LIST OF EXPERIMENTS

ELECTRONICS WORKSHOP- LAB

1. Identification, Study & Testing of various electronic components :
(a) Resistances-Various types, Colour coding (b) Capacitors-Various types, Coding, (c) Inductors
(d) Diodes (e) Transistors (f) SCRs (g) ICs (h) Photo diode (i) Photo transistor (j) LED (k) LDR (l) Potentiometers
2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc.
3. To study and perform experiment on CRO demonstration kit.
4. Soldering & desoldering practice.
5. (a) To Design & fabricate a PCB for a Regulated power supply.
(b) Assemble the Regulated power supply using PCB and test it.
6. To study and plot the characteristics of following Opto-Electronic devices –
(a) LED (b) LDR (C) Photovoltatic cell (d) Opto-coupler
(e) Photo diode (f) Photo transistor (g) Solar cell
7. To study the specifications and working of a Transistor radio kit and perform measurements on it.
8. To study the specifications and working of a Tape Recorder kit.
9. To prepare design layout of PCBs using software tools.
10. To fabricate PCB and testing of electronics circuit on PCB.
11. To design and test regulated power supply using ICs
12. To study the specifications and working of a VCD Player.
13. To study the specifications and working of color TV.

COMPUTER PROGRAMMING LAB-I

1. Simple array and sorting algorithm implementations.
2. Addition, multiplication and transpose of sparse matrices represented in array form.
3. Polynomial addition, multiplication (8th degree polynomials), using array & linked lists.
4. Implementation of stack and queue using array & linked lists.
5. Implementation of circular queue using array.
6. Infix to postfix/prefix conversion.
7. Binary search tree creation and traversing.
8. Generation of spanning trees for a given graph using BFS & DFS algorithms.
9. AVL tree implementation (creation, insertion, deletion).
10. Symbol table organization (Hash Table).

ELECTRONICS LAB I

1. Study the following devices:
(a) Analog & digital multimeters
(b) Function/ Signal generators
(c) Regulated d. c. power supplies (constant voltage and constant current operations)

(d) Study of analog CRO, measurement of time period, amplitude, frequency & phase angle using Lissajous figures.
2 Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse Saturation current and static & dynamic resistances.
3 Plot V-I characteristic of zener diode and study of zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
4 Plot frequency response curve for single stage amplifier and to determine gain bandwidth product.
5 Plot drain current - drain voltage and drain current – gate bias characteristics of field effect transistor and measure of Idss & Vp
6 Application of Diode as clipper & clamper
7 Plot gain- frequency characteristic of two stage RC coupled amplifier & calculate its bandwidth
and
compare it with theoretical value.
8 Plot gain- frequency characteristic of emitter follower & find out its input and output resistances.
9 Plot input and output characteristics of BJT in CB, CC and CE configurations. Find their hparameters.
10 Study half wave rectifier and effect of filters on wave. Also calculate theoretical & practical ripple
factor.
11 Study bridge rectifier and measure the effect of filter network on D.C. voltage output & ripple Factor.

ELECTRONIC MEASUREMENT & INSTRUMENTATION LAB

1. Measure earth resistance using fall of potential method.
2. Plot V-I characteristics & measure open circuit voltage & short circuit current of a solar panel.
3. Measure unknown inductance capacitance resistance using following bridges
(a) Anderson Bridge (b) Maxwell Bridge
4. To measure unknown frequency & capacitance using Wein‟s bridge.
5. Measurement of the distance with the help of ultrasonic transmitter & receiver.
6. Measurement of displacement with the help of LVDT.
7. Draw the characteristics of the following temperature transducers:
(a) RTD (Pt-100) (b) Thermistors (c) Thermocouple
8. Draw the characteristics between temperature & voltage of a K type thermocouple.
9. Measure the speed of a Table Fan using stroboscope.
10. Measurement of strain/ force with the help of strain gauge load cell.
11. Study the working of Q-meter and measure Q of coils.
12. To study the working of Spectrum analyzer and determine the bandwidth of different signals.

COMPUTER PROGRAMMING LAB-II

Programs in C++
1. Write a program to perform the complex arithmetic.

2. Write a program to perform the rational number arithmetic.
3. Write a program to perform the matrix operations. (Transpose, addition, subtraction, multiplication,
test if a matrix is symmetric/ lower triangular/ upper triangular)
4. Implement Morse code to text conversion and vice-versa.
5. To calculate Greatest Common Divisor of given numbers.
6. To implement tower of Hanoi problem.

Program in Java

7. To implement spell checker using dictionary.
8. To implement a color selector from a given set of colors.
9. To implement a shape selector from a given set of shapes.
10. By mapping keys to pens of different colors, implement turtle graphics.
11. To implement a calculator with its functionality.
12. To implement a graph and display BFS/DFS order of nodes.

ELECTRONICS LAB II

1. Plot gain-frequency characteristics of BJT amplifier with and without negative feedback in the emitter circuit and determine bandwidths, gain bandwidth products and gains at 1kHz with and without negative feedback.
2. Study of series and shunt voltage regulators and measurement of line and load regulation and ripple factor.
3. Plot and study the characteristics of small signal amplifier using FET.
4. Study of push pull amplifier. Measure variation of output power & distortion with load.
5. Study Wein bridge oscillator and observe the effect of variation in R & C on oscillator frequency
6. Study transistor phase shift oscillator and observe the effect of variation in R & C on oscillator frequency and compare with theoretical value.
7. Study the following oscillators and observe the effect of variation of C on oscillator frequency: (a)
Hartley (b) Colpitts
8. Design Fabrication and Testing of k-derived filters (LP/HP).
9. Study of a Digital Storage CRO and store a transient on it.
10. To plot the characteristics of UJT and UJT as relaxation.
11. To plot the characteristics of MOSFET and CMOS.

DIGITAL ELECTORNICS LAB

1. To study and perform the following experiments.
(a) Operation of digital multiplexer and demultiplexer.
(b) Binary to decimal encoder.
(c) Characteristics of CMOS integrated circuits.
2. To study and perform experiment- Compound logic functions and various combinational circuits
based on AND/NAND and OR/NOR Logic blocks.
3. To study and perform experiment -Digital to analog and analog to digital converters.
4. To study and perform experiment- Various types of counters and shift registers.

5. To study and perform experiment - Interfacing of CMOS to TTL and TTL to CMOS ICs.
6. To study and perform experiment- BCD to binary conversion on digital IC trainer.
7. To study and perform experiment -
(a) Astable (b) Monostable (c) Bistable Multivibrators and the frequency variation with different parameters, observe voltage waveforms at different points of transistor.
8. To study and perform experiment -Voltage comparator circuit using IC-710.
9. To study and perform experiment- Schmitt transistor binary circuit.
10. Design 2 bit binary up/down binary counter on bread board.

ELECTRONIC ENGINEERING DESIGN LAB

To design the following circuits, assemble these on bread board and test them.
Simulation of these circuits with the help of appropriate software.
1. Op-Amp characteristics and get data for input bias current, measure the output-offset voltage and
reduce it to zero and calculate slew rate.
2. Op-Amp in inverting and non-inverting modes.
3. Op-Amp as scalar, summer and voltage follower.
4. Op-Amp as differentiator and integrator.
5. Design LPF and HPF using Op-Amp 741
6. Design Band Pass and Band reject Active filters using Op-Amp 741.
7. Design Oscillators using Op-Amp (i) RC phase shift (ii) Hartley (iii) Colpitts
8. Design (i) Astable (ii) Monostable multivibrators using IC-555 timer
9. Design Triangular & square wave generator using 555 timer.
10. Design Amplifier (for given gain) using Bipolar Junction Transistor

MICROWAVE ENGINEERING LAB

1. Study of various microwave components and instruments like frequency meter, attenuator, detector &
VSWR meter.
2. Draw V-I characteristics of microwave source like Gunn diode/ Reflex Klystron.
3. Measurement of frequency and wavelength in a rectangular waveguide.
4. Measurement of VSWR (small as well as large values) & reflection coefficient.
5. Measure an unknown impedance with smith chart.
6. Draw the following characteristics of Gunn Diode
(i) Output power and frequency as a function of voltage
(ii) Square wave modulation by PIN diode.
7. Drawing polar pattern of Horn antenna.
8. To observe the action of directional coupler and its use in separating incident & reflected wave.
9. Study of Magic Tee, Circulator, isolator
10. Study of spectrum analyzer & its use in observing the response of
(i) High frequency amplifier
(ii) Low pass, high pass, band pass, band reject filters.

COMMUNICATION LAB-I

1. Harmonic analysis of a square wave of a modulated wave form.
2. Observe the Amplitude modulated wave form & measure modulation index. Demodulation of AM
signal.
3. Generation & Demodulation of DSB – SC signal.
4. Modulate a sinusoidal signal with high frequency carrier to obtain FM signal. Demodulation of the FM
signal.
5. To observe the following in a transmission line demonstrator kit :
(a) The propagation of pulse in non reflecting transmission line.
(b) The effect of losses in transmission line.
(c) Transmission with standing waves on a Transmission line.
(d) The resonance characteristics of a half-wave length long X-mission line.
6. (a) To observe the operation of sampling and sample & hold circuits.
(b) To study the effect of sampling time (sampling pulse width).
(c) To study the effects of changing the sampling frequency & observing aliasing phenomena.
7. To study & observe the operation of a super heterodyne receiver.
8. To study & observe the amplitude response of automatic gain controller (AGC).
9, 10. PAM, PWM & PPM: Modulation and demodulation.

SIGNAL PROCESSING LAB-I

1. Generation of continuous and discrete elementary signals (periodic and non-periodic) using mathematical expression.
2. Generation of Continuous and Discrete Unit Step Signal.
3. Generation of Exponential and Ramp signals in Continuous & Discrete domain.
4. Continuous and discrete time Convolution (using basic definition).
5. Adding and subtracting two given signals. (Continuous as well as Discrete signals)
6. To generate uniform random numbers between (0, 1).
7. To generate a random binary wave.
8. To generate random sequences with arbitrary distributions, means and variances for following :
(a) Rayleigh distribution
(b) Normal distributions: N(0,1).
(c) Gaussion distributions: N (mx, ó x2)
9. To plot the probability density functions. Find mean and variance for the above distributions

COMMUNICATION LAB-II

1. (a) To observe sampling of analog signal. Identify & solve the aliasing problem.
(b) To observe the Transmission of two signals over a single channel using sampling methods.
2. TDM-PAM: Modulation & demodulation.
3. Operation of a PCM encoder & decoder.
4 TDM-PCM: Modulation & demodulation.

5. Observe the performance of a Delta modulation system & to derive from it a delta sigma modulation
system.
6. To generate and study the various data formatting schemes (Unipolar, Bi-polar, Manchester,AMI etc.).
7. Generate ASK signals, with and without carrier suppression. Demodulation of these two types of
modulated signal.
8. Generate the FSK wave forms & demodulate the FSK signals based on the properties of
(a) Tuned circuits (b) PLL
9. Generate the PSK signals and demodulate it.

Simulation using any virtual Instrumentation Software:

10. To carry out convolution in both continuous time and discrete time systems.
11. Companding and multiplexing of PCM signals.
12. Perform various keying Techniques: PSK, ASK, FSK & MSK.

MICROPROCESOR LAB

1. Study the hardware, functions, memory structure and operation of 8085 microprocessor kit.
2. Program to perform integer division: (i) 8-bit by 8-bit (ii) 16-bit by 8-bit.
3. Transfer of a block of data in memory to another place in memory in the direct and reverse order.
4. Searching a number in an array and finding its parity.
5. Sorting of array in: (i) Ascending (ii) Descending order
6. Programme to perform following conversion: (i) BCD to ASCII (ii) BCD to Hexadecimal
7. Programme to multiply two 8-bit numbers.
8. Programme to generate and sum 15 fibanocci numbers.
9. Programme for rolling display of message "INDIAN".
10. To insert a number at correct place in a sorted array.
11. Serial and Parallel data transfer on output port 8155 & 8255 & designing of disco light, running light,
and sequential lights on off by above hardware.
12. Generation of different waveform on 8253/ 8254 programmable timer.

UNIX SHELL PROGRAMMING LAB

1. Use of Basic Unix Shell Commands: ls,mkdir,rmdir,cd,cat,banner,touch,file,wc,sort,cut,grep, dd,dfspace,du,ulimit.
2. Commands related to Inode,I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following
(i) Interactive shell scripts
(ii) Positional parameters
(iii) Arithmetic
(iv) if-then-fi, if-then-else-fi, nested if-else
(v) Logical operators
(vi) else + if equals elif, case structure
(vii) while, until, for loops, use of break

(viii) Metacharacters
(ix) System administration: disk management and daily administration
4. Write a shell script to create a file in $USER /class/batch directory. Follow the instructions
(i) Input a page profile to yourself, copy it into other existing file;
(ii) Start printing file at certain line
(iii) Print all the difference between two file, copy the two files at $USER/CSC/2007 directory.
(iv) Print lines matching certain word pattern.
5. Write shell script for-
(i) Showing the count of users logged in,
(ii) Printing Column list of files in your home directory
(iii) Listing your job with below normal priority
(iv) Continue running your job after logging out.
6. Write a shell script to change data format .Show the time taken in execution of this script.
7. Write a shell script to print files names in a directory showing date of creation & serial number of the
file.
8. Write a shell script to count lines, words and characters in its input(do not use wc).
9. Write a shell script to print end of a Glossary file in reverse order using Array. (Use awk tail)
10. Write a shell script to check whether Ram logged in, Continue checking further after every 30 seconds
till success.

INDUSTRIAL ELECTRONICS LAB

1. Study the characteristics of SCR.
1.1 Observe the terminal configuration.
1.2 Measure the breakdown voltage.
1.3 Measure latching and holding current.
1.4 V-I characteristics.
2 Perform experiment on triggering circuits for SCR.
2.1 R-triggering circuit.
2.2 R-C triggering circuit.
2.3 UJT triggering circuit.
3 Study and obtain the characteristics of Diac.
4 Study and obtain the waveforms for single-phase half-wave controlled converter.
5 Study and obtain the waveforms for single-phase half controlled symmetrical and asymmetrical bridge
converters.
6 Study and obtain the waveforms for single-phase fully controlled bridge converter.
7 Study and obtain the waveforms for voltage-commutated chopper.
8 Study and obtain the waveforms for current-commutated chopper.
9 Perform experiment on single phase PWM inverter.
10 Perform experiment on buck, boost and buck-boost regulators.
11 Perform experiment on Motor control – open loop & closed loop

SIGNAL PROCESSING LAB-II

Modeling and simulation using MAT LAB
1. Realising a given block diagram having multiplier, adder/subtractor and system (Discrete/Continuous)
with given Impulse response. Calculating output for given input.
2. To simulate the transmitter and receiver for BPSK
3. To design and simulate FIR digital filter (LP/HP).
4. To design and simulate IIR digital filter (LP/HP).
DSP Lab using TMS320C6XXX DSP Kits
5. To study the architecture of TMS320C6XXX DSP kits using Bloom with DSP.
6. To generate wave form (SINE, COSINE, SQUARE & TRIANGULAR).
7. Verification of Sampling Theorem.
8. Verification of linear/circular convolution.
9. To design FIR and FIR digital filter (LP/HP).

WIRELESS COMMUNICATION LAB

1. Measurement of antenna characteristics :
Radiation Pattern on polar plots, Beam width and Gain of main lobe for the following types of antennas.
(a) Half wave and quarter wave dipole
(b) Folded dipole
(c) Yagi UDA multiple element folded dipole
(d) Hertz Antenna
(e) End fire array and broad side array
(f) Helix antenna
(g) Paraboloid reflector antenna
(h) Loop antenna
(i) Ground plane antenna
(j) Log periodic antenna
(k) Rhombus antenna
(l) Slot antenna
2. Demonstration of modeling of wire antenna using appropriate design software.
3. Simulation of antenna arrays using appropriate software.
4. Design and testing of microstrip rectangular patch antenna using appropriate software.
5. Investigate the transmission characteristics of the link and measure the gain of the microstrip patch
antennas. Draw the antenna radiation diagram.
6. Radar Trainer: Working of Doppler radar, velocity of moving object, time and frequency measurement
and other applications.
7. To perform Modulation, Demodulation and BER measurement using CDMA – DSSS Trainer.
8. To establish analog/digital communication link and transmit & receive three signals (audio, video, tone)
simultaneously using Satellite Communication Trainer.

9. To study GPS Receiver, establishing link between GPS satellite & GPS trainer and measure of latitude
& longitude.

COMPUTER NETWORK PROGRAMMING LAB

1. **PRELIMINARIES:** Study and use of common TCP/IP protocols and term viz. telnet rlogin ftp,
ping,finger, Socket, Port etc.
2. **DATA STRUCTURES USED IN NETWORK PROGRAMMING:** Representation of unidirectional,
Directional weighted and unweighted graphs.
3. **ALGORITHMS IN NETWORKS:** computation of shortest path for one source-one destination and one
source –all destination.
4. SIMULATION OF NETWORK PROTOCOLS:
(i) Simulation of M/M/1 and M/M/1/N queues.
(ii) Simulation of pure and slotted ALOHA.
(iii) Simulation of link state routing algorithm.
5. Case study : on LAN Training kit
(i) Observe the behavior & measure the throughput of reliable data transfer protocols under various Bit error rates for following DLL layer protocolsa.
Stop & Wait
b. Sliding Window : Go-Back-N and Selective Repeat
(ii) Observe the behavior & measure the throughput under various network load conditions for following MAC layer Protocols
a. Aloha
b. CSMA, CSMA/CD & CSMA/CA
c. Token Bus & Token Ring
6. DEVELOPMENT OF CLIENT SERVER APPLICATION:
(i) Develop „telnet" client and server which uses port other than 23.
(ii) Write a finger application which prints all available information for five users currently logged on and
are using the network for longest duration. Print the information in ascending order of time

VLSI & Optical fiber LAB

PART-I
Schematic design and make Device Level Layout of following circuits.
1. BJT/FET Amplifier in various configuration..
2. Counters, Shift Registers & Sequence Decoders.
3. Various circuits with Op-Amp.
PART-II
Design of following ckt using appropriate software like VHDL/ FPGA.
4. 3-input NAND gate.
5. Half adder.

6. D-Latch.
7. Serial in-serial out shift register.

PART-III

To perform following experiments based on Fiber Optic Trainer.

8. To set up Fiber Optic Analog link.
9. To set up fiber Optic Digital link.
10. Measurement of Propagation loss and numerical aperture.
11. Characterization of laser diode and light emitting diode.