(New Scheme 2010)

STUDY AND EVALUATION SCHEME
FOR

1. **ELECTRONICS & COMMUNICATION ENGINEERING**
2. **ELECTRONICS ENGINEERING (DIGITAL ELECTRONICS)**
3. **ELECTRONICS ENGINEERING (MEDICAL ELECTRONICS)**

SEMESTER - III

Code No.	Subject	Study Scheme Period/Week			Evaluation Scheme						Total Marks
		L	T	P	Internal Assessment		External Assessment Exam				
					Theory	Practical	Written Paper		Practical		
					Max Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs	
1	Principles of Communication Engineering	4	-	3	50	25	100	3	50	3	225
2	Digital Electronics	4	-	3	50	25	100	3	50	3	225
3	Networks, Filters and Transmission Lines	4	-	3	50	25	100	3	50	3	225
4	Electronic Devices and Circuits – II	4	-	3	50	25	100	3	50	3	225
*5	Computer Programming and Applications	3	-	3	50	25	100	3	50	3	225
6	Electronic Fabrication & Product Design	1	-	3	-	75	-	-	100	3	175
**	Student Centered activities	-	-	2	-	-	-	-	-	-	-
	TOTAL	20	-	20	250	200	500		350		1300

** Student centered activities will include: extension lectures, field visits, Soft Skills, seminars, debates, hobby clubs, library studies, awareness regarding ecology and environment, conservation of energy (Petroleum products, electricity etc), social service camps and other co-curricular activities including games. Advanced planning for each semester has got to be made

* Subjects common with Mechanical, Production, Automobile Engineering

PRINCIPLES OF COMMUNICATION ENGINEERING

L	T	P
4	-	3

RATIONALE:

The study of principles of communication systems leads to further specialized study of audio and video systems, line communication and microwave communication systems. Thus the diploma holder in electronics and communication engineering shall find employment in areas of R & D, Production, Servicing and Maintenance of various communication systems. The students should understand the advantages and limitations of various analog and digital modulation systems on a comparative scale and relate to them while studying practical communication systems.

DETAILED CONTENTS

1. **Introduction** **(2 Hr)**
   (a) Need for modulation and demodulation in communication systems.
   (b) Basic scheme of modern communication system.
2. **Amplitude Modulation** **(4 Hr)**
   (a) Derivation of mathematical expression for an amplitude modulated wave showing Carrier and side band components. Significance of Modulation index, spectrum and bandwidth of AM wave, relative power distribution in carrier and sidebands.
   (b) Elementary idea of DSB-FC, DSB-SC, SSB-SC, ISB and VSB modulations, their comparison and areas of applications.
3. **Frequency Modulation** **(5 Hr)**
   (a) Derivation of expression for frequency modulated wave and its frequency spectrum (without proof and analysis of Bessel function), modulation index, maximum frequency deviation and deviation ratio, BW of FM signals, Carlson's rule
   (b) Effect of noise on FM carrier, noise triangle, need for pre-emphasis and de-emphasis, capture effect.
   (c) Comparison of FM and AM communication system.
4. **Phase Modulation** **(2 Hr)**
   Derivation of expression for phase moculated wave, modulation index, comparison with frequency modulation.
5. **Principle of AM Modulators** **(4 Hr)**
   orking principles and typical applications of
   (a) Collector Modulator
   (b) Base Modulator
   (c) Balanced Modulator.
6. **Principles of FM Modulators** **(6 Hr)**
   (a) Working principles and applications of reactance modulator, variactor diode modulator, VCO and Armstrong phase modulator, stabilization of carrier using AFC.
   (b) Block diagram and working principles of reactance transistor and Armstrong FM transmitters.
7. **Demodulation of AM waves** **(3 Hr)**
   (a) Principles of demodulation of AM wave using diode detector circuit, concept of diagonal clipping and formula for minimum distortion (No derivation).
   (b) Principle of demodulation of AM wave using synchronous detection
8. **Demodulation of FM waves** **(4 Hr)**
   (a) Basic principles of FM detection using slope detector.

(b) Principles & working of the following FM demodulators.

- Foster-Seeley Discriminator
- Ratio Detector
- Quadrature Detector
- Phase Locked Loop (PLL) FM Detector

9. Pulse Modulation

(a) Statement of sampling theorem and elementary idea of sampling frequency for pulse modulation. **(4 Hr)**

(b) Basic concepts of time division multiplexing (TDM) and frequency division multiplexing (FDM).

(c) Basic ideas about PAM,PPM,PWM and their typical applications.

(d) **Pulse code modulation (PCM):** basic scheme of PCM system, Quantization, quantization error, block diagram of TDM-PCM communication system and function of each block, Advantages of PCM systems, concept of differential PCM (DPCM). **(4 Hr)**

(e) **Delta Modulation**: Basic principle of delta modulation system, advantages of delta modulation over PCM system, limitation of delta modulation, concept of adaptive delta modulation system (ADM). **(3 Hr)**

(f) Basic Block diagram and working principle of ASK, PSK, FSK & QPSK. **(4 Hr)**

List of Practicals

1. (a) To conserve an AM wave on CRO produced by a standard signal generator using internal and external modulation.
   (b) To measure the modulation index of the wave obtained in above practical.
2. (a) To obtain an AM wave from a collector modulator circuit and observe the AM pattern on CRO.
   (b) To measure index of modulation of the AM signal for different levels of modulating signal.
3. To obtain a FM wave from reactance tube modulator/voltage controlled oscillator circuit and measure the frequency deviation for different modulating signals.
4. To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time constants and obtain its optimum value for least distortion.
5. To obtain modulating signal from a FM detector (Fosterseely/Ratio detector/quradrature/IC) circuit and plot the discriminator characteristics.
6. To observe the sampled signal and compare it with the analog input signal. Note the effect of varying the sampling pulse width and frequency on the sampled output.
7. To verify the sampling theorem.
8. To time division multiplex the two given signals.
9. To observe and note the pulse modulated signals (PAM, PPM, PWM) and compare them with the corresponding analog input signal.
10. To measure the quantization noise in a 3 bit/4 bit coded PCM signal.
11. To feed an analog signal to a PCM modulator and compare demodulated signal with the analog input. Also note the effect of low pass filter at the demodulated output.
12. To study the process of delta modulation/demodulation.

DIGITAL ELECTRONICS

L	T	P
4	-	3

RATIONALE:

This syllabus has been designed to make the students know about the fundamental principles of digital electronics and gain familiarity with the available IC chips. This subject aims to give a background in the broad field of digital systems design & microprocessors.

DETAILED CONTENTS

1. Introduction (2%)

(a) Basic difference between analog and digital signal.
(b) Applications and advantages of digital signals.

2. Number Systems (10%)

(a) Binary, Octal and hexadecimal number system, conversion from one form to another.
(b) Concept of code, weighted and non weighted codes, BCD (8421 code only), excess -3 and grey code.
(c) Concept of parity, single and double parity and error detection.
(d) Alphanumeric codes (ASCII).
(e) Binary arithmetic (addition, subtraction, multiplication and division including binary points). BCD addition, 1's and 2's complement method of addition /subtraction.

3. Logic Gates (10%)

(a) Concept of negative and positive logic.
(b) Definition, symbols and truth table of NOT, AND, OR, NAND, NOR, XNOR, gates, working of AND and OR gates using simple diode circuits, NAND and NOR as universal gates.

4. Logic Simplification (10%)

(a) Postulates of Boolean algebra, De-Morgan's theorems, Various identities, formulation of truth table and Boolean equation for simple problems, implementation of Boolean (Logic) equations with logic gates.
(b) Karnaugh map (up to 4 variables) and simple application in developing combinational logic circuits.

5. Logic Families (10%)

(a) Logic family classification;
  (i) Definition of SSI, MSI, LSI, VLSI
  (ii) Comparison of TTL and MOS family characteristics with respect to delay, speed, noise margin, logic levels, power dissipation, fan-in, fan- out, power supply requirement.
(b) Logic Circuits: Open collector, wired-OR, totem pole output circuit operation (qualitative) for TTL NAND gate.
(c) Tri-state switch / Buffer.

6. Arithmetic Circuits (10%)

(a) Half Adder and Full adder circuits, design and implementation.
(b) Half and full adder circuits, design and implementation.
(c) 4 bit adder/subtractor

7. Display Devices (5%)

LED, LCD, seven segment displays, basic operation of common anode and common cathode types of displays.

8. Multiplexers, De-multiplexers and Decoders (10%)

Basic functions and block diagram of MUX, DEMUX, Encoders and Decoders. Detailed functioning of 3X8 decoder/demux.

9. Latches and Flip-flops (10%)

(a) Concept and types of latch with their working and supplications.
(b) Operation using waveforms and truth tables of RS, JK, D, Master/Slave JK and T flip-flops.
(c) Use of D fil-flop as latch
(d) Flip-flop as basic memory cell

10. Counters (10%)

(a) A synchronous counters:
  (i) Binary counters
  (ii) Modulus of a counter, modified count of a counter, Mod-8 and Mod-10 counter (including design),difference between decade and mod-10 counter.
  (iii) Presentable and programmable counters
  (iv) Down counter, up/down counter.
(b) Synchronous counters (only introduction)
(c) Difference between asynchronous and synchronous counters
(d) Ring counter and Johnson counter with timing diagram.

11. Shift Register (10%)

(a) Introduction and basic concepts including shift left and shift right.
(b) Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out.
(c) Universal shift register.
(d) Buffer register, Tri-state buffer Register.

12. Applications (3%)

Digital Clock and Calculator

List of Practicals

1. Study of pin configuration of different ICs (e.g. DIP ICs etc.)
2. Verification and interpretation of truth tables for AND, OR, NOT, NAND, NOR, Ex-OR and Ex-Nor gates.
3. Logic functions using universal gates
   (a) Realization of logic functions with the help of NAND or NOR gates.
   (b) Construction of a NOR gate latch and verification of its operations.
4. Half-adder and full adder circuits
   (a) Construction of half adder using Ex-OR and NAND gates and verification of its operations.
   (b) Construction of a full adder using Ex-OR and NAND gates and verification of its operations.
5. 4 bit adder / subtractor circuit.
   (a) Construction of a 4 bit adder 2's complement subtractor circuit using a 4 bit adder IC and an Ex-OR and verify the operation of the circuit.
6. IC Flip-flop
   (a) Verification of truth table for some positive edge triggered, negative edge triggered, level triggered IC flip-flops (at least one IC each of D latch, D flip-flop, edge triggered JK and Master –Slave JK flip-flops)
7. Display Devices and their decoder / drivers
   (a) Familiarization and use of different type of single LEDs, common anode and common cathode seven segment LED displays. Use of 7447, 7448 or equivalent decoder /driver ICs for seven segment displays.
8. Tri-state gate ICs

(a) Verification of truth tables and study the operation of tri-state buffer IC 74126 or equivalent

(b) Construction of a 4 / 8 bit bidirectional bus using an appropriate IC.

9. Decoder, Encoder, Multiplexer and De-multiplexer

(a) Verification of truth table for any one each of encoder and decoder ICs.

(b) Verification of truth tables for one/two each of multiplexer/de-multiplexer ICs.

(c) Shift Register

(d) Construction of a 4 bit serial in serial out / serial in parallel out right shift register using JK flip-flops and verification of its operation.

(e) Construction and testing of its operation of a 4 bit ring counter using Jk flip-flop.

10. Universal shift register IC

(a) Verification of truth table for any one universal shift register IC.

11. Asynchronous Counter ICs

(a) Use of 7490 equivalent TTL

(i) Divide by 2

(ii) Divide by 5

(iii) Divide by 10 counters

OR

(a) Use of 7493 equivalent TTL

(i) Divide by 2

(ii) Divide by 8

(iii) Divide by 16 counters

Note : Use of simulation software such as OrCADPSpice MULTISIM, ELECTRONIC WORK BENCH etc. for performing some of the above on the computer also, which will enhance the understanding of the students beyond traditional laboratory experiments.

NETWORKS, FILTERS & TRANSMISSION LINES

L	T	P
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RATIONALE

The study of networks, filters and transmission lines leads to understanding of line communication, audio and video communication and microwave communication. Particularly the study of networks takes off from principles of A C theory and introduces the student to parameters and characteristics of various networks, including filters. Also the study of transmission lines becomes important as its analogy is used in study of transmission of plane electromagnetic waves in bounded media.

DETAILED CONTENTS

1. Introduction to networks (20%)

(a) Two port (4 terminals) networks, network elements, classification i.e, symmetrical and asymmetrical networks, balanced and unbalanced ,T-network, II network, ladder network, lattice network, L-network, bridge-network.

(b) Symmetrical network parameters concepts and significance i.e., characteristic impedance, propagation constant, attenuation constant, phase shift constant and insertion loss.

(c) Asymmetrical network parameters concepts and significance i.e., iterative impedance, image impedance image transfer constant and insertion loss.

(d) Network analysis: analysis of symmetrical T and II networks, derivation of Zo, a, b, c, d parameter, open circuit and short circuit analysis, simple design problems.

(e) The half section of symmetrical T and II section, derivation of iterative impedance, image impedance, open circuit and short circuit impedance of half section. Use of half section.

2. Attenuators (15%)

(a) Unit of attenuation (decibel and nepers), general characteristics of attenuators. Types of attenuators.

(b) Analysis and design of simple attenuators of the following types (i) Symmetrical T (ii) Symmetrical II (iii) L Type.

3. Filters (30%)

(a) Brief idea of the use of filters in different communication systems. Types of filters. Concept of LPF, HPF, BPF, BSF (Band Stop Filter), basic concept about response curve of Butterworth, Chebyshev and Caur type filters.

(b) Theorem connecting attenuation constant and characteristic Zo impedance, determination of cut-off frequency of constant K-filter.

(c) Prototype of LPF & HPF using T, □ configuration. Following curves & simple design problems.

(d) Reactance

(e) □ Vs frequency

(f) □ Vs frequency

(g) M-derived filter section: limitation of prototype filter, advantages of m-derived filter, expression for m in terms of fc and fa for LPF and HPF, plots of attenuation (□), Zo with frequency, simple design problems.

(h) Concept of composite filter and matching of it's various components.

(i) Crystal filter: Crystal and its equivalent circuits, special properties of crystal filter and their use.

(j) Active Filter: Basic concept of active filter, comparison with passive filters, simple design problems on LPF, HPF, first and second order Butterworth filters, concept of all pass filter, active BPF and BSF.

4. Transmission Lines (35%)

(a) Transmission lines and their applications, different types of transmission lines including optical cables and submarine cables wave guide & stripline. Operating frequency range bandwidth of different type of transmission line.

(b) Primary constants of a transmission lines, equivalent circuit of an infinite line, T and π (pie) type representation of a section of transmission line.

(c) Definition, significance of characteristic impedance of a line, concept of short line terminated in Zo, current and voltage along an infinite line, propagation constant, attenuation and phase shift constant of the line.
(d) Relationship of Zo, Y in terms of primary constants of the line.
(e) Condition for minimum distortion and minimum attenuation of signal on the line, necessity and different methods of loading the communication lines (no derivation).
(f) Concept of reflection and standing waves on a transmission line, definition of SWR, relation between VSWR and voltage reflection coefficient, maximum impedance on a line in terms of Zo and VSWR.
(g) Transmission line equation, expression for voltage, current & impedance at a point on the line with and without losses. Expression for input impedance of the line (no derivation).
(h) Input impedance of an open and short circuited line and its graphical representation.
(i) Transmission line at high frequency, effect of high frequency on the losses of a transmission line, application of transmission lines as a reactive component and impedance transformer (quarter wave transformer)
(j) Principle of impedance matching using single stub, comparison of open and short circuited stubs. Concept of broad band matching.

LIST OF PRACTICALS

1. To measure the characteristic impedance of a symmetrical T and Pi network
2. To measure the image impedance of a given asymmetrical T/Pi network
3. For a prototype low pass filter:
   (a) Determine the characteristic impedance experimentally
   (b) Plot the attenuation characteristics
4. To design and measure the attenuation of a symmetrical T/Pi type attenuator
5. For a prototype high pass filter :
   (a) Determine the characteristic impedance experimentally
   (b) To plot the attenuation characteristic
   (c) To plot the impedance characteristic of a prototype band-pass filter
   (d) To plot the attenuation characteristic of a prototype band pass filter
   (e) To plot the impedance characteristic of a m-derived low pass filter
   (f) To plot the attenuation characteristics of a m-derived high pass filter
6. To assemble and test the following Butterworth active filters
   (a) First order low pass and high pass
   (b) Second order low pass and high pass
7. To observe the formation of standing waves on a transmission line and measurement of SWR and characteristic impedance of the line.
   (a) To measure following parameters of a Transmission line.
      (i) Attenuation
      (ii) Input Impedance
      (iii) Phase displacement between the Current & Voltage.
      (iv) Frequency characteristics.
8. Draw the attenuation characteristics of a crystal filter.

Note : Use of simulation software such as OrCADPSpice MULTISIM, ELECTRONIC WORK BENCH etc. for performing some of the above on the computer also, which will enhance the understanding of the students beyond traditional laboratory experiments.

ELECTRONIC DEVICES AND CIRCUITS – II

L	T	P
4	-	3

RATIONALE

The course provides the students with basic understanding of the principles of common electronic devices and circuits of importance, the knowledge regarding the application of various circuits and devices, practical experience in the design, fabrication and testing of circuits

DETAILED CONTENTS

1. **Multistage Transistor Amplifier** **(15%)**

Need of multistage amplifier, different coupling schemes and their working; brief mention of application of each of the types of coupling, working of R-C coupled and transformer coupled multistage amplifier, approximate calculation of voltage gain of two stage R-C coupled amplifier. Frequency response for R-C coupled and transformer coupled amplifiers and physical significance of the terms bandwidth, upper and lower cross over frequencies. Direct coupled amplifier and its limitation; difference amplifier typical diagram and working.

2. **Audio Power Amplifiers** **(15%)**

Difference between voltage and power amplifiers; importance of impedance match in power amplifier, collector efficiency of power amplifier. Typical single ended power amplifier and its working, graphical method of calculation of output power; heat dissipation curve and importance of heat sinks; class A, class B and Class C Amplifier; collector efficiency and distortion in class A,B and C amplifier (without derivations) working principles of push pull amplifier circuits, its advantages over single ended power amplifier, cross over distortion in Class B operation and its reduction. Different driver stages for push pull amplifier circuit. Working principles of complementary symmetry push pull circuit and its advantages. Transformer less audio power amplifiers and their typical applications.

3. **Feedback in Amplifier** **(15%)**

Basic principles and types of feedback Derivation of expression for the gain of an amplifier employing feedback Effect of negative feedback on gain, stability, distortion and bandwidth (only physical explanation), Typical feedback circuits RC coupled amplifiers with emitter by pass, capacitor removed Emitter follower and its application, simple mathematical analysis for voltage gain and input & output impedance of above circuits.

4. **Operational Amplifier** **(15%)**

Characteristics of ideal operational amplifier and its block diagram, definition of inverting and non-inverting inputs, differential voltage gain, input and output voltages, input offset current, input bias current, common mode rejection (CMRR), Power Supply Rejection Ratio (PSRR) and slew rate. Method of offset, Null Adjustment, use of Opamp as an invertor, scale changer, Adder, Subtractor, Differentiator, Integrator. Schmitt trigger circuit, time base generator circuit, S/H switch circuit.

5. **Sinusoidal Oscillators** **(15%)**

Application of oscillators. Use of positive feedback, negative feedback & negative resistance for generation of oscillation, Barkhousen criterion for oscillations. Different oscillator circuits tuned collector Hartley, colpitts, phase shifts, wiens bridge

and crystal oscillators and their working principles (no mathematical derivation), Operational amplifier as Wein Bridge Oscillator and phase shift oscillator

6. **Tuned Voltage Amplifiers** **(15%)**

Classification of amplifiers on the basis of frequency. Series and parallel resonant circuits, expression for resonant frequency, expression for impedance at resonance; relationship between resonant frequency, Q and Band width (no derivation) Hybrid equivalent circuits of transistor and its parameters, h parameters model of single and double tuned amplifiers; their working principles and frequency response (no mathematical derivation) Concepts of neutralization. Staggered tuned amplifier and typical applications in brief.

7. **Optical Electronics Devices and Their Applications** **(10%)**

Working principles and characteristics of photo resistors, photo diodes, photo transistors, photo voltaic cells, LEDS, LCDs and optical couplers. Simple application of optical electronic devices (one example of each may be mentioned)

LIST OF PRACTICALS

1. Two stage R.C. Coupled Amplifier to measure the over all gain of two stages at 1 KHZ and compare it with the gain of 1st stage. Also to observe the loading effect of second stage on the first stage.
2. To plot the frequency response curve of two stage amplifier and compare it with that of the single stage amplifier
3. For a single ended power amplifier measurement of optimum load, maximum undistorted power (by giving maximum allowable signal), collector efficiency and percentage distortion factor.
4. For a push-pull amplifier measurement of optimum load, maximum undistorted power (by giving maximum allowable signal), collector efficiency and percentage distortion factor.
5. For a complementary symmetry amplifier measurement of optimum load, maximum undistorted power (by giving maximum allowable signal), collector efficiency and percentage distortion factor.
6. Feedback in Amplifier: Single stage amplifier with and without by pass capacitor measurement of voltage gain and plotting of frequency response in both cases (i.e. with and without by pass capacitor).
7. Feedback in Amplifier: Emitter follower circuit measurement of voltage gain and plotting of frequency response curve.
8. Sinusoidal oscillator (LC): Hartley/Colpittis oscillator circuit measurement of frequency and amplitude oscillations by plotting the wave shape from CRO
9. Sinusoidal oscillator (RC): Wein bridge oscillator circuit – measurement of resonant frequency and amplitude of oscillations by plotting the wave-shape from CRO
10. Tuned Voltage Amplifier Series and parallel resonant circuit – measurement of resonant frequency. Plotting of the resonance curve (i.e. graph between input frequency and impedance) and calculation of Q of the resonant circuit from this plot.
11. Plotting of the frequency response of single tuned voltage amplifier and calculate the Q of the tuned circuit load.
12. Use of op-amp (IC741) as inverting and non-inverting amplifier, adder, integrator, buffer, scale changer

13. To measure the output off ser voltage of an op-amp (741) and zero adjustment using nulling techniques.

Note : Use of simulation software such as OrCADPSpice MULTISIM, ELECTRONIC WORK BENCH etc. for performing some of the above on the computer also, which will enhance the understanding of the students beyond traditional laboratory experiments.

*CM-601 COMPUTER PROGRAMMING AND APPLICATIONS

L	T	P
3	-	3

RATIONALE

Information technology and computers have great influence on all aspects of our life. All over work places and environment around are being computerized. In order to prepare technicians to work in these environments, it has become essential that students are exposed to computers and their applications along with associated peripherals related to their area of work. Hence the subject.

NOTE: Weightage of each topic for external examination is given in the brackets

DETAILED CONTENTS

1. Programming in C / C++. **(45%)**

- 1.1 Basic structure of C program
- 1.2 Executing a C program
- 1.3 Identifiers & keywords, data types, constants, variables
- 1.4 Operators, expressions & statements.
- 1.5 Library functions
- 1.6 Managing input-output operations, like reading a character, writing a character, formatted input, formatted output through print , scanf, getch, putch statements etc.
- 1.7 Decision making and branching using if --- else, switch, go to statements.
- 1.8 Decision making and looping using white, do & for statements.
- 1.9 Arrays – one dimensional and multi- dimensional
- 1.10 Functions
- 1.11 Recursion
- 1.12 Structures & unions
- 1.13 OOPS concepts

2. Information Storage and Retrieval (15%)

- 2.1 Need for information storage and retrieval
- 2.2 Creating data base file
- 2.3 Querying database file on single and multiple keys
- 2.4 Ordering the data on a selected key
- 2.5 Programming a very simple application
- 2.6 Indexing and storing, concept of storage

3. Computation and Graphic Tools (15%)

3.1 Use of Computation tools for

- (i) Evaluation of function
- (ii) Tabulation of function
- (iii) Integration of functions
- (iv) Matrix calculation
- (v) Statistical calculation

3.2 Use of Graphic tools

- i) Plotting graphics
- ii) Making measurement on the graphs
- iii) Solving equations using graphs

4. Computer Aided Drafting (3-D Design) (15%)

a) Designing simple 3-D objects using Parametric and non-Parametric modeling.

b) Retrieving different views & 2-D details of models.
c) Importing and exporting data for preparing a design.
d) Assembly modeling - Check for fits & tolerances.

5. Applications of computer (10%)

5.1 Web technologies

(i) Introduction to world wide web, search engines
(ii) E-mail, news
(iii) Basics of audio & Video conferencing
(iv) Languages used for web technologies

HTML – Practical examples
DHTML – Practical examples

Practicals

1. Creating / Querying the database.
2. Programming in SQL / PLSQL
3. Programming exercise on defining variables and assigning values to variables.
4. Programming exercise on arithmetic and relational operators.
5. Programming exercise writing input / output statement.
6. Programming exercise on simple for , if , IF ------- else statement.
7. Programming exercise on switch statement.
8. Programming exercise on while, do.. while statement.
9. Programming exercise on one dimensional arrays.
10. Programming exercise on two dimensional arrays.
11. Programming exercise on creating objects in C++.
12. Programming exercise on link lists.
13. Programming exercise sorting data.
14. Designing a simple object using CAD software
15. Retrieving 2D drawing from the designed 3D object.

ELECTRONIC FABRICATION & PRODUCT DESIGN

L	T	P
1	-	3

RATIONALE

DETAILED CONTENTS

1. **Introduction to PCB**
   - (a) Need of PCBs
   - (b) Types of PCBs
   - (c) Types of materials used for PCB, their characteristics and limitations
   - (d) Brief summary of all the processes involved in fabrication of PCB from schematic diagram to final stage.
   - (e) Use of active and passive components. Manuals for using mechanical parameters of components
2. **2. Manual Design of PCB**
   - (a) Layout generation
   - (b) Minimization of layout
   - (c) Layout transfer
   - (d) Etching of PCB
   - (e) Drilling
3. **Introduction to PCB design software**
   - (a) Familiarization and use of PCB software like ORCAD (minimum 9.1), Eagle, Pro E, PCB Express, Lab View (Any two) Electronics Workbench.
   - (b) Practice in PCB designing of circuits of the following categories;
     - (i) Communication circuits
     - (ii) Digital circuits (counters, shift registers, multiplexers, de-multiplexer etc.)
     - (iii) Audio & Video
     - (iv) Microprocessor based circuits
4. **Fabrication and testing**
   - (a) Fabrication of small analog and digital (minimum one each) circuits, CMOS ICs.
   - (b) Final assembly, troubleshooting of the developed product and product
   - (c) demonstration.
   - (d) Criterion for selection and mounting of heat sinks.
5. **Fabrication Techniques**
   - (a) Soldering methods, manual and demo on machine soldering
   - (b) Comparison of soldering methods
   - (c) Practice on PCB soldering/desoldering.
   - (d) Component forming and placement on the PCB
   - (e) Tools and precautions to be observed during manual soldering.