, Adder, Integrator, Comparators.<br>2. Measurement of Op-Amp parameters.<br>3. Schmitt trigger circuit using Op–Amps.<br>4. Astable and Monostable multivibrator using Op-Amps<br>5. Waveform generators using Op-Amps - Triangular and saw tooth<br>6. RC Phase shift Oscillator.<br>7. Precision rectifiers using Op-Amp<br><br>II. Application circuits of 555 Timer/565 PLL/ Regulator(IC 723) ICs<br><br>1. Astable and Monostable multivibrator using Timer IC NE555<br>2. A/D converters- counter ramp and flash type.<br>3. D/A Converters - R-2R ladder circuit<br>4. Study of PLL IC: free running frequency lock range capture range<br><br>III. Simulation experiments using SPICE<br><br>1. Astable and Monostable multivibrator using Op-Amps<br><br>2. Waveform generators using Op-Amps - Triangular and saw tooth<br>3. RC Phase shift Oscillator.<br>4. A/D converters- counter ramp and flash type. |
| 7 | S5:DIGITAL SIGNAL PROCESSING LAB (2019 SCHEME) | Simulation of Signals<br>Verification of the properties of DFT<br>Familiarisation of DSP Hardware<br>Linear Convolution<br>FFT of Signals<br>IFFT with FFT<br>FIR Low Pass Filter<br>Overlap Save Block Reduction<br>Overlap Add Block Reduction |
| 8 | S6:ECL 332 COMMUNICATION LAB (2019 scheme) | Part A<br>Design and setup simple prototype circuits with the help of available ICs.<br>1.FM generation and demodulation using PLL<br>2.Generation and detection of BPSK<br>Part B<br>1. Performance of Waveform Coding Using PCM<br>2.Pulse shaping and matched filtering<br>3.Eye diagram<br>4.Error performance of BPSK<br>5.Error performance of QPSK<br>Part C<br>Emulate communication systems with the help of software-defined-radio hardware and necessary control software.<br>1.Familiarization with software designed radio<br>2.FM reception |
| 9 | S6:MINI PROJECT (2019) | Design and develop a moderately complex electronic system with practical applications. |

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| 10 | S2:C PROGRAMMING LAB (2019 scheme) | Familiarization of hardware components of a computer<br>Familiarization of Linux environment- How to Do programming in C with Linux<br>Familiarization of console I/O and operators in C<br>1.Read 3 integer values and find the largest amoung them.<br>2.Read a Natural Number and check whether the number is prime or no<br>3.Read a Natural Number and check whether the number is Armstrong or not<br>4.Read n integers, store them in an array and find their sum and average<br>5.Read n integers, store them in an array and search for an element in the array using an algorithm for Linear Search<br>6.Read n integers, store them in an array and sort the elements in the array using Bubble Sort algorithm<br>7.Read a string (word), store it in an array and check whether it is a palindrome word or not.<br>8.Read two strings (each one ending with a $ symbol), store them in arrays and concatenate them without using library functions.<br>9.Read a string (ending with a $ symbol), store it in an array and count the number of vowels, consonants and spaces in it.<br>10.Read two input each representing the distances between two points in the Euclidean space, store these in structure variables and add the two distance values.<br>11.Using structure, read and print data of n employees (Name, Employee Id and Salary)<br>12.Declare a union containing 5 string variables (Name, House Name, City Name, State and Pin code) each with a length of C_SIZE (user |
| 11 | S4 CSE: DIGITAL LAB (2019 SCHEME) | **PART A**<br>1.Realization of functions using basic and universal gates (SOP and POS forms).<br>2.Design and realization of half adder, full adder, half subtractor and full subtractor using: a) basic gates (b) universal gates.<br>3.Code converters: Design and implement BCD to Excess 3 and Binary to Gray code converters.<br>4.Design and implement 4 bit adder/subtractor circuit and BCD adder using IC7483.<br>5.Asynchronous Counter: Design and implement 3 bit up/down counter.<br>6.Synchronous Counter: Realization of 4-bit up/down counter.<br>7.Realization of Shift Register (Serial input left/right shift register), Ring counter and Johnson Counter using flipflops.<br>8.Realization of Multiplexers and De-multiplexers using gates.<br>**PART B**<br>1.Realization of Logic Gates and Familiarization of Verilog.<br>(a) Familiarization of the basic syntax of Verilog.<br>(b) Development of Verilog modules for basic gates and to verify truth tables.<br>(c) Design and simulate the HDL code to realize three and four variable Boolean functions.<br>2. Half adder and full adder.<br>(a) Development of Verilog modules for half adder in 3 modeling styles (dataflow/ structural/behavioural).<br>(b) Development of Verilog modules for full adder in structural modeling |

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| 12 | S7:<br>ELECTROMAGNETICS LAB<br>(2019 scheme) | Microwave Experiments:<br>1.Gunn Diode Characteristics<br>2.VSWR and Frequency measurement<br>3.Verification of wavelength relationship in a rectangualr waveguide<br>4.Reflex Klystron mode characteristics<br>5. Directional coupler characteristics<br>6.Impedance Measurement<br><br>Optical Experiments<br>1.Setting up a fiber optic analog link<br>2.Setting up a fiber optic digitsl link<br>3. Stuy of numerical aperture of optical fiber<br>4.Study of losses in optical fiber<br>5. VI characteristics of LED<br>6.VI characteristics of laser<br>7.PI characteristics of LED |

# LIST OF EXPERIMENTS-CSE

| SL NO | NAME OF LAB/WORKSHOP | LIST OF EXPERIMENTS |
|---|---|---|
| 1 | Data Structure Lab | Write a program using linked lists to simulate Memory Allocation and Garbage Collection. Write a time/space efficient program to convert an arithmetic expression from one notation to another. Examine a given Data |
| 2 | Operating System Lab | Implement Process Creation and Inter Process Communication in Operating Systems. Illustrate the performance of First In First Out, Least Recently Used and Least Frequently Used Page Replacement lgorithms. Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems. Implement modules for Storage Management and Disk Scheduling in Operating Systems. |
| 3 | Database Management System lab | Creation of a database using DDL commands and writes DQL queries to retrieve information from the database. Performing DML commands like Insertion, Deletion, Modifying, Altering, and Updating records based on conditions. Practice of SQL TCL commands like Rollback, Commit, Savepoint.<br><br>Implementation of set operators, nested queries and Join queries. Implementation of various control structures using PL/SQL.<br><br>Creation of Procedures and Functions.<br><br>Creation of Packages.<br><br>Creation of database Triggers and Cursors.<br><br>Mini project (Application Development using Oracle/ MySQL using Database connectivity) |

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| 4 | System Software and Microprocessor Lab | Simulate CPU scheduling algorithms. Implement Banker's algorithm for deadlock avoidance. Implement pass one and pass two of two pass assembler. Implement two pass macro processor. Implement an absolute loader. Implement a relocating loader. Implementation of simple decimal arithmetic and bit manipulation operations. Programming exercises using stack and subroutines. Implementation of String manipulations.Interfacing with stepper motor - Rotate through any given sequence. Interfacing with 8255 (mode0 and mode1 only). Interfacing with Digital-to-Analog Converter. Familiarization of 8051 trainer kit by executing simple Assembly Language programs such as decimal arithmetic and bit manipulation. |
| 5 | Networking Lab | Implement Client-Server communication using Socket Programming and TCP as transport layer protocol. Implement Client-Server communication using Socket Programming and UDP as transport layer protocol. Implement a multi user chat server using TCP as transport layer protocol.<br>Implement Concurrent Time Server application using UDP to execute the program at remoteserver. Client sends a time request to the server, server sends its system time back to the client. Client displays the result.<br>Develop concurrent file server which will provide the file requested by client if it exists. If not server sends appropriate message to the client. Server should also send its process ID (PID) to clients for display along with file or the message. |

# LIST OF EXPERIMENTS-SCIENCE

| SL NO | NAME OF LAB/WORKSHOP | LIST OF EXPERIMENTS |
|---|---|---|
| 1 | Engineering chemistry lab CYL 120 | Estimation of total Hardness of water- EDTA method |
| 2 | Engineering chemistry lab CYL 120 | Potentiometric Titration - Redox reaction |
| 3 | Engineering chemistry lab CYL 120 | Determination of cell constant and conductance of solutions |
| 4 | Engineering chemistry lab CYL 120 | Calibration of p H meter and Determination of pH of a solution |
| 5 | Engineering chemistry lab CYL 120 | Estimation of chloride in water |
| 6 | Engineering chemistry lab CYL 120 | Determination of wavelength of absorption maximum and Colorimetric Estimation of iron in solution |
| 7 | Engineering chemistry lab CYL 120 | Synthesis of polymers a) Urea-formaldehyde resin b) Phenol-formaldehyde resin |
| 8 | Engineering chemistry lab CYL 120 | Estimaton of Dissolved Oxygen by Winkler's method |
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| 1 | Engineering Physics lab PHL 120 | CRO-Measurement of frequency and amplitude of wave forms |
| 2 | Engineering Physics lab PHL 120 | Melde's string apparatus-Measurment of frequency in the transverse and longitudinal mode |
| 3 | Engineering Physics lab PHL120 | Wave length measurement of a monochromatic source of light using Newton's Rings |
| 4 | Engineering Physics lab PHL120 | Determination of diameter of a thin wire using air wedge method |
| 5 | Engineering Physics lab PHL120 | To measure the wavelength using a millimeter scale as a grating |
| 6 | Engineering Physics lab PHL 120 | Measurement of wavelength of a source of light using grating |
| 7 | Engineering Physics lab PHL 120 | Calculate the numerical aperture and study the losses that occur in optical fiber cable |
| 8 | Engineering Physics lab PHL 120 | I-V characteristics of solar cell |