Basic Electrical Engineering Lab

Lab Course: Electrical Network Analysis

List of Experiments:

1. Familiarization to PSPice- A circuit analysis tool
2. Verification of Star-Delta Transformation
3. Verification of Maximum Power Transfer Theorem
4. Study of RC Circuits (AC/DC Analysis)
5. Study of RC Circuits (AC/DC Analysis)
6. Measurement of Transient Response in RC & RL Circuit using PSPice
7. Measurement of Resonance Frequency in RLC Series Circuit
8. Measurement of Resonance Frequency in RLC Parallel Circuit
9. Study of RLC Circuits (Natural/Transient Response & Damping)
10. Study of RLC Circuits (Natural/Transient Response & Damping) using PSPice
11. RL & RC filter circuits and their applications
12. Power Factor Improvement
13. Study of Three Phase Balanced/Unbalanced Star/Delta Connected Load
14. Three Phase Power and Methods of Measurement
15. Frequency Response of General First & Second Order Circuits
16. Two Port Networks (Determination of Z Parameter)

Basic Electrical Engineering Lab

Lab Course: Fundamentals of High Voltage Engineering

List of Experiments:

1. Introduction to Insulating materials and Insulators
2. Measurement of High Voltage by using Potential Transformer
3. Measurement of High Voltage using HV Probe
4. To observe Partial Discharge on Ceramic and Polymer Insulators
5. Leakage Current Measurement in Ceramic and Polymer Insulators
6. Comparison of Voltage Distribution in Ceramic and Polymer Insulators
7. To understand structure & working of Marx Impulse Generator
8. To understand structure & working of Walton Multiplier
9. To understand structure & working of Van De Graff Generator
10. To understand structure & working of Cascaded HV Transformer
11. To observe working of Kelvin Water Dropper
12. To observe working of Plasma Globe
13. To understand structure & working of Tesla Coil
14. To observe working of Jacob's Ladder

Basic Electrical Engineering Lab

Lab Course: Instrumentation & Measurements

List of Experiments:

1. Introduction to LabVIEW (Laboratory Virtual Instrument Engineering Workbench)
2. Familiarization of Instruments and symbols on instruments
3. Calibration of Energy Meter (Analog/Digital)
4. Calibration of Voltmeter/Ammeter using potentiometer
5. Calibration of Power Factor Meter
6. Calibration of Wattmeter by Phantom Loading Method
7. Use of C.T & P.T for Range Extension of Voltmeter, Ammeter and Wattmeter

8. Measurement of Resistance (medium & small using Wheatstone Bridge & Kelvin Bridge)
9. Study of Maxwell Bridge & measurement of R, L & C using LCR meter
10. Study of loading effect of an instrument
11. Use of Clamp-On power meter
12. Familiarization and application of Cathode Ray Oscilloscope
13. Measurement of power in three phase star connected load (Two wattmeter method)
14. Measurement of power in three phase delta connected load (Two wattmeter method)
15. Study of Transformer No load characteristics
16. Sensors/Transducers & their applications

Basic Electrical Engineering Lab

Lab Course: Linear Circuit Analysis

List of Experiments:

1. Introduction to Basic DC Circuit.
2. To study the Resistor Colour Coding
3. Study & Verification Of Ohm's Law
4. Study & Analysis of Series Connected Circuit
5. Study & Analysis of Parallel Connected Circuit
6. Study & Analysis Of Series-Parallel Connected Circuit
7. Verification Of KCl & KVL
8. Study & Analysis Of Power Dissipation and to prove Power Supplied is equal to Power Dissipated
9. Study & Verification Of Superposition Principle
10. Study & Analysis Of Variable Resistor
11. Study & Verification Of Thevenin's Theorem with single Voltage Source
12. Study & Verification Of Thevenin's Theorem with Two Voltage Sources
13. Study & Verification Of Norton's Theorem
14. Study & Verification Of Source Transformation
15. Study & Verification Of Maximum Power Transfer
16. Study About the Capacitors & Inductors

Computer Lab

Lab Course: Introduction to Programming

List of Experiments:

1. Introduction to Microsoft Word.
2. Introduction to PowerPoint
3. Introduction to Excel
4. Familiarization with basic components of a computer (motherboard/memory/input/output cards etc)
5. Familiarization with Network devices and setting up a small network (Introduction of networking cables, switches, hubs and routers. Use of router and switch while setting up a small network)
6. Introduction to Programming and Compiler Turbo C++ (Parts of C++ Programs, directives, variable initialization, variables and literals, data types, bool data types)
7. Arithmetic Operators (solving different arithmetic equation)
8. Relational and Logical operators (Familiarization with relational and logical operators, implementation

of AND, OR, NOT)

9. If-else and nested if-else statements (use of if statement, use of if/else statement, use of nested if/else statement)
10. Switch Statements (use of switch conditions, use of conditional operators)
11. For loop (Implementation of for loop. Executing and debugging of different programs using for loop)
12. While loop (Implementation of While loop. Executing and debugging of different programs using While loop)
13. Do-While loop (Implementation of Do-while loop. Executing and debugging of different programs using Do-While loop)
14. 1 D-Array (Implementation of array. Executing and debugging of different programs using array)
15. Miscellaneous (Revision of all techniques and compiling different programs)
16. Semester project submission and Viva

Computer Lab

Lab Course: Data Structure and Algorithm

List of Experiments:

1. Working with Array (1-D and 2-D). Creating and calling of functions.
2. Working with pointers and structures
3. Working with String algorithms and string operations. Word/Text processing (Searching, replacement, insertion and deletion algorithms)
4. Implementation pattern matching algorithms. Implementation of related exercise problems.
5. Working on operations of Array (Traversing, Insertion, and Deleting). Implementing sorting and searching algorithms for array items.
6. Working with Pointers arrays and Record structures. Indexing items in record structure. Implementation example programming problems.
7. Implementing Linked List. Algorithm for Traversing Linked List. Working on algorithm for searching a Linked List.
8. Working on Linked List Insertion Algorithm. Implementation of deleting algorithm.
9. Implementing algorithm for operation on two way Linked List.
10. Implementing Stack ADT. Working on Stack Operations (Insertion, Deletion, Traversing)
11. Implementing Queue ADT. Working on Queue Operations (Insertion, Deletion, Traversing)
12. Implementing Binary Trees. Working with different Binary Search Tree Operations (Insertion, Searching, In-order/Pre-Order/Post-order)
13. Working with Binary Search Tree Operations (Deletion)
14. Working with Heap Operation (Insertion, Deletion), Heap Sort, Min Heap, Max Heap.
15. Implementing recursive procedures. Working on Divide & Conquer procedure.
16. Semester Project. Viva and Project Submission

Computer Simulation Lab

Lab Course: Engineering Drawing

List of Experiments:

1. Basic Introduction to Engineering drawing
2. Free hand sketching of different angles using tools, how to draw isometric figure and their orthographic

views using third angle projection by hand
3. Introduction to AUTOCAD and its basic commands.
4. Fundamentals of 2-D construction and more advanced commands.
5. Drawing of Isometric figures and their orthographic views in AUTOCAD.
6. Drawing of complex Isometric figures and their orthographic views in AUTOCAD.
7. Introduction to Sectional view.
8. Detailed, schematic and Simplified drawing of STANDARD Thread.
9. Detailed drawing of SQUARE thread.
10. Introduction to Auxiliary View.
11. Designing the map of a house in given dimensions
12. Fundamentals of 3-D Drawing
13. Solid Modeling of objects
14. Surface Modeling of objects
15. Introduction to PCB designing.
16. Introduction to PROTEOUS for designing of circuits

Electronics Lab

Lab Course: Communication Electronics

List of Experiments:

1. Introduction to Lab Equipment's and Trainer KL-22001. Study & Analysis of 2 Stage RC Coupled Amplifier
2. Study & Analysis of Direct Coupled Amplifier.
3. Study & Analysis of Transformer Coupled Amplifier.
4. Study & Analysis of Amplifier Characteristics with and without Feedback.
5. To observe the Characteristics of Class B Dual Push-Pull Amplifier
6. To Analyze Class B Complementary Symmetry Characteristics.
7. To Analyze the Characteristics of Class C Single Tuned Amplifier.
8. To observe Characteristics of Active Low and High Pass Filters.
9. To implement and observe behavior of Band Pass and Band Stop Filters.
10. To become familiar with the operation of RC Phase Shift Oscillator.
11. To become familiar with the operation of Wien-Bridge Oscillator.
12. To analyze the operation of Colpitts Oscillator.
13. To analyze the operation of Hartley Oscillator.
14. Study the Characteristics of Crystal based Oscillator.
15. Implementation of Voltage Controlled Oscillator using 555 Timer.
16. To implement and observe Characteristics of Mixer.

Electronics Lab

Lab Course: Microelectronics

List of Experiments:

1. Introduction to IC Fabrication.
2. Revisiting Lab Instruments and Devices for measuring Sensitivity, Bandwidth etc.
3. Study of 555 timers IC Operation.
4. Study of OP-AMP 741µA IC Characteristics: Input impedance & Output impedance
5. Study of OP-AMP characteristics: Slew rate, Bandwidth, Offset Voltage adjustment of 741µA IC.
6. Introduction to LT Spice.
7. Active Filters using 741(LT Spice simulations)
8. Study of JFET Characteristics.
9. Study of MOSFET Characteristics.
10. Study of Cascode MOSFET Amplifier Characteristics
11. Study of Cascode BJT Amplifier Characteristics

12. Study of Current Mirror using BJTs
13. Study of Current Mirror using MOSFETs
14. Study of Current Mirror using Cascode MOSFETs
15. Differential Amplifier using BJT and MOSFET.
16. Finding Transfer Characteristics and Noise Margin of CMOS inverter

Electronics Lab

Lab Course: Electronics Circuit Design

List of Experiments:

1. Introduction to KL-22001.
2. To study the Characteristics of Darlington Pair.
3. Study &Analysis of 2 Stage RC Coupled Amplifier.
4. Study & Analysis of Direct Coupled Amplifier.
5. Study & Analysis of Transformer Coupled Amplifier.
6. Study the Characteristics of Dual Push-Pull Amplifier .
7. Study the Characteristics of FET.
8. Study the Characteristics of MOSFET.
9. Study & Analysis of MOSFET as an Amplifier.
10. Study & Analysis of Differential Amplifier.
11. Design & Analysis of Integrator.
12. Design & Analysis of Differentiator.
13. Design & Analysis of Summing Amplifier.
14. Study of Wien-Bridge Oscillator.
15. Study of Sine Wave Oscillator.
16. Semester Project. Viva and Project Submission

Electronics Lab

Lab Course: Electronics Devices and Circuit

List of Experiments:

1. To study the characteristics of different semiconductor diodes and understand the parameters used to model their behavior.
2. To study the use of diode as a rectifier, ripple reduction by a capacitor and regulation by using a zener diode
3. To become familiar with use of diode in clamping circuit and create low voltage multipliers.
4. To study the characteristics of a MOSFET device and understand the parameters used to model the behavior.
5. To study the biasing and amplification of a single stage common source MOSFET amplifier.
6. First lab project.
7. To study the biasing and amplification characteristics of a common gate and common drain MOSFET amplifiers.
8. To study the high frequency and low frequency response of a common source MOSFET amplifier.
9. To study the voltage transfer characteristics and dynamic operation of CMOS digital logic inverter.
10. To study the design and working of discrete component multi-vibrators and applications of 555 timer.
11. To study the basic characteristics and applications of the operational amplifiers (741µA IC)
12. Second lab project.

Electronics Lab
Lab Course: Linear Circuit Analysis

List of Experiments:

1. Introduction to Basic DC Circuit.
2. To study the Resistor Colour Coding.
3. Study & Verification Of Ohm's Law.
4. Study & Analysis of Series Connected Circuit.
5. Study & Analysis of Parallel Connected Circuit.
6. Study & Analysis Of Series-Parallel Connected Circuit.
7. Verification Of KCl & KVL.
8. Study & Analysis Of Power Dissipation and to prove Power Supplied is equal to Power Dissipated.
9. Study & Verification Of Superposition Principle.
10. Study & Analysis Of Variable Resistor.
11. Study & Verification Of Thevenin's Theorem with single Voltage Source.
12. Study & Verification Of Thevenin's Theorem with Two Voltage Sources.
13. Study & Verification Of Norton's Theorem.
14. Study & Verification Of Source Transformation.
15. Study & Verification Of Maximum Power Transfer.
16. Study about the Capacitors & Inductors.

Multimedia & Vision Lab
Lab Course: Computer Organization

List of Experiments:

1. Hardware description in Verilog
2. To learn verilog HDL on Veriloger Pro
3. Combinational Circuit design Verilog
4. ALU design Single bit structural & behavioral design
5. 4 Bit ALU design using single bit ALU.
6. Arithmetic CIRCUIT design-I (2-bit, 4bit Multiplexer)
7. Arithmetic CIRCUIT design-II Implementation of Veddic Algorithum (2-bit, 4bit Multiplexer)
8. Sequential Circuit-I
9. Register File Design
10. RAM Module Design in Verilog
11. Simple Computer Data Path
12. Program Counter
13. Single Cycle Data Path with Control Cycle
14. Implementing Simple MIPS Machine Design-I
15. Implementing Simple MIPS Machine Design-II
16. Implementing Simple MIPS Machine Design-III

Multimedia & Vision Lab
Lab Course: Signal and Systems

List of Experiments:

1. Introduction to MATLAB
2. Properties of Signal & Systems
3. Signals, Periodicity
4. Signals, Harmonics
5. Fourier Series
6. Convolution
7. Laplace Transform
8. Z- Transform
9. Transfer function

10. Fourier Transform
11. Sound
12. Images
13. Semester Project
14. Graphical User Interface
15. Sampling and Aliasing

Optoelectronics Lab

Lab Course: Optical Fiber Communication

List of Experiments:

1. Fiber optic cable color codes, optical connector and optical communication terminology
2. Learn to operate the OTDR (optical time domain reflectometer): OTDR trace analysis.
3. OTDR Measurement of Fiber length, and optical fiber connector loss
4. Determination of fiber link length and fiber attenuation coefficient.
5. Fiber optic Splicing: Practice
6. Characteristic of the different fiber optic component-1: EDWDM KIT
7. Characteristic of the different fiber optic component-2: EDWDM KIT
8. LED sources and LASER sources characterization: EDCOM
9. Laser Classification & Measurement of Laser output Characteristics.
10. Input & output characteristics of Laser: EDLASE KIT
11. Investigation of EDFA pump power and gain characteristics: (EDAMP KIT)
12. Investigation of EDFA gain and output power characteristics: (EDAMP KIT)
13. Measurement of ASE as function of pump power with no input signal.
14. Measurement of ASE as function of signal power at different Pump Powers.
15. Operating of OPTISYSTEM and study of EDFA in OPTISYStem.

Power Electronics lab

Lab Course: Power Electronics

List of Experiments:

1. Study and Analysis of Reverse Recovery Characteristics Of Diode
2. Study and Analysis of Performance parameters of single phase half wave rectifier
3. Study and Analysis of Performance parameters of single phase full wave rectifier
4. Study and Analysis of Performance parameters of three phase rectifier
5. Study and Analysis of C Filter to limit the amount of Output Ripple Voltage In Full Wave Bridge Rectifier. Calculation of Ripple Factor at Different Capacitances.
6. Study and Implementation of DC-DC Conversion (Buck Converter)
7. Study and Implementation of DC-DC Conversion (Boost Converter)
8. Study and Implementation of Triggering Circuit for Thyristor / SCR Using UJT Oscillator.
9. Study and Implementation of Half wave Controlled Rectification with SCR and UJT Triggering Circuit
10. Study and Implementation of Full wave Controlled Rectification with SCR and UJT Triggering Circuit
11. Understanding the characteristics of DIAC, Understanding the Characteristics of TRIAC, Application of DAIC and TRIAC in Dimmer/Fan regulator.
12. Study and Implementation of DC Motor Forward/ Reverse Control with the Help of SCR
13. Study and Implementation Single Phase Single Stage Inverter
14. Study and Implementation of Two Stage Square Wave Inverter
15. Study and analysis of IGBT Characteristics

Power Systems Lab

Lab Course: Power Distribution & Utilization

List of Experiments:

1. Study of two wire D.C Distributor fed at one end
2. Study of two wire D.C Distributor fed at both ends
3. Improvement of Power Factor of an induction motor by using static capacitors
4. To study Fundamentals of illumination schemes.
5. Verification of inverse square and Lambert cosine laws
6. To design a proper Illumination scheme for a given working place
7. Study of light sources. Incandescent lamps. sodium & mercury vapour lamps and Fluorescent Tube Light
8. Electric Braking as applied to a D.C Shunt motor by Rheostatic method
9. Electric Braking as applied to a D.C Shunt motor by Plugging method
10. Measurement of earth resistance by using Earth Tester
11. Testing of Earthing Rod and Strips according to BSS Standards
12. To study different types of Batteries
13. To study components used in substation
14. To study electric heating and furnaces
15. To study different types of Wiring Tests by using “MEGGER”
16. Parallel operation of alternators

Power Systems Lab

Lab Course: Power System Analysis

List of Experiments:

1. Introduction to Power System Analysis
2. Introduction to MATLAB
3. Study and Implementation of Single Line Diagram Using Simulink and Parameters Evaluation in Per Unit System of Calculations
4. Study and Formulation of Bus Admittance Matrix using MATLAB
5. Algorithm Design and its Implementation for Bus Admittance Matrix Using MATLAB
6. Study and Implementation of Gauss Seidel Method for the solution of equations using MATLAB for (1) Single Variable (2) Two Variables (3) n Variables
7. Record observations for Gauss Seidel Method for a given power system on Convergence Time, Line Flows and Accuracy
8. Record observations for Newton Raphson Method for a given power system on Convergence Time, Line Flows and Accuracy
9. Record and compare observations for Gauss Seidel method & Newton Raphson Method for a given power system on convergence, convergence time and number of iterations for convergence
10. Record and compare observations for Gauss Seidel method & Newton Raphson Method for a given power system on active & reactive power at slack bus, reactive power at generation bus and line flows & losses
11. Implement One line Diagram of Given Power System Using ETAP
12. Load Flow Analysis of Given Power System Using ETAP and Investigate Results
13. Symmetrical short circuit studies and analysis of a given power system in ETAP
14. Unsymmetrical short circuit studies - sub transient , transient and steady state comparison
15. Transient stability analysis of a multi machine power system
16. Study and analysis of power system stability using equal area criteria for a single machine system from pre to post fault conditions

Power Systems Lab

Lab Course: Power System Operation & Control

List of Experiments:

1. Analysis and plot of heat rate (cost) characteristics of thermal generating units using heat rate data for given system. Analysis and plot of heat rate (cost) characteristics of thermal generating units using characteristic equations of thermal units.

2. Analysis and Plot of Convex and non-Convex Characteristics of Thermal Generation Units using MATLAB
3. Study and Implementation of Equal Incremental Cost Criteria for Economic Dispatch of Thermal Generating units neglecting Generation Limits and Transmission Loss using MATLAB (Analytic Method)
4. Economic Dispatch of Thermal Generating units neglecting Generation Limits and Transmission Loss using λ-Iteration Method.
5. Economic Dispatch of Thermal Generating units with Generation Limits and neglecting Transmission Loss using λ-Iteration Method. Economic Dispatch of Thermal Generating units with Generation Limits and Transmission Loss using λ-Iteration Method.
6. Economic Dispatch of Thermal Generating units neglecting Transmission Loss and Generation Limits using Gradient Method
7. Economic Dispatch of Thermal Generating units neglecting Transmission Loss and Generation limits using Quadratic Programming (Newton Method)
8. Unit Commitment of Thermal Generating Units using Enumeration Method
9. Unit Commitment of Thermal Generating Units using Priority List Scheme
10. Short Range Fixed Head Hydrothermal Coordination using Classical Method
11. Short Range Fixed Head Hydrothermal Coordination using Approximate Newton Raphson Method
12. Demonstration and Modeling of different Components of Thermal Generating Units used for Load Frequency Control (LFC)
13. Simulation and Stability Analysis of Load Frequency Control (LFC) of Thermal Generating Unit for given Test System
14. Simulation and Stability Analysis of Automatic Generation Control (AGC) by modifying the Load Frequency Control (LFC) Transfer Function
15. Demonstration and Modeling of different Components of Thermal Generating Units used for Automatic Voltage Regulator (AVR) and Simulation of given Test System
16. Simulation and Stability Analysis of Automatic Voltage Regulator (AVR) by modifying the Transfer Function with Stabilizer using rate Feedback Stabilizer. Simulation and Stability Analysis of Automatic Voltage Regulator (AVR) by modifying the Transfer Function with Stabilizer using PID Controller Stabilizer.

Power Systems Lab

Lab Course: Power Transmission

List of Experiments:

1. To study different types of Overhead Line Conductors & one line diagram
2. Testing of ACSR Conductors
3. To study different types of power cables and methods of laying underground cables
4. Testing of imperial size cables according to BSS 3360 & BSS 2004.
5. Testing of metric size cables according to BSS 6360, 6004 & 6346
6. Localization of an earth fault by “Murray Loop Test”
7. Blavier Test for the location on an earth fault in underground cable
8. Efficiency and Regulation of a Short Transmission Line
9. Efficiency and Regulation of Medium Transmission Line connected in nominal Pi
10. Efficiency and Regulation of Medium Transmission Line connected in nominal T
11. To Study different types of Insulators
12. To observe the voltage distribution across an Insulator String
13. To study parts of power transformer
14. Study of Sag and factors effecting on Sag of Transmission Line

15. To study different types of dampers
16. To observe and compensate Ferranti effect in a Long Transmission Line

Workshop Lab

Lab Course: Workshop & Projects

List of Experiments:

1. To learn symbolic representation of basic Electrical Elements/Components & their working.
2. To learn the working principle and uses of different tools in Workshop.
3. To learn the different types of cables, their classifications w.r.t. material, number of cores, Conductor size and application.
4. To learn different types of switches their working & control.
5. To learn different methodologies of electrical wiring, design of domestic Switch Board, Power Board and Distribution Board etc.
6. To study working and connections of lighting sources e.g. incandescent bulb, Fluorescent tube light, CFL, LED & HID lamps.
7. To learn uses and connections of general measuring instruments
8. To study working ,connections & calibration of an Energy Meter
9. To learn purpose and types of earthling and earth Resistance.
10. To learn Mugger and its use for insulation testing and resistance measurement etc.
11. To learn basic protective devices like fuse, circuit breaker.
12. To learn basics of Solar panel
13. To find learn basics of battery, its charge & discharge characteristics
14. To learn basics of battery, its charge & discharge characteristics
15. To find the capacity of battery at different discharge rates
16. Semester Project and Viva.

Digital Systems Lab

Lab Course: Digital Logic Design

List of Experiments:

1. Introduction to the laboratory equipment's and hands on experience to the digital trainer KL31001 (Digital Logic Kit) and ICs.
2. Verify the truth tables of basic, universal and combinational logic gates using ICs.
3. Realization of Boolean function using logic gates ICs
4. Simplification of Boolean Functions. Implementation of the simplified Boolean function and verification with the listed Minterms.
5. Simulate the behavior of logic gates and verify truth tables using Verilog HDL in Modelsim.
6. Simulation of combinational circuits using dataflow modeling and operators in verilog using modelsim
7. Implementation and verification of 2x4 line and 3x8 line decoder using gates and IC. Display counting from 0-9 on a seven segment display with 7447 BCD-to seven segment display decoder.
8. Implementation and verification of 2x1, 4x1 and 8x1 multiplexer, using logic gates and ICs.
9. Simulate and verify behavior of 2x1,4x1 multiplexer 32- bit 2x1 mux,2to4 line ,3x8 line decoder using dataflow and behavioral modeling Verilog HDL in Modelsim.
10. Implementation and verification of half adder, full adder and four bit adder using logic gates and ICs. Simulate and verify Half adder, Full adder and Four Bit using Verilog HDL in Modelsim.
11. Implementation and verification of D flip flop, T flip flop and JK flip flop using logic gates and ICs. Simulate and verify behavior of D-flip flop, T-flip flop and JK-flip flop using Verilog HDL in Modelsim.
12. Design and implementation of digital circuits through State Machine using logic gates and flip flops.
13. Simulate and verify digital circuits through state Machine using Verilog HDL in Modelsim.

14. Design and Implementation of shift registers using D flip flop
    Serial Input Serial Output, Serial Input Parallel Output, Parallel Input Serial Output, Parallel Input Parallel Output. Also verify the operation of universal shift register.

15. Simulate and verify the output of shift registers using D flip flop using Verilog HDL in Modelsim. Serial Input Serial Output, Serial Input Parallel Output, Parallel Input Serial Output, Parallel Input Parallel Output. Also verify the operation of universal shift register.
16. Implementation and Verification of 4-bit parallel load register and 4-bit binary counter with parallel load using logic gates and flip flops.

Digital Systems Lab

Lab Course: MicroProcessor Systems

List of Experiments:

1. What are microprocessors (8086/8088) Familiarization to architecture of Intel 8086. Familiarization to emulator8086.
2. How to write a code using Assembly Language in emulator 8086.Verify the output of the following tasks
   Write an assembly program that reads two decimal digits from user having a sum less than 10, adds them and displays the result on output.
   Write an assembly program that displays a 10x10 box of asterisks.
   Write an assembly program that reads first four initials of your name and then displays each letter in new line.
3. How to use flow Control Instructions in assembly language.

- Write an assembly program that reads a key then displays its status as a digit or as uppercase or lowercase letter or some other key.
- Write an assembly program that displays a message 50 times using loop instruction.
- Write an assembly program that reads two number from user and then shows which smaller one is.

4. Use multiplication and division instructions

- Write an assembly program the reads two number (0-99) from user and divides the first by second. Finally display the results.
- Write an assembly program that reads a number from user and displays the factorial of the number.

5. Discuss different families of microcontrollers. Introduction to AVR family. Pin Configuration of atmega16.Familiarization to Code vision. (Compiler)
6. Fuse bit settings in atmega16. Steps to program micro-controller (atmega16) using super-pro universal programmer. Implement a simple program to blink a led at PORTA pin 0.
7. Implement the following program using general purpose (I/O) ports/pins of atmega16.
   Blink a led at a speed of 1KHz. Send 0-255 on PORTB and check output using LEDS.
8. Implement a simple car parking system having a maximum capacity of 9 cars using external interrupts of atmega16.
9. Interfacing of Alphanumeric LCD with atmega16.
   Implement a task that displays your name on first line and registration number on second line. It then shifts the displays text towards right at a readable speed. Implement a task that will display counting from 0-99 on lcd screen using atmega16.
10. Write a simple program to implement an electronic dice using general purpose I/O ports of atmega16
11. Use of timers in atemga16 [Normal mode ,polling method and interrupt method]
    Implement a task that toggles the state of a led using timer0 after each 32ms.
    Implement a task that counts up with a delay of 500ms by using interrupt service routine of timer0 with no prescalar.
12. Use of timers in atemga16[CTC mode and Timer as counter]
    Implement a task that generates a square wave with a variable time period using CTC mode.

Implement a task that counts an event using timer0 and displays the result on lcd. Also add a led to the circuit that turns on when the counting reaches 10.

13. Familiarization to the trainer (MDA 8086).Interfacing 8086 using 8255 to leds and Seven Segment Display.
    Write a program for led to blink in order 11, 12, 13, and 14 on the training kit.
    Write a program to display the digits in decimal, from 0-9 into 7-segment display
14. Interfacing of 8086 with a 8*8 LED dot Matrix on training kit MDA 8086. Write a C language program to display a character on the 8*8 LED matrix. Write a C language program to display the student's name on the 8*8 LED matrix.
15. What are microprocessors (8086/8088) Familiarization to architecture of Intel 8086. Familiarization to emulator8086.
16. How to write a code using Assembly Language in emulator 8086.Verify the output of the following tasks
    Write an assembly program that reads two decimal digits from user having a sum less than 10, adds them and displays the result on output.
    Write an assembly program that displays a 10x10 box of asterisks.
    Write an assembly program that reads first four initials of your name and then displays each letter in new line.

Microwave & Communication Lab
Lab Course: Antenna and wave propagation

List of Experiments:

1. Transmission Line Demonstrator TLD-511 and study of wave Propagation, Dispersion and Attenuation along a transmission Line.
2. Studying the effect of terminations on transmission line and concept of characteristic impedance, implementation of standing waves phenomenon.
3. Understanding of system and equipment ASD512.
4. Familiarization with HFSS software.
5. Implementation of Wave Port Excitation, Radiation Setup & Analysis on HFSS software.
6. Designing and simulating Ultra high frequency probe on HFSS software.
7. Implementation and simulation of Monopole and Dipole Antennas on HFSS and study of their S-parameters.
8. Implementation of Horn Antenna and Horn Antenna with Dipole Excitation on HFSS software.
9. Familiarization to Extended Circuit, Balanced currents in extended circuits and understanding operation of balanced feeder.
10. Design of End-Fed vertical Antennas and Practical top-loaded antennas using Antenna trainer DL 2595 and study of effect of altering effective antenna length on its propagation properties.
11. Design of Directional antennas with driven elements using Antenna trainer DL 2595.
12. Design and examination of folded antenna elements using antenna trainer ADS 512.
13. Implementation and examination of Loop Antenna using Antenna trainer ADS 512.
14. Design and implementation of Parasitic Arrays using Antenna trainer ADS 512.
15. Implementation of Waveguides and effect of waveguides on microwave signals using microwave base trainer.
16. Semester Project & Viva and Project Submission

Microwave & Communication Lab
Lab Course: Cellular mobile communication

List of Experiments:

1. Familiarization to Waveguides and transmission of wireless signals using waveguides.

2. Implementation of Monopole antenna using antenna system demonstrator (ASD-512) and simulation using HFSS
3. Implementation of Dipole antenna using antenna system demonstrator (ASD-512) and HFSS.
4. Horn Antenna design using HFSS
5. Implementation of the technique of NRZ line coding using DCS1-1 on DCS-6000-01 digital trainer.
6. Implementation of the technique of RZ line coding using DCS1-2 on DCS-6000-01 digital trainer.
7. AMI line coding using DCS1-3 on DCS-6000-01 digital trainer.
8. Manchester line coding using DCS1-4 on DCS-6000-01 digital trainer.
9. Implementation of NRZ line decoding using DCS2-1 on DCS-6000-01 digital trainer.
10. Implementation the technique of RZ line decoding DCS2-2 on DCS-6000-01 digital trainer.
11. AMI line decoding using DCS2-3 on DCS-6000-01 digital trainer.
12. Manchester decoding using DCS2-4 on DCS-6000-01 digital trainer.
13. Generation of binary random sequence with length 10000 using MATLAB and Plot the histogram.
14. Generation of a real Gaussian noise sequence with zero mean and variance 1 using MATLAB. Verify that the sequence has a Gaussian distribution and Plot and compare it with the theoretical Gaussian function.
15. Processing a binary data stream using a Communication System that consists of a base-band modulator, channel and demodulator using MATLAB. Compute the system's BER (Assume 16-QAM).
16. Semester Project & Viva and Project Submission

Microwave & Communication Lab
Lab Course: Communication systems

List of Experiments:

1. Voltage Controlled Oscillator. Calibration of signal source Voltage controlled Oscillator (VCO). Study of Modulated carrier signal and effect of attenuator. External frequency control inputs on a modulated signal.
2. Frequency response of a tuned circuit and effect of Damping on it using ACS2956D and voltage controlled oscillator.
3. Implementation of Amplitude Modulation and Demodulation using double balanced modulator
4. Implementation of Frequency Modulation and Demodulation using voltage controlled oscillator
5. Implementation the techniques of line coding (NRZ and RZ) using DCS1-1 and DCS1-2 on DCS-6000-01 digital trainer.
6. Implementation of Manchester and AMI line coding using DCS1-3 and DCS1-4on DCS-6000-01 digital trainer.
7. Implementation of Line decoding (NRZ and RZ) using DCS2-1 and DCS2-2 on DCS-6000-01 digital trainer.
8. Line decoding (Manchester and AMI) using DCS3-1 and DCS4-1 on DCS-6000-01 digital trainer.
9. Implementation of the techniques of pulse width modulation PWM using µA741 and LM555.
10. Implementation of Pulse width demodulation circuit using MC 1496 Modulator IC.
11. Implementing the techniques of pulse Code Modulation (PCM)
12. Implementation of Pulse Code Demodulation using IC CW6694 and µA741.
13. Implementing ASK Modulation using MC1496 and ASK synchronous demodulation.
14. To design and implement FSK Modulation using VCO (voltage controlled oscillator) and FSK detector circuit using PLL.
15. Implementation of PSK Modulation and Demodulation using MC1496
16. Semester Project & Viva and Project Submission.

Microwave & Communication Lab

Lab Course: Microwave Engineering

List of Experiments:

1. Transmission Line Demonstrator TLD-511 and study of wave Propagation, Dispersion and Attenuation along a transmission Line.
2. Studying the effect of terminations on transmission line and concept of characteristic impedance, implementation of standing waves phenomenon.
3. Finding Resonance of a line for which line is an integral number of half-wavelengths long, Demonstration of effect of line terminations.
4. Measurement of Microwave signals, discovering their polarization and reflection characteristics.
5. Implementation of Diffraction and Interference characteristics of microwave signals.
6. Familiarization to Waveguides and effect of waveguides on microwave signals.
7. Implementing the Penetration Properties of different materials and see the effect of attenuation on microwaves.
8. Implementation of Waveguides on HFSS software.
9. Designing of coaxial connector on HFSS software
10. Implementation of Coaxial connector excitation & simulations on HFSS software
11. Designing structure of Hybrid ring on HFSS software
12. Simulation of Microwave Resonators and Band pass Filter on HFSS software
13. Simulation of Micro strip band stop filter on HFSS software
14. Implementation of Directional Couplers on HFSS software
15. Familiarization with ADS software
16. Semester Project & Viva and Project Submission