SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

Electronics & Telecommunication Engineering

PROGRAM EDUCATIONAL OBJECTIVES AND PROGRAM OUTCOMES FOR

Electronics & Telecommunication Engineering Program

STRUCTURE OF S.E (Electronics & Telecommunication Engineering) W.E.F 2013-14

STRUCTURE OF T.E (Electronics & Telecommunication Engineering) W.E.F 2014-15

STRUCTURE OF B.E (Electronics & Telecommunication Engineering) W.E.F 2015-16

SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

STRUCTURE OF S.E (Electronics & Telecommunication Engineering) W.E.F 2013-14

S. E. (Electronics & Telecommunication Engineering) Semester- I

Sr. No.	Subject	Teaching Scheme				Examination Scheme				
		L	Tut	P	Total	Th.	TW	POE	OE	Total
01	Engineering Mathematics-III	3	1		4	100	25	----	---	125
02	Electronics Circuit Analysis and Design-I	4	-	2	6	100	25	*50	---	175
03	Circuits and Network	4	-	2	6	100	25	--	---	125
04	Digital Techniques	4	--	2	6	100	25	50	---	175
05	Data Structures	3	----	2	5	100	25	50	---	175
06	Electronic Workshop Lab	---	1	2	3	---	50	---	---	50
Total		**18**	**2**	**10**	**30**	**500**	**175**	**150**	**---**	**825**

07	Environmental Science-I	1	--	--	1	--	--	-	--	--

S. E. (Electronics & Telecommunication Engineering) Semester- II

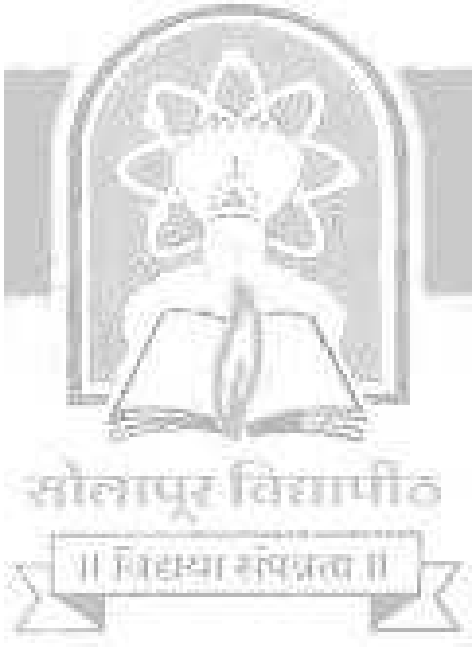
Sr. No.	Subject	Teaching Scheme				Examination Scheme				
		L	Tut	P	Total	Th.	TW	POE	OE	Total
01	Electronics Circuit Analysis and Design-II	4	--	2	6	100	25	#50	---	175
02	Analog Communication	4	--	2	6	100	25	50	---	175
03	Control Systems	3	--	2	5	100	25	----	---	125
04	Linear Integrated Circuits	4	--	2	6	100	25	50	---	175
05	Signals and Systems	3	1	--	4	100	25	---	---	125
06	Electronic Software Lab-**I**		1	2	3	---	50	---	---	50
Total		**18**	**2**	**10**	**30**	**500**	**175**	**150**	**---**	**825**

07	Environmental Science	1	--	--	1	--	--	--	--	--

Note:

- * Practical and Oral Examination of Electronic Circuit Analysis & Design-I is combined with Circuits And Networks
- # Practical and Oral Examination for Electronic Circuit Analysis & Design – II and Electronic Software Lab-I is combined
- Term work assessment shall be a continuous process based on student's performance in class tests, assignments, homework, subject seminars, quizzes, and laboratory books and their interaction and attendance for theory and lab sessions as applicable.

- Vocational Training (be evaluated at B.E. Part-I) of minimum 15 days shall be completed in any vacation after S.E. Part-II but before commencement of B.E. Part-I & the report should be submitted in B.E. Part-I.
- The batch size for the practical's/tutorials be of 20 students. On forming the batches, if the strength of remaining students exceeds 9 students, then a new batch be formed.



Solapur University, Solapur

S.E. (Electronics and Telecommunication Engineering)

Semester-I

1. ENGINEERING MATHEMATICS-III

Teaching Scheme:	**Examination Scheme:**
Theory: 3 Hrs./ week	**Theory:** 100 marks
Tutorial : 1 Hr/ week	**Term work:** 25 Marks

Course Objectives

1. To introduce higher order linear differential equations related to electronics and electrical circuit problems
2. To introduce Laplace and inverse Laplace transforms and analyze electrical circuits using it
3. To introduce Fourier series and integral transform.
4. To introduce Z transform and its properties
5. To introduce vector calculus

Course Outcomes

At the end of this course, the student will be able to-

1. Solve the higher order linear differential equation related to electrical circuit theory
2. Apply Laplace and inverse Laplace transforms for analysis of simple electrical circuits
3. Express the function in terms of sines and cosines components so as to model simple
4. Periodic functions.
5. Exhibits knowledge of Z transform and its properties
6. Use different vector differential operators

SECTION – I

Unit 1 : **Linear Differential equations with constant coefficients** – Basic defination, differential operator, complimentary functions, particular integral shortcut method for standard functions like $e^{ax}, \sin(ax+b), \cos(ax+b), x^m, e^{ax}V \text{ and } xV$, particular integral general method (without method of variation of parameters) for other functions, electrical engineering Applications **[6 Hrs.]**

Unit 2: First Order Partial Differential equations– Non-linear partial differential equations of $type\ I\ \ f(p,q)=0, type\ II\ \ f(p,q,z)=0, type\ III\ \ f_1(p,x)=f_2(q,y)$, Linear Partial Differential equations by Lagaranges method. **[5 Hrs.]**

Unit 3: Laplace Transform: Definition, Laplace Transform of standard functions, Properties- First shifting, change of scalar, multiplication of power t and division by t, Laplace Transform of derivative and integral, Laplace transform of Periodic functions, Unit step functions and unit Impulse functions. **[5 Hrs.]**

Unit 4: Inverse Laplace Transform: Methods of finding Inverse Laplace transforms, Convolution Theorem, Applications to solve linear differential equations related to electrical circuits with constant coefficients. **[5 Hrs.]**

SECTION-II

Unit 5: Fourier series: Definition, Euler's formula, Expansions of function, Change of interval, even and odd functions, half range Fourier series. **[6 Hrs.]**

Unit 6: Fourier Transform: Fourier integral, Fourier sine and cosine integral, Complex form of Fourier integral. Fourier Transform, Fourier sine and cosine transform and Inverse transform. **[5 Hrs.]**

Unit 7: **Z-Transform:** Z-Transform of elementary Functions, Properties of Z-Transform and Inverse Z-Transform. **[5 Hrs.]**

Unit 8: Vector Calculus: Differentiation of vectors, vector differential operator, Gradient, Divergence and Curl of vector field, Solenoid, irrotational and conservative vector field. **[5 Hrs.]**

Text books:

1. J.N. and P.N. Wartikar, A textbook of Applied Mathematics Vol. II and Vol. III – Vidyarthi Grah Prakashan, Pune.
2. B.S.Grewal, Higher Engineering Mathematics – Khanna Publications, Delhi.
3. A textbook of Applied Mathematics by N.P. Bali, Ashok Saxena and N.Ch. S.N. Iyengar – Laxmi Publications , Delhi.
4. Advanced Engineering Mathematics by Kreyzig-John Wiley & SMS, Newyork.

Reference Books:

1. Peter O'Neil , Advanced Engineering Mathematics - Cengage Learning.
2. M D Greenberg, Advanced Engineering Mathematics(Second Editions) - Pearson.

Term Work:

The term work shall include minimum eight Assignments covering all units.

Solapur University, Solapur

S.E. (Electronics & Telecommunication Engineering)

Semester-I

2. ELECTRONIC CIRCUIT ANALYSIS & DESIGN - I

Teaching Scheme:	**Examination Scheme:**
Theory: 4 Hrs./Week	**Theory:** 100Marks
Practical: 2Hrs./week	**Term Work:** 25 Marks
	Practical/Oral Exam: 50 Marks

Course Objectives

1) To prepare good fundamentals and practical knowledge about PN Junction Diode and its various applications.
2) To give good fundamental concept about BJT, FET and application of BJT – Switch & Amplifier.
3) To prepare students to design, simulate, develop and test for unregulated power supply and transistor amplifier, relay driver circuits.

Course Outcome

1) Student can demonstrate an ability to design various electronic circuits using diode and BJT.
2) Student understands Electronic System Design.
3) Student can participate and succeed in competitive examinations.

SECTION I

Unit 1: PN Junction Diode: **[8 Hrs.]**

Diode characteristics (using Diode Equation), Effect of Temperature, AC & DC Load Line, Junction Capacitance, Ratings of Diode.

PN Junction as Rectifier: HWR, FWR, Bridge Rectifier (detailed analysis includes various parameters- Io (rms), Vo (rms), Io (avg), Vo (avg), Ripple Factor, Efficiency, TUF, PIV)

Unit 2: Diode Applications: **[7 Hrs.]**

Clipping Circuits (Series & Shunt Clippers: +ve, -ve & Combinational), transfer characteristics, Clamper Circuits (+ve, - ve & Combinational), Voltage Multipliers (Voltage Doublers & Tripler) (Analysis of all). **Zener Diode**: Characteristics, Working, Application as Voltage Regulator, Rating of Zener Diode, Design of zener voltage regulator.

Unit 3: Filter: **[3 Hrs.]**

Capacitance, Inductance, LC & π Filter (Analysis includes derivation for Ripple Factorn & their comparison)

Unit 4: Design of Unregulated Power Supply: **[6 Hrs.]**

Design of unregulated power supply using Rectifier & Filter(design includes selection of Transformer, Diode & Respected Filter Component)

SECTION II

Unit 5: Bipolar Junction Transistor: **[9 Hrs.]**

I/O Characteristics, Current Components, Early Effect, AC&DC Load Line, Ratings of Transistors.

Biasing of Transistors: Tharmal Runaway, Biasing – Fixed, Collector to base & Self biasing, Compensation techniques.

Hybrid Model of BJT: AC equivalent Circuit of BJT using h – parameter, Determination of Amplifier Parameters (Av, Ai, R i, Ro). Application of BJT – Switch & Amplifier.

Unit 6: Transistor Amplifier Frequency Response: **[3 Hrs.]**

Effect of Cc & Ce on Low frequency Response, Effect of Junction Capacitance at High Frequency.

Unit 7 : Design of Driver Circuit using Transistors: **[4 Hrs.]**

Design of Single Stage Amplifier using BJT (CE, CE with Re & Ce)

Unit 8: Field Effect Transistor: **[8 Hrs.]**

JFET, V-I characteristics, different configurations of JFET, parameters of JFET, Common source biasing and application as an amplifier. JFET as VVR, application of VVR. MOSFET – Types, V-I Characteristics, application as a switch

Note: For selection of components in design **Data Sheet** should be referred.

Text Books:

1. Electronic Devices and Circuits Allen Mottershed PHI Publication
2. Electronic Devices and Circuits- J.B.Gupta 3rd Edition KATSON Books
3. Electronics Devices and Circuits- S. Shalivahanan,N SureshKumar, Tata McGraw Hill Publication

Reference Books :

1. Electronic Devices Floyd Pearson Education
2. Electronic Devices & Circuit Theory Boylestad Pearson Education
3. Electronic Design Martin Roden Shroff Publication from Concept to Reality
4. Pulse, Digital & Switching Circuits Millman Taub Tata McGraw Hill Publication
5. Electronic Circuit Design, Talbar Sontakke, SadhuSudha Prakashan, Nanded.
6. “Microelectronics Circuit” by Sedra Smith,Oxford University Press, 4thEdition.

Term work:

List of Practicals (Minimum eight practicals from 1 to 12 and Minimum six practicals from 13 to 22)

List of Practical for Electronic Circuit Analysis & Design – I

1. Full Wave Rectifier circuit design and analysis.
2. Performance, parameters of filter circuit.
3. Clipper, clamper Circuits.
4. Voltage multiplier using diode.
5. V-I Characteristics of zener diode & its application as regulator.
6. Design & implementation of Un-regulated power supply using FWR & Capacitor filter.
7. I/O Characteristics of CB configuration.
8. I/O Characteristics of CE configuration.
9. Frequency response of single stage CE amplifier.
10. Design and implementation of relay driver circuit.
11. V-I characteristics of JFET.
12. Application of MOSFET as a switch.

List of Practical for Circuits and Networks

13. Verification of superposition theorem.
14. Maximum Power Transfer Theorems.
15. Frequency response of series resonance circuit.
16. Step response of RC circuit.
17. Z and Y parameters.
18. H and G parameters.
19. Design LPF, plot frequency response & find cut off frequency.
20. Design constant (HPF) high pass filter ,plot frequency response & find cut off frequency .
21. Design of attenuators (L-type and T-type.)
22. Design of attenuator (π-type.)

Note:* Practical and Oral Examination of Electronic Circuit Analysis & Design – I is combined with Circuits and Networks

Solapur University, Solapur

S.E. (Electronics and Telecommunication Engineering)

Semester-I

3. CIRCUITS AND NETWORKS

Teaching Scheme:	**Examination Scheme:**
Theory: 4 Hrs./ week	**Theory:** 100 marks
Practical: 2Hrs./week	**Term work:** 25 Marks

Course Objectives

1) To develop skills for analysis of linear circuits with dependent and independent AC/ DC excitations.
2) To understand concept of resonance in electric circuits and its applications.
3) To understand evaluation and analysis of transient and steady state response of Linear circuits
4) To understand fundamental knowledge about passive filters, Attenuators and its design

Course Outcomes

1) Students can analyze Linear Circuit by understanding different Network theorems and analysis methods.
2) Student can evaluate transient and steady state response of Linear circuits.
3) Student can design passive filter and attenuator Circuits

SECTION I

Unit 1: Circuit Analysis and Network Theorems **[10 Hrs.]**

Network Graphs: Fundamental definitions, Incidence matrix, Fundamental cut set and Tieset matrix.
Network Analysis: Mesh, Super mesh, Node and Super Node analysis. Source transformation and source shifting.
Network Theorems: Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems.

Unit 2: Resonance: **[6Hrs.]**

Series resonance, impedance and phase angle of series resonant circuit, voltage and current in series resonant circuit. Effect of resistance on frequency response curve, bandwidth, selectivity and quality factor. Significance of Quality factor.
Parallel resonant circuit(Tank circuit), resonant frequency, variation of impedance with frequency, reactance curves, numerical problems based on above.

Unit 3: Two Port Networks **[8 Hrs.]**

Relation between two port variables, open circuit impedance parameters(Z), short circuit admittance parameters(Y), Transmission parameters(ABCD), Hybrid parameters(h), reciprocity and symmetry conditions. Relationship between parameter sets. Parallel, series and Cascade connection of two-port networks, T and π representation, terminated 2 port network. Analysis of common two ports.

SECTION II

Unit 4: Transient Response **[9 Hrs.]**

Review of Laplace Transform Basics: Initial conditions, evaluation and analysis of transient and steady state response of following:
RL circuit step voltage response. RL circuit step current response. RC circuit step current response. RC circuit step voltage response. RLC circuit step voltage response. RLC step current response. RLC circuit sinusoidal response.

Unit 5: Network Function **[6 Hrs.]**

Concept of complex frequency, network function for one port and two port network. Poles and zeros of network function. Restriction on poles and zero location of driving point function and transfer function. Time domain behavior from poles and zero plot.

Unit 6: Filters and attenuators **[9 Hrs.]**

Flters: Characteristic of high pass, low pass and band pass and band stop filter. Constant K type filters, m-derived filter, section m derived LPF,HPF, BPF and BSF.
Attenuator's : Neper & Decibels, L , T and π type, Lattice attenuators.

Text Books:

1. Circuit & network analysis and synthesis by A Sudhakar and Shaymmohan S Palli. TMH publication. 3rdEdition
2. A Course in Electrical Circuit Analysis Sony Gupta Dhanpatroy Son's publication.
3. Circuit Theory (Analysis and Synthesis) A. Chakrabarti Dhanpat Rai & Co. 6th Edition.

Reference Books :

1. Network Analysis M.E. Van Valkenburg, PHI publication. 3rd Edition
2. Theory and problems of Electric Circuits Joseph A Edminster, Shaum Series
3. Network & System - D. Roy Choudhary, Wiley Eastern (2nd Edition).
4. Network Analysis F.F.Kuo - John Wiley & Sons (2nd Edition).
5. Electrical Network theory- Balabancan and Bickart Robert ,E.Kreiger publishing company.

Term work:

List of Practicals (Minimum Six practicals)

Note:

- The list of Practicals for Circuits and Network is mentioned in Electronics Circuit Analysis and Design –I syllabus
- *Practicals and Oral Examination of Electronic Circuit Analysis & Design – I is combined with Circuits And Networks

Solapur University, Solapur

S.E. (Electronics and Telecommunication Engineering)
Semester-I
4. DIGITAL TECHNIQUES

Teaching Scheme:	**Examination Scheme:**
Theory: 4 Hrs/Week	**Theory:**100 Marks
Practical : 2 Hr/Week	**Term-Work:** 25 Marks
	Practicals/Oral Exam: 50 Marks

Course Objectives

1) To understand principles, characteristics and operations of combinational & sequential logic circuits.
2) To design combinational circuits by using logic gates, MSI circuits, PLDs.
3) To design, implement and analyze, asynchronous and synchronous sequential circuits using flip flops.

Course Outcome

1) Students will be able to design & realize combinational logic circuits using logic gates, MSI circuits, PLDs for various practical applications.
2) Students will be able to design, implement and analyze, asynchronous and synchronous Sequential circuits using flip flops.
3) Students will be able to implement the fundamentals in Industrial Applications.

SECTION I

Unit 1: Codes and Simplification technique [5 Hrs.]

Codes- BCD, Gray, Seven segment. Principles of combinational logic: Standard representation for Logical Function, canonical forms, don't care conditions, minimization techniques (using K-map upto 4 variables only), static and dynamic Hazards.

Unit 2: Combinational Circuit Design [9 Hrs.]

Adder, Subtractor, code converters (binary to gray & gray to binary, BCD to 7 segment), IC 7447, 7448. MUX, DEMUX, encoder, priority encoder, decoder Multiplexer (Tree) and Demultiplexer (Tree), magnitude comparator, adder with look ahead carry generator, ALU (74181), Parallel adder (IC 7483), subtractor using adder.

Unit 3: Logic Families [4 Hrs.]

Characteristics of Digital ICs, Typical values for TTL, CMOS & ECL. Input/output profile for TTL & CMOS. TTL logic families-standard TTL, Totem-pole, open collector, tri-state (concept & application). Significance of TTL sub families (L, H, LS, S). MOS family- PMOS, NMOS, CMOS (inverter, NAND & NOR), importance of (C, HC). CMOS-TTL interfacing, comparison of TTL & CMOS.

Unit 4: Flip-Flops **[6 Hrs.]**

Sequential logic circuit, Flip-Flop as 1 bit latch, Characteristic table and characteristic equation of clocked S-R, J-K, D and T flip flop. Race around condition, Master Slave J-K flip-flop, excitation tables, flip-flop conversion.

SECTION II

Unit 5: Registers **[7 Hrs.]**

Asynchronous and synchronous sequential circuits, Shift register (modes of operation), 4 bit bi-directional shift register using D / J-K, universal shift registers, application of shift registers- (ring counter, Sequence generator, Johnson's counter, IC 7495/74195.

Unit 6: Counters **[7 Hrs.]**

Design of ripple counter using flip-flop (IC 7490,7493), 4 bit up/down counter (positive / negative edge triggered), mod –N counter, Design of Synchronous counter using Flip-Flop, 4 bit up/down counter, IC 74191.

Unit 7: Synchronous Sequence Machines **[6 Hrs.]**

Moore/Mealy machines, representation techniques, state diagram, state assignment, state reduction, implementation using flip flops. Application like sequence generator & detection.

Unit 8: Memory and PLD's **[4 Hrs.]**

RAM, ROM, PLDs- PROM, PAL, PLA Architecture, Implementing combinational circuits using PLDs.

Text Books:

1. Digital Design - M. Morris Mano - Pearson Education (3rd Edition)
2. Digital Principles – Leach, Malvino, TMH (6th Edition).
3. Fundamental of Digital Circuits- Anand Kumar- Prentice Hall of India Pvt. Ltd.
4. Digital Electronics – Dr. R. S. Sedha – S. Chand Publications.(3rd Revised Edition).
5. Digital System , Principles and Applications, Ronald J. Tocci,PHI

Reference Books:

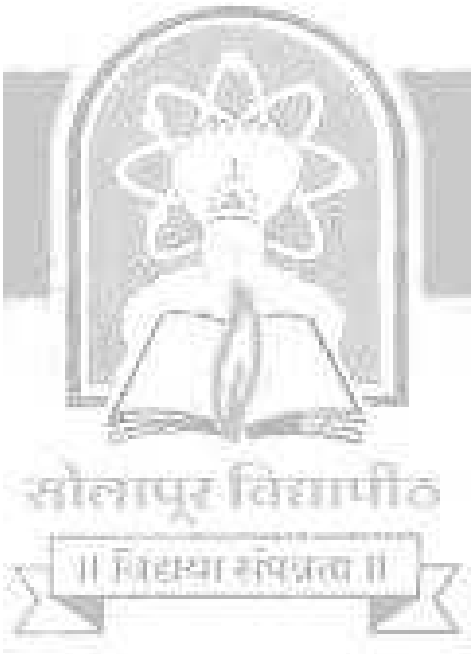
1. Digital Design Principles and Application - Wakerly – Pearson Education
2. Digital Electronics - Gothman - (PHI)
3. Digital Logic and Computer Design - Morris Mano - Pearson Education
4. The Principles of Computer hardware- Alan Clements (Low Price 2000)(Third Edition), Oxford Press.

Term work:

List of Practicals (Minimum Twelve Practicals)

1. Implementation of SOP and POS logical functions using universal gates.
2. Implementation of full adder, and full subtractor using logic gates.
3. Code conversion using logic gates or logic ICs: BCD to Binary, Binary to Gray, Gray to Binary.
4. Design and implementation of 2 bit digital comparator using logic gates and functional verification of 4 bit digital comparator using IC 7485.
5. Design & implementation of 1 decimal digit BCD adder using IC 7483.

6. (i) Verification of functionality of multiplexer.
   (ii) Design and implement combinational logic function using multiplexer ICs.
7. (i) Verification of functionality of decoder.
   (ii) Design and implement combinational logic function using decoder IC.
8. Verification of the functionality of BCD to Seven segment decoder/driver.
9. Implement S-R, D, J-K, T flip flops using logic gates.
10. Functional verification of universal shift registers using IC 7495.
11. Design and implementation of Ring counter using shift register.
12. Design and implementation of Johnson counter using shift register.
13. Design and implementation of Pulse train generator using IC 7495.
14. Functional verification of ripple counter using IC 7490
15. Functional verification of synchronous counter using IC 74191
16. Design of synchronous sequence generator using MS JK flip-flop.



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Semester-I

5. DATA STRUCTURES USING 'C'

Teaching Scheme:	**Examination Scheme:**
Theory: 3 Hrs./Week	**Theory:** 100 Marks
Practical: 2 Hrs./Week	**Term-Work:** 25 Marks
	Practical/Oral Exam: 50 Marks

Course Objectives

1. To provide an in-depth knowledge in problem solving techniques and data structures.
2. To understand the different methods of organizing data.
3. To implement the different data structures.

Course Outcome

1. Student will be able to demonstrate the concepts of Stacks, Queues, Linked List, Trees
2. Student will be able to give difference between linear & non-linear data structures.
3. Student will be able to manage the data efficiently.
4. Student will be able to function on multidisciplinary industry as a professional.

SECTION I

Unit 1: Stacks, Queues: **[8Hrs.]**

Stack-Definition, representation, operations, implementation and its applications (converting infix to postfix expression using algorithm, evaluating postfix expression using algorithm)

Queue- Definition, representation, operations, implementation of simple Queue & Circular Queue and its applications, Definition & concept of DEQUE & Priority Queue.

Unit 2: Linked List: **[8 Hrs.]**

Definition, Representation, operations, & applications of singly linked list (Polynomial representation using Algorithm), Doubly linked list, Circular linked list, Concept of Avail list.

Unit 3: Recursion: **[4 Hrs.]**

Definition, recursive flow chart, programs using recursive functions (factorial, GCD, Multiplication of two numbers, Fibonacci sequence)

SECTION II

Unit 4: Non-Linear Data structures: **[8 Hrs.]**

Trees- Basic Terminology, Binary tree, Traversal methods & program implementing tree Traversal methods, Binary Search Tree- Definition, Representation, Inserting & Deleting Algorithm.

Graphs- Basic concepts of graph theory, storage representation, Traversal Methods.

Unit 5: Searching Techniques: [**4 Hrs.]**

Linear Search, Binary Search, Definition of hashing, Hash Functions, Hash Collision, Collision Resolving Techniques- open Addressing & closed Addressing.

Unit 6: Sorting Techniques: **[8 Hrs.]**

Bubble Sort, Insertion Sort, Selection Sort, concept of Merge Sort, Quick Sort, Radix sort, Analysis of sorting techniques based on time complexity

Text Books:

1. Data Structures Using C & C++, Y.Langsam, M.J. Augenstein, A.M Tanenbaum Pearson Education Second Edition
2. Data structures using C, Rajani Jindal Umesh Publication
3. Data structures through C in Depth, S.K.Srivastava, Deepali Srivastava, BPB Publication.
4. Data Structures using C, ISRD Group, TMH

Reference Books:

1. Fundamentals of Data Structures, Ellis Horowitz, Sartaj Sahani (Galgotic Book Source)
2. Data Structures and Program design, Robert L. Kruse (PHI).
3. Data structure & algorithm, mark Allen Weiss (Pearson Publication, Second edition)
4. Data Structures using C & C++, Rajesh K. Shukla, Wiley Precise.

Term work:

List of Practicals (Minimum Twelve Practicals)

1. Implementation of stack using array.
2. Implementation of Queue using array.
3. Implementation of circular Queue using array.
4. Implementation of stack using Linked list.
5. Implementation of Queue using Linked list.
6. Implementation of Circular Queue using Linked list.
7. Implementation of singly Linked list.
8. Implementation of Josephus problem using Circular Linked list.
9. Find Factorial of a given no, by defining recursive function.
10. Find GCD of given no, by defining recursive function.
11. Find multiplication of n Natural no by defining recursive function.
12. Implementation of Tree Traversal Methods.
13. Search element from list using linear search & Binary search method.
14. Write the program to Sort the given list using Bubble sort method
15. Write the program to Sort the given list using Selection sort method
16. Write a program to Sort the given list using Insertion sort method

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Semester-I

6. ELECTRONIC WORKSHOP LAB

Teaching Scheme:

Tutorial:1Hr./Week

Practical: 2Hrs./Week

Examination Scheme:

Term Work: 50 Marks

Course Objectives

1) To understand working principle of audio system.
2) To make students familiar with measuring instruments like CRO, DSO, Signal Generator.
3) To understand PCB Designing process.

Course Outcomes

1) Students are able to demonstrate knowledge about audio system.
2) Students are able to use CRO, DSO and Signal Generator.
3) Students are able to design PCB using PCB designing software.

Unit 1: **Study of Audio System:**

Microphone, Loudspeaker, Public Address System.

Unit 2: Electronic Measuring Instruments:

CRO, Signal Generator, Multimeter, Spectrum Analyzer, Digital Storage oscilloscope.

Unit 3: Measurement of parameters:

Distance, weight, speed, temperature using various transducers, pressure and various gas sensors (such as MQ2, MQ6, MQ7…etc).

Unit 4: Printed Circuit Boards (PCB):

Types, Layout procedure, artwork, Fabrication (In this, fabrications of small circuit using discrete component on single side PCB is expected).

Text Books:

1. Audio Video Systems - R. G. Gupta – TMH
2. Electronic Instruments and Instrumentation Technology MMS.Anand Prentice Hall of India Pvt. Ltd.
3. A course in Electrical and Electronics Measurements and Instrumentation - A.K. Sawhney - Dhanpat Rai & Co.
4. Electronic Components and Materials - Dr. Madhuri A. Joshi - Shroff Publications Third Edition

5. Instrumentation and Control System – Katta Narayan Reddy,Palakodeti Sri Rama Krishnadu Scitech Pulication

Reference Books

1. Electrical and Electronic Measurements –Banerjee,PHI
2. Introduction to Measurements and Instrumentation, 4th edition- Ghosh PHI
3. Electronic Instrumentation and Measurement Techniques, W.D. Copper,PHI

Web Resources: Refer online datasheets

Term work:

Tutorials: Minimum 2 assignments per Unit.

List of Practicals (Total seven Practicals include minimum six Practicals from 1 to 8 and 9th practical)

1. Public Address System.
2. Introduction to Measuring Instruments.
3. Analog and Digital Circuits building and testing on Breadboard.
4. Measurement of different electronic parameters using CRO and Signal generator.
5. Measurement and testing of different types of Electronic components (Resistors, capacitors, inductors, diodes, transistors, ICs)
6. Measurement of displacement using LVDT.
7. Measurement of temperature by using any electronic transducer like Thermocouple, Thermistor or RTD.
8. Speed measurement using any electronics transducer like magnetic pick up & photo electric pick up.
9. Small circuit building using discrete components on single sided PCB.
    a) PCB layout and artwork using any PCB designing software.
    b) PCB Designing process.
    c) Component mounting, soldering and testing of PCB.

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S.E. (Electronics & Telecommunication Engineering)

Semester-II

1. ELECTRONIC CIRCUIT ANALYSIS & DESIGN – II

Teaching Scheme:	**Examination Scheme:**
Theory: 4Hrs/Week	**Theory:** 100Marks
Practical: 2Hr/Week	**Term Work:** 25Marks
	Practical/Oral Exam: 50Marks

Course Objectives

1) To prepare fundamental knowledge for Negative and Positive feedback amplifier and its design.
2) To enable students to analyze and Design Electronic Circuits for Power amplifier, Oscillator and Multivibrator using transistor.
3) To make students to design regulated power supply using regulator ICs.

Course Outcome

1) Student can apply concept of Negative feedback and positive feedback for amplifier design.
2) Student can design regulated power supply and waveform generation circuits using IC555
3) Student can participate and succeed in competitive examinations

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SECTION I

Unit 1 : **Multistage Transistor Amplifiers** **[5 Hrs.]**

Need of cascading, different coupling schemes, Frequency response for Multistage amplifier, Frequency response, Analysis using h parameters. (Av, Ai, Ri, Ro, Avs, Ais), RC coupled amplifier, Transformer coupled amplifier, Direct coupled amplifier

Unit 2 : Feed Back Amplifier **[6 Hrs.]**

Theory of –ve feed back, types of –ve feed back, its effect on stability,

BW, noise, distortion, i/p resistance & o/p resistance. Design of R-C coupled amplifier

involving voltage series & current series feedback.

Unit 3 : Sinusoidal Oscillators **[7 Hrs.]**

Barkhausen criteria.

Types of oscillators - RC oscillators- phase shift, Wein bridge oscillator.

LC oscillators– Hartley Colppits & Crystal oscillator (analysis of all), Design of RC oscillator.

Unit 4 : Power amplifiers **[6 Hrs.]**

Classification, class A, B, C & AB (Analysis of A, B, & AB), Calculations of power gain, efficiency, power dissipation. Cross over distortion, Harmonic distortion, Complementary symmetry power amplifier, Design of complementary system Power Amplifier.

SECTION II

Unit 5: Transistorized Voltage Regulators: **[4Hrs.]**

Design of Series Pass, Series Pass with Pre Regulator, short circuit protection, thermal shut down, line regulation, load regulation & ripple rejection ratio

Unit 6 : IC Regulator **[7Hrs.]**

Fixed volt regulator using IC 78XX & 79XX series, variable volt regulator using IC LM 317 & LM 337. Dual regulated power supply, features of IC voltage regulator, Current boosting in voltage regulator. Design of voltage regulators using above IC.

Unit 7: Multivibrators using Transistors: **[6Hrs.]**

Monostable, Bistable, Astable, Schmitt Trigger(analysis of astable and monostable), design of triggering circuits.

Unit 8 : Waveform generator using IC 555 **[7 Hrs.]**

Monostable, Astable & Bistable Multivibrators, Schmitt trigger ,Power ON delay circuit using IC 555, pulse generator using IC 74121 & 74123. Design and applications of Astable & Monostable Multivibrator.

Text Books:

1. Electronic Devices and Circuits Allen Mottershed PHI Publication
2. Electronic Devices and Circuits- J.B.Gupta 3rd Edition KATSON Books
3. Electronics Devices and Circuits- S. Shalivahanan,N SureshKumar, Tata McGraw Hill Publication

Reference Books :

1. Electronic Devices Floyd Pearson Education
2. Electronic Devices & Circuit Theory Boylestad Pearson Education
3. Electronic Design from Concept to Reality Martin Roden Shroff Publication
4. Op Amp and Linear Circuits Ramakant Gaikwad PHI Publication
5. "Microelectronics Circuit" by Sedra Smith,Oxford University Press, 4thEdition.

Term work:

List of Practicals (Minimum eight Practicals from 1 to 11 and Minimum six from 12 to 22.)

List of Practicals for Electronic Circuit Analysis & Design – II

1. Frequency response of two stage RC coupled amplifier.
2. Voltage series feedback amplifier.
3. RC Phase shift oscillator.
4. Wein-Bridge oscillator.
5. Complimentary-Symmetry amplifier.
6. Fixed Voltage Regulator Using 78xx & 79xx.
7. Variable voltage regulator using LM317 & LM 337.
8. Astable Multivibrator using using transitor
9. Monostable Multivibrator using transistor
10. Astable Multivibrator using IC 555.
11. Schmitt trigger circuit using IC 555.
12. Monostable Multivibrator using IC 555.

List of Practicals for Electronic Software Lab-I

13. Voltage series feedback amplifier/ RC Phase shift oscillator using ORCAD Capture 9.2.
14. Fixed Voltage Regulator Using 78XX and79XX using ORCAD Capture 9.2.
15. Variable voltage regulator using LM317 & LM 337 using ORCAD Capture 9.2.
16. Monostable Multivibrator using IC 555 using ORCAD Capture 9.2.
17. V-I characteristics of JFET using ORCAD Capture 9.2.
18. Working with Arithmetic, Exponential, logarithmic, Trigonometric operation in Matlab.
19. Working with Matrix, Vectors and arrays.
20. Plot of Basic test Signals using plot, stem, fplot, and subplot.
21. Program for Sampling Theorem using Matlab
22. Program for finding Z transform using Matlab.
23. Design of single sided PCB using Eagle Cad.

Note:# Practical and Oral Examination for Electronic Circuit Analysis & Design – II and Electronic Software Lab-I is combined

Solapur University, Solapur

S.E. (Electronics and Telecommunication Engineering
Semester-II
2. ANALOG COMMUNICATION

Teaching Scheme:	**Examination Scheme:**
Theory: 4 Hrs/Week	**Theory:** 100 Marks
Practical: 2 Hr/Week	**Term-Work:** 25 Mark
	Practical/Oral Exam: 50 Marks

Course Objectives

1) To understand the need of modulation & types of analog modulation.
2) To understand fundamentals of antennas and wave propagation.
3) To develop knowledge about fundamentals of telephone system.

Course Outcome

1) Students will be able to compare different modulation techniques
2) Students will be able to perform experiment as well as to analyze and interpret data.
3) Students will be able to apply Modern engineering tools (MATLAB) for modulation techniques.
4) Students will be able to identify, formulate & solve communication engineering problems.

SECTION I

Unit1: Introduction [6 Hrs.]

Importance of Communication, Element of a communication system, Modulation and Demodulation, Need of Modulation, Type of modulation, Type of communication Channels (Transmission line, Parallel wires, Coaxial cables, waveguides and optical fibers), Electromagnetic spectrum, Bandwidth, Concept of multiplexing (TDM,FDM), Application of communication.

Unit 2 : Noise [6 Hrs.]

Sources of Noise, Types of Noise, White Noise, Noise calculations, Noise figure, Noise Temperature, Signal to noise ratio.

Unit 3: Amplitude Modulation & Demodulation [12 Hrs.]

Mathematical treatment and expression for AM, Frequency spectrum, Modulation Index, Representation of AM wave, Power relation as applied to Sinusoidal Signals, AM generation Techniques, SSB generation techniques, DSB, ISB and VSB.

AM Demodulation, AM radio receiver types, TRF, Superheterodyne, AM receiver Characteristics, Intermediate frequencies and its choice, AGC.

SECTION II

Unit 4 : Frequency Modulation & Demodulation [9 Hrs.]

Mathematical analysis of FM and PM, Frequency spectrum analysis of FM, Modulation Index, Bandwidth requirements, Narrow Band and wide band FM, Comparison of AM,FM and PM, Direct and indirect methods of FM generation, Need for Pre-emphasis, De-emphasis.

FM detection Techniques - Slope Detector, Dual Slope Detector, Foster Seeley Discriminator, Ratio Detector, Comparison between AM & FM.

Unit 5 : The Telephone System [9 Hrs.]

Introduction, Public switched Telephone Network, The Local Loop, Signals & Noise in the telephone system, Traffic Load and Service Grade, Switching Matrices, Multiple Stage Switching, Two-and Four-Wire connections, Time-Division Multiplexing, TSI (Time Slot Interchanging)

Unit 6 : Antenna And Radio Wave Propagation [6 Hrs.]

Introduction - Characteristics of antennas, Half wave dipole antenna, folded antenna, Yagi Antenna, Horn antenna, Lens antenna.

Wave propagation – Introduction, Ground wave, Sky waves, Space waves.

Text Book:

1. Electronic Communication, Kennedy, Davis TATA McGraw Hill. 4th Edition.
2. Electronic Communication Systems, Blake, CENGAGE Learning, 2nd Edition
3. Principles of communication System, Taub Schilling, TMH, 2nd Edition
4. Analog and Digital Communication, T.L. Singal,TATA McGraw Hill
5. Electronic Communications Modulation and Transmission, Rebert J. Schoenbak, Eastern - 2nd Edition,PHI

Reference Book:

1. Electronic Communication System, Dennis Roddy, John Coolen, Pearson Education 4th Edition
2. Advanced Digital Comunication System, NIIT, PHI Pulication.
3. Communication Electronics, Principles and application, Frenzel,TATA McGRAW-HILL,3rd edition.
4. Telecommunication Switching Systems and Networks, Thiagarajan Viswanathan, PHI Learning

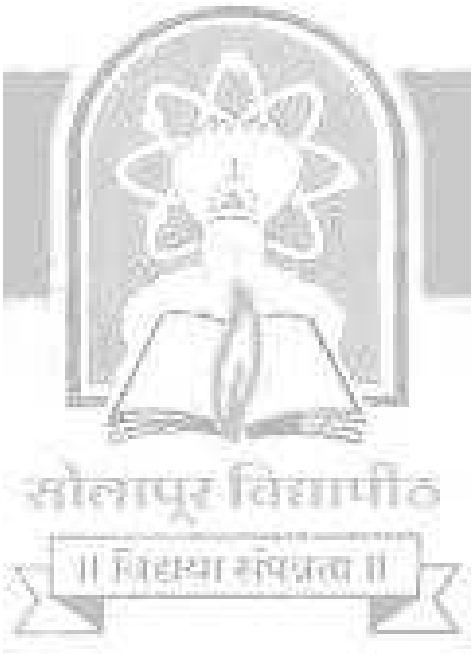
Term work:

List of Practicals (Minimum Twelve Practicals)

1. AM Generation Techniques
2. AM Detection Techniques
3. Measurement of Noise Figure
4. FM Generation Techniques
5. FM Detection Techniques
6. SSB Transmission & Reception
7. DSB Transmission & Reception)
8. Antenna Characteristics
9. DTMF Encoder Decoder
10. Spectrum Analysis of AM & FM signals
11. TDM/FDM

12.Pre-Emphasis-De-Emphasis
13. Super heterodyne Receiver
14.FM radio receiver
15. Simulation of Analog modulation techniques using MATLAB
16. Simulation of Frequency modulation techniques using MATLAB

Note: The visit to communication industries is compulsory & the Visit report should be submitted in Term Work.



Solapur University, Solapur

S.E. (Electronics & Telecommunication Engineering)

Semister II

3. CONTROL SYSTEMS

Teaching Scheme:	**Examination Scheme:**
Theory: 3 Hrs/Week	**Theory:** 100 Marks
Practical: 2 Hr/Week	**Term Work:** 25 Marks

Course Objectives

1) To understand concepts of various control systems.
2) To represent control system using block diagram and signal flow graph and obtain transfer function of system.
3) To understand stability of control systems.
4) To understand Time domain analysis of control systems.
5) To obtain Frequency domain analysis of control systems.

Course Outcomes

1) Students will be able to analyze various control systems.
2) Students will be able to obtain transfer function of systems using signal flow graph and block diagram reduction.
3) Students will be able to obtain stability of systems.
4) Students will be able to make time domain analysis of control systems.
5) Students will be able to make frequency domain analysis of control systems.

SECTION I

Unit 1 : **Introduction:** **[4 Hrs.]**

Types of control systems, examples of control systems: Liquid level control system, position control system, missile launching and guidance system and automatic aircraft landing system. Transfer function of closed loop system.

Unit 2 : Mathematical modeling of systems : **[5 Hrs.]**

Mathematical modeling of basic mechanical elements: translational and rotational. Mathematical modeling of Electrical systems using R, L and C. Analogous system: force – voltage and Force – current analogy. Transfer function of RLC circuits.

Unit 3 : System representation and components: **[8 Hrs.]**

Block diagram representation and reduction techniques, Signal Flow Graph- Construction, Mason's Gain formula.

Working principle, construction, types and applications of following control system components Stepper motor and Tacho-generator

Unit 4 : Stability analysis: **[3 Hrs.]**

Concept of stability, absolute and conditional stability, relative stability, Routh – Hurwitz criterion for stability.

SECTION II

Unit 5 : Time response of systems: **[6 Hrs.]**

Standard test signals, time response of first order systems to step, ramp and impulse input. Step response of second order system, time domain specifications, steady state errors and error constants of type0, type1 and type2 systems.

Unit 6: Root locus: **[5 Hrs.]**

Concept of root locus, construction of root locus and stability analysis using root locus.

Unit 7 : Frequency domain analysis: **[6 Hrs.]**

Frequency response specifications, co-relation between time domain and frequency domain response, Bode plot: asymptotic bode plot, stability analysis using bode plot.

Unit 8 : Compensators: **[3 Hrs.]**

Need of compensator, types (Lead, Lag & Lead Lag) and their selection

Text Books:

1. Control Systems Engineering I. J. Nagrath & M Gopal New Age International Publication (Fifth Edition)
2. Feedback & Control Systems. Schaum's Outline Series McGraw Hill
3. Automatic Control Systems B. C. Kuo PHI Publication
4. Control Systems Engineering, R.Anandanatrajan,P.Ramesh Babu - Scitech Publication.

Reference Books :

1. Control Systems ,Manjita Srivastava, M.C. Srivastava, Smriti Bhatnagar,TMGH
2. Modern Control Engineering K.Ogata Pearson Education
3. Principles of Control Systems S.C. Goyal & U. A. Bakshi Technical Publication,Pune.

Term work:

List of Practicals (Minimum Ten Practicals)

1) To verify potentiometer as transducer and as error detector.

2) To verify Synchro as transducer.

3) To verify Synchro as error detector.

4) To verify operation of AC position control system.

5) To verify operation of DC position control system.

6) To obtain Effect of type of feedback on control system.

7) To obtain Time response of first order system.

8) To obtain Step response of second order system using R, L and C.

9) To obtain Frequency response of second order system using R, L and C.

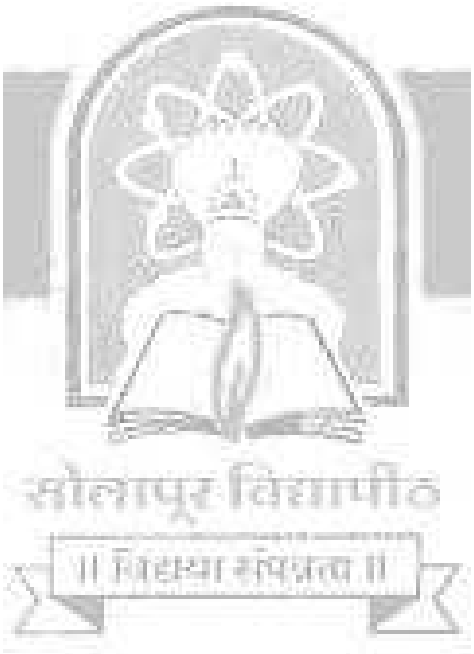
10) To verify liquid level control system.

11) To obtain frequency response of Lead Lag compensator.

12) To obtain Root locus using MATLAB.

13) To obtain Bode plot using MATLAB.

14) To obtain time response of second order system using MATLAB



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Semester-II

4. LINEAR INTEGRATED CIRCUITS

Teaching Scheme:	**Examination Scheme:**
Theory: 4 Hrs./Week	**Theory:** 100 Marks
Practical: 2 Hrs./Week	**Term Work:** 25 Marks
	Practical/Oral Exam: 50 Marks

Course Objective

1. To make students to know the basic characteristic, construction, mathematical models, open loop & close loop operations of Op-Amp.
2. To enable students to analyze AC, DC circuits and find frequency response of Op-Amp.
3. To design & analyze different linear, non-linear & mathematical application circuits using Op-Amp.

Course Outcomes

1. Students will be able to design linear and non-linear Op-Amp circuits for various practical applications.
2. Students would be able to attempt questions on Op-Amp at GATE level exams.

SECTION I

Unit 1: Operational Amplifier Fundamentals [**10 Hrs.]**

Differential amplifiers, AC & DC analysis of Dual Input Balanced Output configuration, Comparative study of other configurations, CMRR, current mirror. Op-Amp Fundamentals - block diagram, Electrical parameters & their measurement, Equivalent circuit of Op-Amp, study of IC741 etc.
Offset variation w.r.t time, thermal drifts, power supply and universal balancing techniques.

Unit 2: Frequency Response of OP-AMP [**4 Hrs.]**

Frequency Response of Op-Amp, high frequency equivalent circuit, compensation techniques, Slew rate consideration & its importance.

Unit 3: OP-AMP with negative feedback **[4 Hrs.]**

Block diagram representation of feedback configurations, Voltage-Series feedback amplifier, Voltage-Shunt feedback amplifier, Virtual ground concept, Differential amplifier.

Unit 4: General linear applications of OP-AMP [**6 Hrs.]**

AC amplifiers, Summing, scaling and averaging amplifier (in both mode), Instrumentation Amplifier, V to I and I to V convertors (4 to 20 mA interfacing).
Op-Amp as differentiator and Integrator including study of frequency response.

SECTION II

Unit 5: OP-AMP as Comparators [**5 Hrs.]**

Basic comparator, Zero Crossing Detector, Schmitt Trigger, window detector, clippers, clampers, peak detectors, Sample and Hold circuit.

Unit 6: Waveform Generators [**7 Hrs.]**

Oscillators- principles etc, Phase shift, Wien Bridge, Quadrature oscillators. Square, Triangular, saw tooth wave generators using Op-Amp. Function generator IC 8038.

Unit 7: Non Linear and special Applications [**8 Hrs.]**

Log–antilog amplifiers, Precision rectifiers, Multipliers and dividers. VCO, PLL – IC 565 and its applications.

Unit 8: Active Filters **(4 Hrs.)**

Basic filter definitions, Advantages of active filters, First and second order low pass and high pass Butterworth filters.

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Text Books:

1. Op-Amps & Linear Integrated circuits – by Ramakant A. Gayakwad PHI -4th Edition
2. Operational Amplifiers - by Clayton - Pearson Education- 4th Edition

Reference Books:

1. Op-Amps & linear Integrated circuits – by D.Roy Choudhury & Shail B. Jain- NEWAGE Publishers - 3rd Edition
2. Design of op-amp and linear circuits – by Franco - TMH - 3rd Edition
3. Op-Amps & linear Integrated circuits – by Driscoll- PHI- 6th Edition

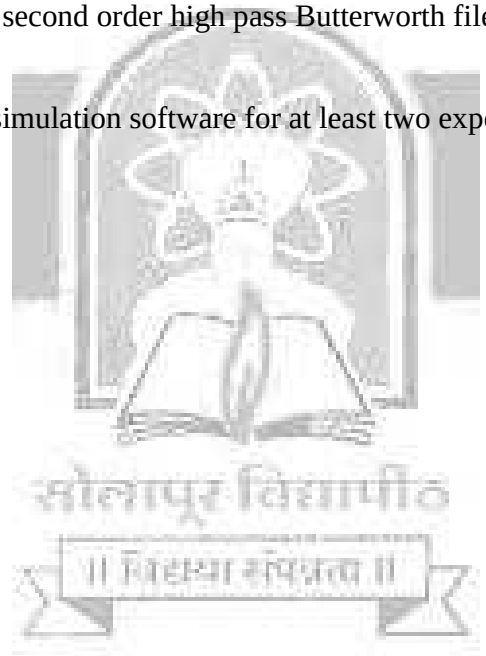
Term work:

List of Practicals (Minimum twelve Practicals)

1. Measurement of parameters – Vio, Iio, I_B etc
2. Op-Amp as Inverting and Non-inverting amplifier, Voltage follower.
3. Frequency response of Inverting and Non-inverting amplifiers.
4. Implementation of Op-Amp as adder & subtractor.
5. Op-Amp as Integrator and Differentiator.

6. Op-Amp as Schmitt trigger.
7. Op-Amp as window detector.
8. Op-Amp as peak detector.
9. Op-Amp as waveform generators (Square, triangular, Saw tooth)
10. RC oscillator.
11. Op-Amp as Precision rectifier.
12. Phase Lock Loop 565.
13. Op-Amp as Clippers & Clampers.
14. V to I convertor with grounded load.
15. Implementation of first & second order low pass Butterworth filer.
16. Implementation of first & second order high pass Butterworth filer.

Note: Simulate results using simulation software for at least two experiments.



Solapur University, Solapur

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Semester-II

5. SIGNALS & SYSTEMS

Teaching Scheme:	**Examination Scheme:**
Theory: 3 Hrs/Week	**Theory:** 100 Marks
Tutorial: 1 Hr/Week	**Term-Work:** 25 Marks

Course Objectives

1) To analyze the types of basic signals and it's transformations, systems & it's properties
2) To introduce the sampling theorem, LTI systems and their properties.
3) To represent and realize LTI System by differential and difference Equations.
4) To understand the concept and applications of Fourier Transform and Z transform.

Course Outcomes

1) Students are able to represent different signals and systems mathematically and are able to perform simulation using MATLAB.
2) Students are able to model LTI system.
3) Students can determine system stability using z transform.
4) Students are able to solve questions on signals and systems for various competitive examinations.

SECTION I

Unit 1 : **Signals and Systems** **[8 Hrs.]**

Introduction to signal and systems, Types of Signals, Elementary Continuous time & discrete time Signals, Transformations of independent Variable, , Classification of Signals, Properties of System, Interconnections of systems.

Unit 2 : Linear Time-Invariant Systems **[4 Hrs.]**

Introduction, Properties of Linear Time-Invariant Systems, Block diagram representation of LTI Systems described by Difference & Differential Equations,

Unit 3 : Convolution **[8 Hrs.]**

The Representation of Signals in Terms of Impulses, Convolution Integral, Convolution Sum.

SECTION II

Unit 4 : Sampling **[4 Hrs.]**

Introduction, Representation of a Continuous- Time Signal by Its Samples, The Sampling Theorem, Reconstruction of a signal from its Samples using different methods (Interpolation, Zero order hold, low pass filter), The Effect of Undersampling (Aliasing).

Unit 5 : Fourier Analysis for Continuous-Time Signals and Systems [**8 Hrs.]**

Introduction, The Response of LTI Systems to Complex Exponentials, Fourier series Representation of Continuous-Time & Discrete Time Periodic signals, Convergence of Fourier Series, Properties of Continuous-Time & Discrete Time Fourier Series, Representation of Aperiodic Signals : The Continuous -Time Fourier Transform, Fourier Transform for Periodic Signals, Properties of Fourier Transform, Application of Fourier Transform in LTI systems.

Unit 6 : The Z-Transform **[8 Hrs.]**

Introduction, The Z-Transform, The Region of Convergence for the Z-Transform, Properties of Z-Transform, The Inverse z-Transform(Power Series method and Partial Fraction Expansion Method), Application & Characteristics of LTI System Using Z Transform, Stability, Frequency Response.

Text Books:

1. Signals and Systems A.V. Oppenheim and A. S. Wilsky, 2nd edition [Pearson Education]
2. Signals and Systems Simon Haykin & Barry Van Veen, 2nd edition [Wiley & Sons]
3. Signals and Systems, I. RaviKumar, PHI

Reference Books :

1. Signals and Systems M. J. Roberts [TMH]
2. Signals and Systemsby V. Krishnaveni & A. Rajeswari [Wiley India]
3. Signals and Systems by P. Ramesh Babu & R. Anandnatarajan [Scitech]

Term work:

The term work shall include minimum eight Assignments covering all units.

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Semester-II

6. ELECTRONIC SOFTWARE LAB-I

Teaching Scheme:

Tutorial : 1 Hr./Week

Practical: 2Hrs./Week

Examination Scheme:

Term-Work: 50 Marks

Course Objectives

1) To develop fundamentals of Simulation Software for simulation of different linear, non-linear Electronics application.
2) To understand the concept of MATLAB software and it's signal processing toolbox .
3) To implement PCB design using PCB design Software.

Course Outcomes

1) Student will able to handle electronic circuit design software.
2) Student will able to use the signal processing toolbox for Signal processing applications.
3) Student will able to make their project using PCB design Software.

Unit 1: Simulation of Electronic circuits studied in Electronics circuit Analyses and Design –II by using simulation software such as Orcad Capture 9.2, Proteus, etc.

Unit 2: Introduction to MATLAB, Signal processing Toolbox.

Unit 3: Design of single sided PCB using PCB design Software such as ORCAD.

Text Books:

1. Getting starting with Matlab — Rudra Pratap.
2. Mastering Matlab -7 — Hanselman- — Pearson Education
3. Modelling and simulation using MATLAB Simulink — Dr.Jain Shailendra — Wiley India

Websites:

1) http://www.cadence.com
2) http://www.mathworks.com/
3) http://www.linear.com/designtools/software/
4) http://www.kicad-pcb.org
5) http://www.cadsoftusa.com

Term work:

List of Practicals (Minimum six Practicals)

Note:

- # Practical and Oral Examination for Electronic Circuit Analysis & Design – II and Electronic Software Lab-I is combined.
- The list of Practicals for Electronic Software Lab-I is mentioned in Electronics Electronic Circuit Analysis & Design – II syllabus

Prof. V.S.Shirval Member,BOS,E&TC	Prof.S.M.Mukane Member,BOS,E&TC	Prof.Dr.S.K.Dixit Chairman,BOS,E&TC