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

Syllabus for semester III, Diploma. (Electronics and communication engineering)

Course code: EC370 **Course: Principle of communication Engineering**

L: 3Hrs, T: 1 Hr, per week **Total marks-150**

Prerequisite: Nil **Coordinator: S.K. Ranjan**

Course outcomes

1. The students should be able to understand the basic concept of communication system.

2.The student should study the advantages and limitations of various analog and digital modulation system.

3.The students should study the different techniques of modulation and demodulation process.

4. The students should know the limitation s of communication system.

5.The student should know the difference between analog and digital communication system.

UNIT I : Introduction (2 Hrs)

Need for modulation and demodulation in communication systems.Basic scheme of modern communication system.

UNIT II : Amplitude Modulation (4 Hrs)

(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.Elementary idea of DSB-FC, DSB-SC, SSB-SC, ISB and VSB modulations, their comparison and areas of applications.

UNIT III

Frequency Modulation (5 Hrs)

(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 Effect of noise on FM carrier, noise triangle, need for pre-emphasis and de-emphasis, capture effect. Comparison of FM and AM communication system.

UNIT IV : Phase Modulation (2 Hrs)

Derivation of expression for phase modulated wave, modulation index, comparison with frequency modulation.

UNIT V: Principle of AM Modulators (4 Hrs)

orking principles and typical applications of Collector Modulator, Base Modulator, Balanced Modulator.

UNIT VI: Principles of FM Modulators (6 Hrs)

(a) Working principles and applications of reactance modulator, variactor diode modulator, VCO and Armstrong phase modulator, stabilization of carrier using AFC. Block diagram and working principles of reactance transistor and Armstrong FM transmitters.

UNIT VII : Demodulation of AM waves (3 Hrs)

(a) Principles of demodulation of AM wave using diode detector circuit, concept of diagonal clipping and formula for minimum distortion (No derivation). Principle of demodulation of AM wave using synchronous detection.

UNIT VIII Demodulation of FM waves (4 Hrs)

(a) Basic principles of FM detection using slope detector. Principles & working of the following FM demodulators.(!) Foster-Seeley Discriminator(2) Ratio Detector(3)Quadrature Detector(4) Phase Locked Loop (PLL) FM Detector

UNIT IX

Pulse Modulation (4 Hrs)

Statement of sampling theorem and elementary idea of sampling frequency for pulse modulation.

Basic concepts of time division multiplexing (TDM) and frequency division multiplexing (FDM).Basic ideas about PAM,PPM,PWM and their typical applications.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 Hrs)

Text book:

1. Principle of communication engineering A

2. Communication system: Symonhykin

3. analog and digital communication system : B.P. lathi

Reference books

1 communication system: singh and shapre

2. Principle of communication engineering: George Kanady

Syllabus for semester III, Medical Electronics

Course code:371 **Course : Digital Electronics**

Contact hours:- L-4 , T-1 per week **Total Marks:15**

Couse outcomes

On completion of this course, students are expected to:-

(I) To be capable of understanding the various analog &digital communication signals.

(ii) Basic idea of number system to perform various arithmatic operation.

(iii) They will also learn the basic concept of Logicgates.

(IV) They are capable of implementing using K-Map.

(v) They will also learn the basic concept & types of combinational & sequential circuits.

1. Introduction

(a) Basic difference between analog and digital signal.

(b)Applications and advantages of digital signals.

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2. Number systems

(a) Binary,Octal and Hexadecimal number system, conversion from one from to another.

(b) Concept of code,weighted and non weigthed 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 compliment method of addition/subtraction.

3. Logic Gates

(a) Concept of negative and positive logic.

(b) Definition,symbol and truth table of NOT,AND,OR,NAND,NOR,EX-OR,EX- NOR, Gates, working of AND and OR gates using simple diode circuits, NAND and NOR as universal gates.

4. Logic Simplification

(a) Postulates of Boolean algebra ,De-Morning's theorems, various identities, formulation of truth table and Boolean equation for simple problems, implementation of boolean (logic) equation with logic gates.

(b) Karnaugh map (up to 4 variables) and simple application in developing combinational logic circuits.

5. Logic Families

(a) Logic family classification;

(i) Defination of SSI,MSI,LSI,VLSI

(II) Comparision 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 for TTL NAND gate.

(c) Tri-state switch/ Buffer.

6. Arithmetic Circuits

(a) Half adder and Full adder circuits, design and implementation.

(b) Half and Full subtractor circuits,design and implementation.

(c) 4 bit adder/subtractor.

7. Display Devices

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

8. Multiplexer, Demultiplexers and Decoders

Basic functions and block diagram of MUX,DEMUX,Encoders and Decoders.

Detailed functioning of 3x8 decoders/demux.

9. Latches and Flip flops.

(a) Concept and tyres of latch with their working and their application.

(b) Operation using waveforms and truth tables of RS,JK,D,Master/slave JK and T flip flops.

(c) Use of D flip flop as latch.

(d) Flip flop as basic memory cell.

10. Counters

(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) Presettable and programmable counters.

(iv) Down counter, up/down counter.

(b) Synchronous counters(only introduction)

(c) Difference between asynchrounous and synchronous counters

(d) Ring counter and Johnson counter with timing diagram.

11. Shift Register

(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

Digital Clock and Calculator

Text Books/Reference Material:-R.P Jain(Tata Mc. graw Hills),R.K Gaur(Dhanpat Rai Publication), B.R Gupta(Kataria Publication).

Syllabus for semester III, Medical Electronics

Course code: EC372 **Course: N.F.T.L**
L: 3Hrs, T: 1 Hr, per week **Total marks-150**

Course outcomes

1. The students should be able to write the equilibrium equation on mesh and nodal basis
2. The students should be able to understand the different types of networks.
3. The students should be able to study the properties of symmetric and asymmetric two port networks.
4. The students should be able to implement the source transformation and find the exact solution for all types of circuits.
5. The students should be able to understand the various types filters and its uses.
6. The students should be to design a simple filter circuits.
7. The students should be able to study the different types of transmission medium on the basis of frequency.
8. The should be able to study the different types of loses occurring in the transmission medium.
9. The students should be able to study the different types of matching techniques

UNIT I

Introduction to networks (20%)

Two port networks, network elements, classification i.e, symmetrical and asymmetrical networks, balanced and unbalanced, T-network, pi −network, ladder network , lattice network, L-network, bridge-network. Symmetrical network parameters concepts and significance i.e, characteristic impedance, propagation constant, attenuation constant, phase shift constant and insertion loss,Asymmetrical network parameters concepts and significance i.e., iterative impedance, image impedance image transfer constant and insertion loss.**Network analysis**: analysis of symmetrical T and pi networks derivation of Zo, a, b, c, d parameters, open circuits and short circuits analysis, simple design problems.The half section of symmetrical T and pi section, derivation of iterative impedance, image impedance, open circuit and short circuit impedance of half section. Use of half section.

UNIT II Attenuators(15%)

Unit of attenuation (decibel and nepers), general characteristics of attenuators. Types of attenuators.Analysis and design of simple attenuators of the following types (i) symmetrical T (ii) symmetrical pi (iii) L Type.

UNIT III

Filters (30%)

Brief idea of the use of filters in different communication systems. Types of filters. Concept of LPF, HPF, BPF, BSF, basic concept about response curve of butterworth, chebyshev and caur type filters.Theorem connecting attenuation constant and characteristic Zo impedance, determination of cut −off frequency of constant K- filter.
Prototype of LPF and HPF using t, pi configuration. Following curves and simpledesign problems.Reactance,M-derive filter section: limitation of prototype filter, advantage of m-derive filter, expression for m in terms of fc and fa for LPF and HPF plots of attenuation , Zo with frequency, simple design problems.Concept of composite filter and matching of it's various components.**Crystal filter**: crustal and its equivalent circuits, special properties of crystal filter and their use.**Active filter**: Basic concept of active filter, comparision with passive filters, simple design problem on LPF,HPF, first and second order butter worth filters, concept of all pass filter , active BPF and BSF.

UNIT IV
Transmission lines. (35%)

Transmission lines and their application, different types of transmission lines including optical cable and submarine cable wave guide and stripline. Operating frequency range bandwidth of different types of transmission lines .Primary constant of transmission lines , equivalent circuit of an infinite line T and pi type representation of a section of transmission lines.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.Relationship of Zo, Y in terms of primary constant of the line.Condition for minimum distortion and minimum attenuation of signal on the line, necessity and different method of loading the communication lines.Concept of reflection andstanding waves on a transmission lines, definition of SWR, relation between VSWR and voltage reflection coefficient , maximum impedance on a line in terms of Zo and VSWR.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)Input impedance of an open and short circuited line and its graphical representation.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)Principle of impedance matching using single stub , comparison of open and short circuited stubs. Concept of broad band matching.

Text Book

1) Network and system : D p roy andchaudhary
2) Network filter and transmission line: A. chakrabarti

Reference Books:

1) Network analysis and synthesis : A. chakrabarti
2) Transmission lines and networks: Umeshsinha

Syllabus for Semester IIIrd Medical Electronics

Course code:EC-373 **Course Title : Electronics Devices and circuits-II**
L:4hr T:1hr **Total Marks: 150**

Course Outcomes:

1. **Student will be able to understand about multistage amplifier.**
2. **Student will be learn to calculate overall gain and response of amplifier**
3. **Student will be known about audio amplifier and their type.**
4. **Student will be capable to know about feedback amplifier and its importance in various fields.**
5. **Student will get concept of oscillation and their application.**
6. **Student will get about OPAMP (741 IC)and their various application.**
7. **Students will acquire the basics of optoelectronics devices and opt couplers.**

Unit-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.

Unit-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.

Unit-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.

Unit-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.

Unit-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

Unit-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.

Unit-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)

Text Books:

1. Electronic devices and circuits by S.K. SahdevDhanpatRai and corporation pvt Ltd.
2. Electronic devices and circuits BY J.B. Gupta Satyaprakashanpvt Ltd.

Reference Books:

1. Integrated Electronics by MilimumHelikyas Tata Macrahill

Electronic devices and circuits By boystied

Syllabus for Semester IIIrd, Medical Electronics

Course code:EC-374 **Course Title :Computer Programming &application**

L:4hr T:1hr **Total Marks: 150**

Course Outcomes

1 It has become essential that students are exposed to computers and their applications along with associated peripheral related to there are of work.
2 Understand, analyze and implement software development tools like algorithm, pseudo codes and programming structure
3 Study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language
4 Write small programs related to simple/ moderate mathematical, and logical problems in 'C'.
5 Study, analyze and understand simple data structures, use of pointers, memory allocation and data handling through files in 'C'.
6 Create, Study and analyze the data base using DBMS &extract the different keys .
7 Achieve general knowledge of CAD & familiar with CAD windows.
8 Study about internet basics, search engine (how to store & access the data)

Unit - 1 Programming in C/ C++.

(i) Basic structure of C program.
(ii) Executing a C program.
(iii) Identifiers & Keywords, data types, constants, variables.
(iv) Operators, expressions & statements.
(v) Library functions.
(vi) Managing input – output operations, like reading a character, writing a character, formatted input, formatted output through print, scanf , getch, putch statements ect.
(vii) Decision making and branching using if – else, Switch, go to statements.
(viii) Decision makings and looping using while, do – while, & for statements.
(ix) Array – one dimensional and multi – dimensional.
(x) Functions
(xi) Recursion
(xii) Structures & Unions.
(xiii) OOPS concepts.

Unit –2 Information Storage and Retrieval

(i) Need for information Storage and Retrieval.
(ii) Creating data base file.
(iii) Querying database file on single and multiple key.
(iv) Ordering the data on a selected key.
(v) Programming a very simple application.
(vi) Indexing and storing , concepts of storage.

Unite - 3 Computation and Graphic Tools.

1 Use of Computation tools for

(i) Evaluation of functions
(ii) Tabulation of functions
(iii) Integration of Function
(iv) Matrix calculation
(v) Statistical Calculation

2. Use of Graphic tools.

(i) Retrieving different view & 2-D details of models.
(ii) Importing and exporting data for preparing a design.
(iii) Assembly modeling – check for fits & tolerances.

Unit 5 Applications of Computers

1. Web Technologies
(i) Introduction to W.W.W. , Search Engines.
(ii) E- Mail, News.
(iii) Basic of audio & video conferencing.
(iv) Languages used for web technologies

Reference books:

1. Programming in C by G.S. Baluja& G.K. Baluja and introduction to computer.

Syllabus for Semester IIIrd, Medical Electronics

Course code: EC380 **Course Title: P.C.E**

P:-3hrs., Per Week **Total Marks: 75**

Course outcomes

On completion of this lab/ students will be able to

1. Observe the performance of amplitude modulation and demodulations under various changing parameters.
2. To understand the concept of different types of other modulations. i.e. Freq. modulation, phase modulation.
3. To understand the concept of digital & data modulation, one can access the various types of modulations. i.e. Pam, PWM, PCM
4. Also one can closely observe the process of TDM, sampling theorem.

To get the experience of designing different types of modulation systems also on CRO one can observe the various patterns of modulated

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List of Practical:

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.

Syllabus for Semester III , Medical Electronics

Course code: EC371 Course Title: Digital Electronics Lab

L: 4 Hrs. T: 1 hrs., Per Week Total Marks: 75

Course outcomes:-

1. On completion of this course, students are expected to be capable of understanding the various ICs & their pin description with pin diagram & different logic gates.

2 .Use of universal gates such as NAND/NOR .Also designing of half adder & full adder ckts.

3. They will also learn the basic concept of shift of data either through serial and parallel data registers.

4. Students become able to understand various flip flops and their uses in counters. Students will also learn about display devices LEDs display.

5. A basic introductory concept of digital communication is also developed through these practicals. It is expected that students will be able to design systems based on above mentioned ICs of digital.

List of Practical:-

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 logic 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 operation.

4. Half adder /subtractor circuits

(a) Construction of half adder using EX-OR and NAND gates and verificaton of its operations.

(b) Construction of a full adder using EX-OR and NAND gates &verification of its operations.

5. 4 bit adder/subtractor circuit.

(a) Construction of a 4 bit adder 2's compliment subtractor circuit using a 4 bit adder IC and 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 flip flops)

7 .Display Devices and their decoder /drivers

(a) Familiarization and use of different types 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. Tristate gate ICs

(a) Verification of truth tables and study the operation of tri state buffer IC 744126 or equivalent.

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

9. Decoder, encoder, multiplexer, and demultiplexer

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

(b) Verification of truth tables for one/two each of multiplexer/demultiplexer 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.

Syllabus for Semester IIIrd, Medical Electronics

Course code: EC382 Course Title: N.F.T.L Lab

L: 4 Hrs. T: 1 hrs., Per Week Total Marks: 75

Course Outcomes:-

Students will practice and verify symmetrical and asymmetrical networks

1. Students will practically verify of various filters and their characteristics.
2. Students will verify characteristics of transmission line.

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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.

Syllabus for Semester 3rd EDC-II Medical Electronics

Course code: EC-373 **Course Title: EDC-II Lab**
P:3Hrs **Total Marks: 75**

Course Outcomes:

1. Student will practice on multistage amplifier

2. Student will practice on power amplifier, tunedvoltage amplifier.

3. Student will perform and verify tuned circuits and oscillators .

4. Student will practices on OPAMP.

1. Two stage R.C. Coupled Amplifier to measure the overall 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

Syllabus for Semester IIIrd, Medical Electronics

Course code:EC-384 **Course Title :Computer Programming & application**

P:-3 hrs per week **Total Marks: 75**

Course Outcomes

1. After completion of this course, the students would be able toApply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, linking and executing a program using the development environment
3. Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user-manuals

Practical based on following topics.

1. Create / Querying the database.
2. Programming in SQL/ PL SQL
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 array, two dimensional array
10. Programming exercise on creating objects in C++.
11. Programming exercise on link lists.
12. Programming exercise on sorting data.
13. Designing a simple object using CAD software.
14. Retrieving 2D drawing from the designed 3D object

Syllabus for Semester IIIrd, Medical Electronics

Course code:EC-385 **Course: Electronics fabrication and production L: 1, P:-3 hrs per week** **Total Marks: 175**

Course Outcomes:

1. Student will understand about assembly of electronics components on PCB
2. Students will practices on various electronics devices which are used in design system.
3. Student will update about soldering and desoldering process.
4. Student will be practices on troubleshooting process
5. Student will be aware about PCB

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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.