Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Syllabus

Name of the Program: B. Tech. in ECE	**Year**: II Year	**Semester**: III
Course Name: Linear Algebra and Numerical Analysis	**Course Code:** MAUL304	**Credit**: 4
Max Marks: 100	**CIE**: 40	**SEE**: 60
End Term Exam Time: 3 Hrs.	**Teaching Scheme**: 3L + 1T + 0P	

Module No.	Contents	Hours
1	INTRODUCTION: Objective, scope, outcome of the course and Prerequisite	1
2	Linear Algebra: Vector Spaces, subspaces, Linear independence, basis and dimension, Inner product spaces, Orthogonality, Gram Schmidt orthogonalization, characteristic polynomial, minimal polynomial, positive definite matrices and canonical forms, QR decomposition.	10
3	Numerical Methods – 1: Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Gauss's forward and backward interpolation formulae. Stirling's Formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.	10
4	Numerical Methods – 2: Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.	7
5	Numerical Methods – 3: Numerical solution of ordinary differential equations: Taylor's series, Euler and modified Euler's methods. Runge- Kutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods.	9
6	Numerical Methods – 4: Solution of polynomial and transcendental equations- Bisection method, Newton-Raphson method and Regula-Falsi method.	8
Total		45

Text Books:

1. Jain M.K. and Iyenger SRK, Numerical methods for scientific and Engineering computation, New Age Publ, 2014, 6th Ed.
2. Grewal B.S., Higher Engineering Mathematics, KhannaPubl.,2023, 44th Edition.

Reference Books:

1. Balagurusamy E, Numerical methods, McGraw Hill Publ.,2015.
2. Ramana B.V., Higher Engineering Mathematics, McGraw Hill Education, 2024.
3. Dukkipati R.V., Applied Numerical methods using MATLAB, New Age Publ., 2015
4. Kreyszig I E., Advanced Engineering Mathematics, Wiley publication, 2011.
5. Ganesh A., Linear Algebra and its Applications, CBS, 2014.

Prerequisite:

1. Fundamentals of Differentiation and Integration

2. Basic concepts of Abstract Algebra

Prerequisite:

1. Fundamentals of Differentiation and Integration

2. Basic concepts of Abstract Algebra

Course Outcomes:

	Course Outcomes	**Bloom's Level**
MAUL304.1	Understand the concepts of Vector Spaces, subspaces, inner product spaces, QR decomposition.	L2
MAUL304.2	Apply Interpolation Methods for Equal and unequal intervals to get Interpolation polynomials	L3
MAUL304.3	Use Numerical differentiation and Integration techniques.	L3
MAUL304.4	Solve Ordinary differential equations using numerical methods.	L2
MAUL304.5	Compute numerical solutions of algebraic and transcendental equations	L3

Prepared by: - **Verified by: -**

Name & Signature **Name & Signature**

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Name of the Programme: B. Tech. in ECE	**Year**: II	**Semester**: III
Course Name: Technical Communication	**Course Code**: HSUL302	**Credit**: 1
Max Marks: 100	**CIE: 40**	**SEE: 60**
End Term Exam Time: 3 hrs.	**Teaching Scheme: 1**L+0T+0P	

Module No.	Contents	Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Basics of Technical Communication** Meaning, aspects and style of technical communication Reading Strategies: Skimming, Scanning, SQ3R, ERRQ	2
3	**Advanced Grammar** Articles Prepositions Conditionals Common Errors	6
4	**Technical Writing** Business Letters E-mail Writing Minutes of Meeting Resume Writing	4
5	**Advanced Technical Writing** Technical Reports Technical Proposals	2
	Total	**15**

Text Books:

1. Technical Communication: Principles and Practice by Meenakshi Raman and Sangeeta Sharma.Third Edition. New Delhi: OUP., 2017

Reference Books:

1. Effective Technical Communication by M. Ashraf Rizvi, Tata McGraw-Hill Publishing Company Ltd, 2018.

2. Effective Technical Communication edited by G. Venkatraman, Pearson, 2024

3. Technical Communication: Process and Product by Sharon Gerson and Steven Gerson, Pearson, 2014

Prerequisite:

1. Basics of Technical Communication

a) Introduction to technical communication
b) knowledge of technical documents
c) use of tools for reading and writing

2. Advanced Grammar

Basic Strategies of Grammar

3. Technical Writing

Differentiating between technical and creative writing

4. Advanced Technical Writing

a) Knowing the basics of advance writing strategies.
b) Knowing the part of language in advance writing

Syllabus

Name of the Program: B. Tech. in ECE	**Year**: II	**Semester**: III
Course Name: Electronics Devices and Circuits	**Course Code**: ECUL301	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs.	**Teaching Scheme:** 3L+0T+0P	

Module No.	Contents	Hours
1	**Introduction:** Objective, scope, outcome of the course and Prerequisite	1
2	**Introduction to Semiconductor Physics:** Introduction, Energy band gap structures of semiconductors, Classifications of semiconductors, Degenerate and non-degenerate semiconductors, Direct and indirect band gap semiconductors, Electronic properties of Silicon and Germanium, Drift current, Diffusion current, Mobility, resistivity, Variation of semiconductor conductivity with temperature and doping, Generation and recombination of carriers, Continuity equation.	8
3	**Diode:** P-N Junction diode, Barrier Formation in P-N Junction Diode, Contact potential, diode equation, V-I characteristics, temperature dependence of V-I characteristic, static and dynamic resistances, diode equivalent circuits, load line analysis, breakdown mechanisms in semiconductor diodes, Zener diode, Voltage regulation using zener diode, Schottky diode, Tunnel Diode, Varactor Diode, photodiode, LED Diode Applications: rectifiers, clipper and clamper circuits	12
4	**Bipolar Junction transistor:** Introduction to Bipolar Junction transistor, Transistor current components, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. Ebers Moll model, Current gain parameter, Operating point, D.C and A.C Load lines, Need for biasing, B.J.T biasing techniques for stabilization, Stability factors, Bias Compensation techniques.	12
5	**Low frequency small signal Models of BJT:** re model, h-parameter model, Analysis of single stage transistor amplifier: voltage gain, current gain, Input impedance and Output impedance.	5
6	**Field Effect Transistor:** Introduction to FET, JFET, V-I characteristics of JFET, Comparison of BJT and FET. MOS capacitor, Enhancement and Depletion type MOSFETs, V-I characteristics of MOSFET FET as Voltage variable resistor, Small signal model of FET, FET biasing.	8
	Total	**46**

Text Books:

1. Electronic Devices and Circuits by Milliman & Halkias, McGraw Hill, 4e-2015.
2. Electronic Devices and Circuit Theory by Robert L. Boylestad, Pearson education, 9e-2017.
3. Electronic devices & circuits by S. Salivahnan, TMH, 3e-2012

Reference Books:

1. Microelectronic Circuits by A. S. Sedra, Kenneth C. Smith, Oxford University Press, 7e-2017
2. Electronic Devices by Thomas L. Floyd, Prentice Hall,9e- 2013
3. Electronic Devices and Circuits by J.B. Gupta, Katson, 6e-2022
4. Basic Electronic devices & circuits by Mahesh B. Patil, PHI, 2013

Prerequisite:

1. Basic Physics
2. Circuit Analysis
3. Fundamentals of Electronics

Syllabus

Name of the Program: B. Tech. in **ECE**	**Year**: II Year	**Semester**: III
Course Name: **Digital System Design**	**Course Code**: ECUL302	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs.	**Teaching Scheme:** 3L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**Introduction to digital system** - logic gates, number system, Number representation, Boolean algebra. Simplification of logic expressions using Boolean Algebra. Sum of Product and Product of Sum forms, canonical forms, Karnaugh maps up to 6 variables, Implementation of Boolean expressions using universal gates. Binary Codes & Code Conversion.	10
3	**Combinational logic circuits**- Adders, Subtractors, BCD adder, ripple carry look ahead adders, comparators, parity generator, decoders, encoders, multiplexers, de-multiplexers, Realization of Boolean expressions using combinational logic circuits	9
4	**Sequential circuits** – Latches, Flip flops, Shift registers, Design of Binary counters – Synchronous and Asynchronous up/down counters, mod N counter, Counters for random sequence. Finite state machines: Basic concepts and design; Moore and Mealy machines, State minimization/reduction, state assignment, serial binary adder, sequence Detection. Finite state machine design case studies. Hazard.	10
5	**Logic families** - Transistor as a switch; Logic family and their characteristics – RTL, DTL, I^2L, HTL, TTL, ECL and static CMOS. Memories – ROM and RAM, PLA, PAL and FPGA.	7
6	**Introduction to VHDL** - HDL, different modelling styles in VHDL, Data types and objects, Dataflow, Behavioural and Structural Modelling, Synthesis and Simulation VHDL constructs and codes for combinational and sequential circuits.	8
	Total	**45**

Text Books:

1. Digital Design With an Introduction to the Verilog HDL by M. Morris R. Mano and Michael D. Ciletti, Prentice Hall of India, India, 6th Edition, 2014.
2. D. D. Givone, "Digital Principles and Design", Tata Mc-Graw Hill, New Delhi, 2003.
3. "Digital Circuit Design with VHDL" by Pedroni V.A., Prentice Hall India, 2nd Edition, 2014

Reference Books:

1. "Fundamentals of Digital Logic with Verilog Design" by S.Brown and Z.Vranesic, , Tata McGraw Hill, edition 2, 2003
2. Fundamentals of Logic Design by Charles H. Roth, Jr. Cengage Learning, 7th Edition, 2014

3. "Digital Principles and Applications", by D.P. Leach, A. P. Malvino, Goutam Guha, Tata McGraw Hill, edition-3, 2011.

Prerequisite:

1.Basics Logic Gates
2.Basics of Number system
3.Basics of Boolean Algebra

Syllabus

Name of the Program: B. Tech. in **ECE**	**Year**: II	**Semester**: III
Course Name: **Circuit Theory**	**Course Code**: ECUL303	**Credit**: 4
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs.	**Teaching Scheme:** 3L+1T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**Basic Circuit laws and Network Theorems:** Node and Mesh Analysis, source transformation and duality network theorems: Thevenin's, Norton's, Reciprocity, Superposition, Compensation, Miller's, Tellegen's and maximum power transfer theorems. Inductively coupled circuits – mutual inductance, coefficient of coupling and mutual inductance. Transformer equivalent, inductively and conductively coupled circuits	12
3	**Transient and steady state analysis:** Sinusoidal and steady state analysis of RC, RL, and RLC networks with and without initial conditions. Transient response analysis of first order and second order circuits with Impulse, Step, Ramp and sinusoidal excitation. Complex periodic waves and their Fourier analysis. Power in a circuit. Resonance: series and parallel resonance, selectivity. steady state response of a network to non-sinusoidal periodic inputs, Transfer function of a circuit, step response of RL, RC, RLC using transfer function	12
4	**Two Port General Networks:** Two port parameters impedance, admittance, hybrid, ABCD and their inter relations. Transformer equivalent, interconnection of two port networks. The ladder network, image impedance, image transfer function, application to L-C network, attenuation and phase shift in symmetrical T and pi networks	12
5	**Graph theory in circuits:** Concept of network graphs, properties of a tree in graph, formation of incidence matrix, tie set matrix, cut set matrix, KVL-KCL in topological forms, relationship between branch voltage matrix, relationship between branch voltage matrix, network equilibrium equations	8
	Total	**45**

Text Books:

1. Circuit theory by A Chakrabarti, 2021
2. M. E. Van Valkenburg, T. S. Rathore, Network Analysis, Pearson - 2019.

Reference Books:

1. Sukhija M S, Circuit and Networks : Analysis Design and Synthesis - 2016.

2. William H. Hayt, Jr., Jack E. Kemmerly, Steven M. Durbin, Engineering Circuit Analysis, McGraw-Hill-2024.

Prerequisite:

1. Basic laws of the circuit.
2. mathematics
3. complex variable analysis

Syllabus

Name of the Program: B. Tech. in ECE	**Year**: II	**Semester**: III
Course Name: **Data Structure and Algorithm**	**Course Code**: ECUL304	**Credit**: 2
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 2L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**DEFINITION & CHARACTERISTICS OF ALGORITHMS –** Structures, Difficulties in estimating exact execution time of algorithms, Concept of complexity of program, Asymptotic notations: Big-Oh, theta, Omega Definitions and examples, Determination of time and space complexity of simple algorithms without recursion	4
3	**ARRAYS:** Array as storage element, Row major & column major form of arrays, computation of address of elements of n dimensional array. Arrays as storage elements for representing polynomial of one or more degrees for addition & multiplication, Sparse matrices for transposing & multiplication, stack, queue, Dequeue, Circular queue for insertion and deletion with condition for over and underflow. EVALUATION OF EXPRESSION - Concept of precedence and associativity in expressions, Difficulties in dealing with infix expressions, Resolving precedence of operators and association of operands, Postfix & prefix expressions, conversion of expression from one form to other form using stack (with & without parenthesis), Evaluation of expression in infix, postfix & prefix forms using stack. Recursion	8
4	**LINEAR LINKED LISTS** - Singly, doubly and circularly connected linear linked lists-insertion, Deletion at/ from beginning and any point in ordered or unordered lists, Comparison of arrays and linked lists as data structures,Linked implementation of stack, queue and de-queue, Algorithms for of insertion, deletion and traversal of stack, Queue, Dequeue implemented using linked structures. Polynomial representation using linked lists for addition, Concepts of Head Node in linked lists.	6
5	**NON-LINEAR STRUCTURES** - Trees definition, Characteristics concept of child, Sibling, Parent child relationship etc, Binary tree: different types of binary trees based on distribution of nodes, Binary tree (threaded and unthreaded) as data structure, insertion, Deletion and traversal of binary trees, constructing binary tree from traversal results. Threaded binary Tree. Time complexity of insertion, deletion and traversal in threaded and ordinary binary trees. AVL tree: Concept of balanced trees, balance factor in AVL trees, insertion into and deletion from AVL tree, balancing AVL tree after insertion and deletion.	6
6	**GRAPHS** - Definition, Relation between tree & graph, directed and undirected graph, representation of graphs using adjacency matrix and list. Depth first and breadth first traversal of graphs, Finding connected components and spanning tree. Single source single destination shortest path algorithms **SORTING** - Insertion, quick, Heap, Topological and bubble sorting algorithms. **SEARCHING** - Sequential and binary search	5
	Total	**30**

Text Books:

1. Malik – Data structures using C++, Cengage Learning, 2010
2. Data Structures with C (Schaum's Outline Series) Lipschutz Seymour, McGraw Hill Education India, 2017

Reference Books:

1. Data Structures in C/C++, Tanenbaum, Pearson, 2014
2. An introduction to data structures with applications By Jean-Paul Tremblay, P. G. Sorenson, TMH, 1984

Prerequisite:

1. Basic of Computer Programming

Syllabus

Name of the Program: B. Tech. in ECE	**Year**: II	**Semester**: III
Course Name: **Electronics Devices Lab**	**Course Code**: ECUP320	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs.	**Teaching Scheme:**0L+0T+3P	

Module No.	Contents
1	Study the following devices: (a) Analog & digital multimeters (b) Function/ Signal generators (c) Regulated d. c. power supplies (constant voltage and constant current operations) (d) Study of analog and digital CRO, measurement of time period, amplitude, frequency & phase angle using Lissajous figures.
2	Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse Saturation current and static & dynamic resistances.
3	Plot the output waveform of half wave rectifier and effect of filters on waveform. Also calculate its ripple factor.
4	Plot the output waveform of the full-wave rectifier and calculate its ripple factor.
5	Plot and verify output waveforms of different clipper and clamper circuits.
6	Plot V-I characteristic of Zener diode
7	Implementation of Zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator
8	Plot input-output characteristics of BJT in CB, CC and CE configurations.
9	Implementation of different biasing circuits of BJT amplifiers and calculate its Q point.
10	Plot frequency response of two stage RC coupled amplifier & calculate its bandwidth .
11	Plot input-output characteristics of field effect transistor and measure Idss and Vp.
12	Plot frequency response curve for FET amplifier and calculate its gain bandwidth product.

Text Books:

1. Integrated Electronics: Analog and Digital Circuits and systems by Jacob Millman and D. Halkias, McGraw Hill, 4e 2007.
2. Electronic Devices and Circuit Theory by Boylestad L, Prentice Hall Publications, 8e 2005
3. Electronic Devices and Circuits by S.Salivahanan,N.Suresh kumar, McGraw Hill, 4e 2017.
4. Electronic Devices and Circuits by Balbir Kumar, Shail b. Jain, PHI , 1e 2015

Reference Books:

1. Electronic Devices and Circuits by K. Lal Kishore, B.S Publications 4e 2014.
2. Electronic Devices and Circuits by G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. Electronic Devices and Circuits by A.P Godse, U. A Bakshi, Technical Publications 3e 2007.
4. Electronic Devices and Circuits by K.S. Srinivasan Anurdha Publications, 2010

Prerequisite:

1. Basic Electronics Knowledge:
2. Basic Circuit Construction Skills
3. Instrumentation Skills
4. Soldering Skills

Syllabus

Name of the Program: B. Tech. in **ECE**	**Year**: II	**Semester**: III
Course Name: **Digital System Design Lab**	**Course Code**: ECUP321	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs.	**Teaching Scheme:**0L+0T+3P	

Module No.	Contents
1	To verify the truth tables of logic gates: AND, OR, NOR, NAND, NOR, EX-OR and EX-NOR
2	Realization of adders & subtractors circuits using NAND/NOR gates.
3	Realization of code converters using logic gates. (a) BCD to excess-3 (b) Binary to gray code
4	Realization of 4-to-1 multiplexer and 1-to-4 demultiplexer using basic gates.
5	Realization of a combinational circuit that will accept a 8421 BCD code and drive a seven-segment display.
6	Realization of R-S, J-K and D-flip flops
7	Realization of asynchronous up/down and decade counter.
8	Realization of shift registers using Flip-flops.
9	Design a circuit that will do the assigned work as mentioned below: A lawn-sprinkling system is controlled automatically by certain combinations of the following variables. Season (S=1, if summer; 0, otherwise); Moisture content of soil (M=1, if high; 0, if low) Outside temperature (T=1, if high; 0, if low); Outside humidity (H=1, if high; 0, if low) The sprinkler is turned on under any of the following circumstances. 1. The moisture content is low in winter. 2. The temperature is high and the moisture content is low in summer. 3. The temperature is high and the humidity is high in summer. 4. The temperature is low and the moisture content is low in summer. 5. The temperature is high and the humidity is low.
10	Write a VHDL Code to realize 2 input NAND, NOR, XOR and XNOR logic gate.
11	Write a VHDL Code to realize Half-adder, Full-adder & Parallel adder
12	Write a VHDL Code to realize (a) Multiplexer (b) Decoder
13	Write a VHDL Code to realize SR, D, JK and T flip-flops.

Text Books:

1. Digital Design with an Introduction to the Verilog HDL by Mano M. Morris and Michael D. Ciletti, Prentice Hall of India, 5e 2017
2. D. D. Givone, "Digital Principles and Design", Tata Mc-Graw Hill, New Delhi, 2003.
3. Circuit Design and Simulation with VHDL by Pedroni V.A., Prentice Hall India, 2e 2014.

Reference Books:

1. Fundamentals of Digital Logic with Verilog Design by S. Brown and Z. Vranesic, Tata McGraw Hill, 2e 2003
2. Fundamentals of Logic Design by Charles H. Roth, Cengage Learning, 5e 2009.
3. Digital Principles and Applications by D.P. Leach, A. P. Malvino, Goutam Guha, McGraw Hill, 7e 2011.

Prerequisite:

1.Basics Logic Gates
2.Basics of Number system
3.Basics of Boolean Algebra

Syllabus

Name of the Program: B. Tech. in ECE	**Year**: II	**Semester**: III
Course Name: **Circuit Simulation & PCB Designing Lab**	**Course Code**: ECUP322	**Credit**: 2
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs.	**Teaching Scheme: 0**L+0T+4P	

Module No.	Contents
1	Study of the process of schematic design, its simulation and PCB design
2	Simulate a resistive electrical network with at least three independent DC sources and verify the superposition principle.
3	Design and simulate a Full wave bridge rectifier and analyze the effect of filters on waveform. Also calculate its ripple factor.
4	To Design and simulate. a. 3x8 decoder and verify the truth table b. 8-to-1 multiplexers and verify the truth table
5	Simulate an RL (or RC) circuit with DC excitation. Analyze transient behavior of circuits with different time constants.
6	Design a voltage divider bias for CE BJT amplifier so that BJT will remain in active mode. Analyze the effect of resistance R1 and R2 on the different modes of BJT.
7	Design and simulate a power supply circuit for 5 V, 1 Amp and 9 V, 1 Amp regulated supply. Also design PCB layout for this supply and fabricate it using PCB CNC machine.
8	Design and simulate a simple electronic circuit using the 555 timer IC that will make an LED blink on and off at a regular interval. The blinking frequency should be adjustable by modifying the timing components (resistor and capacitor). Design a PCB layout for this circuit.
9	Design and simulate a circuit that automatically turns on an LED when the ambient light falls below a certain threshold, such as in low-light conditions at night. The circuit will use a BJT and a photodiode or LDR (Light Dependent Resistor) to sense the surrounding light and switch the LED on or off based on the input light level. Fabricate the PCB using wet etching method.
10	Design and simulate a circuit that automatically controls a fan using a relay, BJT, and 555 timer IC. The fan should be switched on manually and should automatically switch off after a set amount of time. Fabricate the PCB.
11	Design and implement a circuit for controlling the direction and speed of a DC motor using an H-Bridge configuration, PWM (Pulse Width Modulation) signal, and 555 timer IC. The system should allow the motor to: i) Change Direction: The motor should run forward, reverse, or stop, depending on user input. ii) Adjust Speed: The speed of the motor should be adjustable through a PWM signal, allowing the motor to run at various speeds, from slow to full speed. Design PCB layout and fabricate it.

Text Books:

1. Electronic Devices and Circuit Theory by Boylestad L, Prentice Hall Publications, 8e 2005
2. Electronic Devices and Circuits by S.Salivahanan,N.Suresh kumar, McGraw Hill, 4e 2017.
3. Digital Electronics by P Raja, Scitech, 3e 2016
4. Proteus Tutorials: https://www.labcenter.com/tutorials/

Reference Books:

1. Electronic Devices and Circuits by A.P Godse, U. A Bakshi, Technical Publications 3e 2007.
2. Digital Electronics: Circuits and Systems by V K Puri, TMH, 1e 1997

Prerequisite:

1. Basics Logic Gates, digital components and digital circuits
2. Analog components and Analog circuits
3. Network theory

Syllabus

Name of the Program: B. Tech. in **ECE**	**Year**: II	**Semester**: III
Course Name: **Data structure and Algorithm Lab**	**Course Code**: ECUP323	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs.	**Teaching Scheme:**0L+0T+2P	

Module No.	Contents
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite
2	Implement stack, queue and circular queue using a one dimensional array as storage element. The program should implement the basic addition, deletion and traversal operations.
3	Implement the addition of two variable polynomials using an array.
4	Implement addition and transposition operations of sparse matrix using array .
5	Implementation of insertion, selection and bubble sorting algorithms.
6	Implementation of quick and merge sorting algorithms.
7	Implementation of binary search using arrays
8	Implement singly connected linked lists illustrating operations like addition at different locations, deletion from specified locations and traversal
9	Implement doubly linked lists illustrating operations like addition at different locations, deletion from specified locations and traversal
10	Implementation of binary tree with operations like addition, deletion, traversal.
11	Depth first and breadth first traversal of graphs represented using adjacency matrix and list.

Text Books:

1. Data structures using C++ by Malik D S, Cengage Learning, 2e 2009
2. Data Structures with C (Schaum's Outline Series) Lipschutz Seymour, McGraw Hill Education India, 2017

Reference Books:

1. Data Structures in C/C++ by Tanenbaum, Pearson, 2e 2015
2. An introduction to data structures with applications By Jean-Paul Tremblay, P. G. Sorenson, MGH, 1e 1984

Swami Keshvanand Institute of Technology,
Management & Gramothan, Jaipur

IV Sem

(Electronics & Communication Engineering)

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Syllabus

Name of the Program: B.Tech. in **ECE**	**Year**: II Year	**Semester**: IV
Course Name: Probability and Stochastic Process	**Course Code**: MAUL404	**Credit**: 2
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 2L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	Sets and set operations; Probability space; Conditional probability and Bayes theorem; Combinatorial probability and sampling models	5
3	Discrete random variables, probability mass function, probability distribution function, example random variables and distributions; Continuous random variables, probability density function, probability distribution function, example distributions	7
4	Joint distributions, functions of one and two random variables, moments of random variables; Conditional distribution, densities and moments; Characteristic functions of a random variable; Markov, Chebyshev and Chernoff bounds	6
5	Random sequences and modes of convergence (everywhere, almost everywhere, probability, distribution and mean square); Limit theorems; Strong and weak laws of large numbers, central limit theorem	6
6	Random process. Stationary processes. Mean and covariance functions. Ergodicity. Transmission of random process through LTI. Power spectral density.	5
	Total	**30**

Text Books:

1. Probability, Random Variables And Stochastic Processes by Papoulis , TMH, 4th edition (2008)
2. Stochastic Processes by Sheldon M. Ross, Wiley, 2nd edition (2013)

Reference Books:

1. Probability and statistics for engineering and the sciences by Devore, Cengage learning, 9th edition (2023)
2. Probability, Random Variables And Random Signal Principles by Peebles Peyton Z, TMH, 4th edition (2012)
3. Probability Theory and Stochastic Processes for Engineers by Bhat, Pearson (2011)

Prerequisite:

1. Engineering Mathematics

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in ECE	**Year**: II	**Semester**: IV
Course Name: **Analog Electronics**	**Course Code**: ECUL401	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 3L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**FEEDBACK AMPLIFIERS:** Voltage amplifier, current amplifier, transconductance amplifier and trans-resistance amplifier, Feedback concept, Feedback Topologies, Transfer gain with feedback, characteristics of negative feedback amplifiers, Analysis of voltage-series, voltage-shunt, current-series and current-shunt feedback amplifier, Stability criterion, Compensation techniques, miller compensation.	9
3	**HIGH FREQUENCY AMPLIFIERS** - Hybrid Pi model, Conductances and capacitances of hybrid Pi model, high frequency analysis of CE amplifier, gain bandwidth product, unity gain frequency f_T, Emitter follower at high frequencies. **POWER AMPLIFIERS** - Various classes of operation (Class A, B, AB, C), Power efficiency and linearity issues. Push-Pull amplifiers with and without transformers.	9
4	**Oscillators:** Review of the basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge), LC oscillators (Hartley, Colpitt, Clapp), Current mirror: Basic topology and its variants, V-I characteristics, output resistance and minimum sustainable voltage (VON), maximum usable load. Non-sinusoidal oscillators: Astable, Monostable and Bistable multivibrators. Schmitt trigger.	9
5	**Differential amplifier:** Basic structure and principle of operation, Single ended and double ended configurations, calculation of differential gain, common mode gain Op-amp: parameters, mode of operation, OP-AMP applications: inverting and non-inverting amplifiers, summing amplifier, integrator and differentiator, precision rectifier	9
6	**ACTIVE FILTERS:** Low pass, high pass, band pass and band reject filters, All pass filter, Switched capacitor filter, Butterworth filter design, Chebyshev Filter design The 555 timer as astable and monostable multivibrators. Zero crossing detector, Schmitt trigger and its applications.	8
Total		**45**

Text Books:

1. Integrated Electronics: Analog and Digital circuits & system by Millman & Halkias, TMH, 4th edition (2007)
2. Fundamentals of Analog Circuits by Floyd, Pearson, 2nd edition (2012)

   Library Book:

   Electronic Devices by Floyd, Pearson, 10th edition (2021)
3. OP-AMPs and linear integrated circuits by Ramakant A. Gayakwad, Pearson, 4th edition (2018)

Reference Books:

1. Electronic Devices and Circuits by BELL David A., Oxford, 5th edition (2015).
2. Electronics Devices and Circuits by Salivahanan, MGH, 4th edition (2017)
3. Microelectronic Circuits Analysis and Design by M. H. Rashid, Cengage Learning (2011)
4. Operational amplifier with linear integrated circuits by William D. Stanley, Pearson, 4th edition (2002)

Prerequisite:

1. **B**asic knowledge of diodes, BJT, FET
2. Biasing techniques of BJTs, FETs

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(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in **ECE**	**Year**: II	**Semester**: IV
Course Name: **Signal and Systems**	**Course Code**: ECUL402	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 3L+0T+0P	

Module No.	Contents	Hours
1	INTRODUCTION Objective, scope, outcome of the course and Prerequisite	1
2	**Introduction to signal and system**: Basic definition of signals and types, Continuous and discrete time signals, Energy and power signals, even-odd signals, orthogonal signals, periodic and aperiodic singles. Basic Signals: impulse, step, ramp, exponential, sinusoidal, signum function, Basic operations on the signals: scaling, shifting, inversion System: continuous and discrete type systems, classification of systems.	8
3	**LTI system:** Introduction, System characteristics, System interconnection, impulse response of LTI system, convolution, Linear constant coefficient differential equation Basic building blocks or elements of continuous and discrete time LTI system,	6
4	**Fourier Series and Fourier Transform:** CTFS: Introduction, convergence of Fourier series, properties of CTFS, Trigonometric Fourier series, DTFS: Introduction, properties of DTFS, magnitude and phase response Time and frequency characterization of signals and systems Fourier Transform; CTFT: Introduction, - its properties and sinusoidal steady state analysis of systems, Continuous time LTI system by Linear constant coefficient differential equations DTFT: Introduction, - its properties, discrete time LTI system by Linear constant coefficient differential equations Duality	12
5	**Laplace Transform and z-Transform**: The Laplace Transform, region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations and system behavior, Inverse Laplace transform, application of Laplace transform in analysis the properties of continuous time LTI system, z-Transform, region of convergence, poles and zeros of system, z-Transform analysis, solution to differential equations and system behavior, Inverse z-Transform, application of z-Transform in analysis the properties of discrete time LTI system.	12
6	The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on. Aliasing and its effects. Relation between continuous and discrete time systems.	6
	Total	**45**

Text Books:

1. Signals and Systems by R. Anand, Khanna Publishing House, 1st edition, 2019
2. Signals and system by Farooq Hussain, Umesh Publications, 2012

3. Signals and system by K.M. Soni, S.K. Kataria & Sons, 7th edition (2023)

Reference Books:

1. Signals and Systems by Oppenheim Willsky, Pearson, 2nd edition (2006)
2. Signals and Systems - Continuous and Discrete by R.F. Ziemer, W.H. Tranter and D.R. Fannin,, 4th edition, Pearson Education (2014)
3. Signals and Systems by Simon Haykin, John Wiley and Sons, 2nd edition (2021)

Prerequisite:

1. Engg. Mathematics
2. Calculus
3. Complex variables
4. Ordinary differential equation

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in ECE	**Year**: II	**Semester**: IV
Course Name: **Analog and Digital Communication**	**Course Code**: ECUL403	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 3L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**Continues wave Modulation**: Frequency domain representation of signals. Amplitude Modulation (AM), Envelope Detection, Limitations of AM, DSB-SC Modulation, Coherent Detection, SSB, Angle Modulation, Frequency Modulation, Narrowband FM, Generation of FM, Detection of FM, Phased locked Loop;	10
3	**Noise:** Noice Sources and Classification; Noise temperature, Noise Bandwidth and other parameters, Gaussian and white noise characteristics, Noise in AM receivers, Noise in FM receivers. Threshold effect in angle modulation. Pre-emphasis and De-emphasis.	9
4	**Pulse modulation**: Sampling process. PAM, PWM, PPM modulation and demodulation methods. TDM, pulse code modulation. Delta modulation, Adaptive Delta Modulation, Differential Pulse Code Modulation, Error probability in PCM.	9
5	**Optimal reception of digital signal**: Line coding (RZ, NRZ): Polar, Bipolar, Manchester, AMI. Inter symbol interference, Pulse shaping, Nyquist criterion for distortion less transmission, Raised cosine spectrum. Optimum detection: optimum filter, Matched filter.	7
6	**Digital Modulation Techniques**: Geometric interpretation of signals and Orthogonalization. ASK, BPSK, BFSK, QPSK, MSK modulation techniques and Coherent detection of these techniques. Signal constellation and calculation of error probabilities of ASK, FSK, PSK.	9
	Total	**45**

Text Books:

1. "Principles of Communication Systems" by Herbert Taub, Donald L. Schilling, MGH, 4th edition (2015)
2. "Modern Digital and Analog Communication Systems" by B.P. Lathi, Oxford, 4th edition (2012)
3. "Communication Systems Engineering" by John G. Proakis and Masoud Salehi, Pearson, 2nd edition (2018)

Reference Books:

1. "Digital Communications" by Simon Haykin, Wiley, 2010
2. "Analog Communication" by K.N. Hari Bhat and D. Ganesh Rao, CENGAGE, 2017

Name of the Program: B.Tech. in Electronics and Communication Engg.

- **Prerequisite:**

1. Understanding signals and systems is fundamental to both analog and digital communication.
2. Probability theory and random variables play a crucial role in analyzing noise and interference in communication systems
3. Proficiency in mathematics, including calculus, linear algebra, and differential equations, is essential for understanding the mathematical models and analysis techniques used in communication systems.
4. Familiarity with basic electronic components, circuits, and devices is helpful for understanding the implementation aspects of analog communication systems, such as modulation and demodulation techniques.

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in **ECE**	**Year**: II	**Semester**: IV
Course Name: **Microprocessor and Microcontroller**	**Course Code**: ECUL404	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:**3L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**8085 microprocessor:** Architecture, Pin Description, Timing diagram, Addressing Modes, Instruction set, Assembly Language Programming ,Interrupts, Counters and Time Delay	11
3	**8086 microprocessor:** Architecture, Pin Description, Addressing Modes, Instruction set **Programmable Interface Devices:** Basics of Programmable I/O, Programmable Peripheral Interface (8255),Programmable Interval Timer (8254),Programmable Interrupt Controller (8259A),Programmable DMA Controller (8257)	11
4	**8051 Microcontroller:** Overview of 8051 Microcontroller, Architecture, Memory Organization, Addressing Modes and Instruction set of 8051	8
5	**Timer, Interrupt and communication:** 8051 Timers, External Hardware Interrupts, Serial Communication ,On board Communication Interfaces-I2C Bus, SPI Bus, UART Peripheral Interfacing: Interfaces: LCD, LED, Keyboard	9
6	**ARM Processor:** ARM architecture, I/O pins, Ports, timers, interrupts, memory organization, pipelining and Hazards, ARM processor families, addressing modes, protected mode, real address mode, system management mode, memory models and management,	5
	Total	**45**

Text Books:

1. Microprocessor Architecture, Programming, and Applications with the 8085 by Ramesh Gaonkar, Penram International Publishing, 6th edition (2013).
2. The 8051 Microcontroller and Embedded Systems by Mazidi, Muhammad Ali, Pearson, 2nd edition (2009)
3. ARM System –On –Chip architecture by Steve Furber, Addision Wesley, 2nd edition, 2000.

Reference Books:

1. Microprocessor and Interfacing by Hall Douglas V., TMH, 3rd edition (2012) .
2. The 8051 Microcontroller by K. J. Ayala, CENGAGE, 3rd edition (2008).
3. Fundamentals of Microprocessor and microcomputers by B. Ram, Dhanpat rai Publications, 6th Edition (2006)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Prerequisite:

1. Mathematics
2. Digital Electronics,
3. Fundamental of Programming

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in ECE	**Year**: II Year	**Semester**: IV
Course Name: **Electronics Measurement and Instrumentation**	**Course Code**: ECUL405	**Credit**: 2
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 2L+0T+0P	

Module No.	Contents	Hours
1	**INTRODUCTION:** Objective, scope, outcome of the course and Prerequisite	1
2	**THEORY OF ERRORS** - Accuracy & precision, Repeatability, Limits of errors, Systematic & random errors, Modeling of errors, Probable error & standard deviation, Gaussian error analysis, Combination of errors	5
3	**ELECTRONIC INSTRUMENTS AND BRIDGES** - Electronic Voltmeter, Electronic Multimeters, Digital Voltmeter, and Component Measuring Instruments: Q meter, Vector Impedance meter, RF Power & Voltage Measurements, Introduction to shielding & grounding. Bridge Measurement: DC bridges- Wheatstone bridge, AC bridges – Kelvin, Hay, Maxwell, Schering and Wien bridges, Wagner ground Connection.	6
4	**OSCILLOSCOPES** – CRT Construction, CRO circuits, CRO Probes, Techniques of Measurement of frequency, Phase Angle and Time Delay, Multi-beam, multi-trace, storage & sampling Oscilloscopes	6
5	**TRANSDUCERS**- Classification, Selection Criteria, Characteristics, Construction, Working Principles and Application of following Transducers: RTD, Thermocouples, Thermistors, LVDT, Strain Gauges, Bourdon Tubes, Seismic Accelerometers, Tacho-generators, Load Cell, Piezoelectric Transducers, Ultrasonic Flow Meters.	6
6	**ACTUATORS**-Pneumatic Hydraulic system: Control valves, cylinder, rotary actuators, Mechanical actuating system, Types of Motion, Kinematics chains, Cams, Gear trains, Belts and chain drives, Electrical actuating systems: Solid-state switches, Solenoids, D.C. motors, AC motors, Stepper motors, Piezoelectric actuator, micro-actuators.	6
	Total	**30**

Text Books:

1. Electronic Instrumentation by H.S. Kalsi, Tata McGraw Hill, 3rd Edition, 2011.
2. A course in Electrical and Electronic measurement and instrument by Sawhney, Dhanpat Rai Publications, 18th Edition, 2007

Reference Books:

1. Electronic Instrumentation and Measurement by Bell David, Oxford, 3rd Edition, 2013
2. Electronic Measurements & Instrumentation by Bernard Oliver, MGH (2010)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Prerequisite:

1. Knowledge of basic electronic components.
2. Basic Circuit analysis

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(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Programme: B. Tech. (All Branches)	**Year**: II	**Semester**: IV
Course Name: Managerial Economics and financial Accounting	**Course Code**: HSUL401	**Credit**: 1
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 1L+0T+0P	

Module No.	Contents	Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Basic economic concepts** Meaning, nature and scope of managerial economics, deductive vs inductive methods, Economic problems: scarcity and choice, circular flow of economic activity, national income-concepts and measurement.	4
3	**Demand and Supply analysis** Demand-types of demand, determinants of demand, demand function, demand forecasting –purpose, determinants, elasticity of demand Supply-determinants of supply, supply function, elasticity of supply.	3
4	**Production and Cost analysis** Theory of production- production function, production optimization, least cost combination of inputs, isoquants, law of variable proportions, laws of returns to scale. Cost concepts-explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation.	3
5	**Financial statement analysis** Capital and accounting, profit and loss statement and related concepts, balance sheet and related concepts, financial ratio analysis .	4
	Total	**15**

Text Books:

1. Managerial Economics by DN Dwivedi, Vikas publishing House, 9th edition (2023)
2. Financial Management by MR Agarwal, Garima Publication, 2024

Reference Books:

1. Managerial Economics by Varsheney & Maheswari, S. Chand, 22nd edition (2014)
2. Managerial Economics and Financial Analysis by A. R. Aryasri, TMH, 3rd edition (2008)

Prerequisite:

1. Knowledge of basic mathematics & business economics.

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in ECE	**Year**: II	**Semester**: IV
Course Name: **Analog Electronics Lab**	**Course Code**: ECUP421	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 0L+0T+3P	

S. No.	Name of experiment
1	Implementation of Voltage Series and Current Series Negative Feedback Amplifier.
2	Implementation of Voltage Shunt and Current Shunt Negative Feedback Amplifier.
3	Design Wein bridge oscillator and observe the effect of variation in oscillator frequency
4	Design a transistor-based phase shift oscillator, observe the effect of variation in resistance (R) and capacitance (C) on the oscillator's frequency, and compare the observed results with the theoretical values.
5	Design Hartley and Colpitts oscillators and observe the effect of variation of capacitance on oscillator frequency.
6	Design Inverting And Non-Inverting Operational Amplifier.
7	Design a Summer, Scalar, average amplifier and voltage follower using Operational Amplifier.
8	Design a differentiator and integrator using Op-Amp.
9	Design active filters: LPF, HPF using OPAMP
10	Design active filters: BPF, BSF using OPAMP
11	Design Astable and Monostable multivibrators using IC-555 timer
12	Design Triangular & square wave generator using 555 timer.

Text Books:

1. Integrated Electronics: Analog and Digital circuits & system by Millman & Halkias, TMH, 4th edition (2007)
2. Fundamentals of Analog Circuits by Floyd, Pearson, 2nd edition (2012)
3. Library Book:
4. Electronic Devices by Floyd, Pearson, 10th edition (2021)
5. OP-AMPs and linear integrated circuits by Ramakant A. Gayakwad, Pearson, 4th edition (2018)

Reference Books:

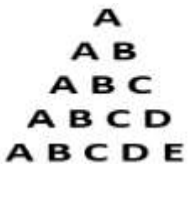
1. Electronic Devices and Circuits by BELL David A., Oxford, 5th edition (2015).
2. Electronics Devices and Circuits by Salivahanan, MGH, 4th edition (2017)
3. Microelectronic Circuits Analysis and Design by M. H. Rashid, Cengage Learning (2011)
4. Operational amplifier with linear integrated circuits by William D. Stanley, Pearson, 4th edition (2002)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in ECE	**Year**: II Year	**Semester**: IV
Course Name: **Python Programming Lab**	**Course Code**: ECUP422	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs	**Teaching Scheme:** 0L+0T+2P	

Module No.	List of Experiments
1	Write a program to demonstrate about fundamental Data types in Python Programming. (i.e., int, float, complex, bool and string types)
2	Write a program to Read name, address, email and phone number of a person through keyboard and print the details.
3	a. Write a program that declares 3 integers, determines and prints the largest and smallest in the group. b. Write a Python program to print all the Disarium numbers between 1 and 100.
4	Write a python script to print the current date in the following format "Tue Apr 23 09:26:47 IST 2024"
5	a. Write a Program to demonstrate list and tuple in python. b. Write a program that uses a for loop to print the numbers 8, 11, 14, 17, 20, . . . , 83, 86, 89.
6	Write a program to print Fibonacci Series.
7	a. Write a program to demonstrate working with dictionaries in python. b. Perform following operations on dictionary 1) Insert 2) delete 3) change 4) update.
8	a. Write a program to print each line of a file in reverse order. b. Write a program to compute the number of characters, words and lines in a file.
9	a. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder) b. Write a Python code to merge two given file contents into a third file.

Name of the Program: B.Tech. in Electronics and Communication Engg.

10	Write Python programs to print the following Patterns:  

Text Books:

1. Core Python Programming, 2016 W. Chun, Pearson.
2. Learning Python, Mark Lutz, Orielly, 3 Edition 2007

Reference Books:

1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications - 1 st Ed. 2021.

Prerequisites for a Python Programming Lab

1. Basic understanding of programming concepts such as variables, data types, control structures (loops and conditionals), and functions.
2. Familiarity with fundamental programming constructs like loops, conditionals, and basic data structures (such as lists, tuples, and dictionaries).
3. Knowledge of object-oriented programming (classes and objects).
4. Basic knowledge of algorithms and problem-solving techniques.
5. Prior exposure to any programming language like C/C++.

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B. Tech. in ECE	**Year**: II	**Semester**: IV
Course Name: **Analog and Digital Communication Lab**	**Course Code**: ECUP423	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs.	**Teaching Scheme:**0L+0T+3P	

Module No.	Contents
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite
2	Observe the Amplitude modulated wave form and DSB SC signal & measure modulation index and demodulation of AM and DSB-SC signal.
3	Modulate a sinusoidal signal with high frequency carrier to obtain FM signal and demodulation of the FM signal.
4	To identify & solve the aliasing problem and verify the Nyquist criteria through the experimental setup.
5	To perform the PAM (natural, flat top, sample & hold sampling), PWM, PPM Modulation & demodulation techniques.
6	To observe the transmission of four signals over a single channel using TDM-PAM method.
7	To perform the PCM modulation & demodulation and study the effect of channel like attenuation, noise in between modulator & demodulator through the experimental setup.
8	To perform the 4 channel PCM multiplexing & de-multiplexing in telephony system.
9	To perform the Delta & Adaptive delta modulation & demodulation and also study the effect of channel like attenuation, noise in between modulator & demodulator through the experimental setup.
10	To perform the experiment of generation and study the various data formatting schemes (Unipolar, Bipolar, Manchester, AMI etc.)
11	To perform the experiment of generation and detection of ASK, FSK, BPSK, signals.

Text Books:

1. “Principles of Communication Systems” by Herbert Taub, Donald L. Schilling, MGH, 4th edition (2015)
2. "Modern Digital and Analog Communication Systems" by B.P. Lathi, Oxford, 4th edition (2012)
3. "Communication Systems Engineering" by John G. Proakis and Masoud Salehi, Pearson, 2nd edition (2018)

Reference Books:

1. "Digital Communications" by Simon Haykin, Wiley, 2010
2. "Analog Communication" by K.N. Hari Bhat and D. Ganesh Rao, CENGAGE, 2017

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in Electronics and Communication Engg.	**Year**: II	**Semester**: IV
Course Name: **Microprocessor and Microcontroller Lab**	**Course Code**: ECUP424	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 2 Hrs.	**Teaching Scheme:**0L+0T+2P	

Module No.	Contents
Following exercises has to be Performed on 8085	
1	Write a program for (a) Multiplication of two 8 bit numbers (b) Division of two 8 bit numbers
2	Write a program for Sorting of array in: (a) Ascending order (b) Descending order
3	Write a program to generate a Software Delay. (a) Using a Register (b) Using a Register Pair
4	Write a Program to Data transfer on output port 8255 and implementation of running light and sequential lights.
5	Write a Program to interface of Stepper Motor and DC Motor Speed control.
6	Write a Program to Interface ADC with 8085.
Following exercises has to be Performed on 8051	
7	Write a program to find Largest and Smallest Numbers among set of numbers.
8	Write a program to interfacing of LCD to 8051
9	Write a program to interface of Stepper motor and DC motor to 8051.
10	Write a program to: (a) Interfacing of 8-bit ADC with 8051 Microcontroller (b) Interfacing of 8- bit DAC with 8051 Microcontroller and Waveform generation using DAC
11	Write a program for Traffic light Control using 8051.
12	Write a program for Elevator Control using 8051.

Name of the Program: B.Tech. in Electronics and Communication Engg.

Text Books:

1. Microprocessor Architecture, Programming, and Applications with the 8085 by Ramesh Gaonkar, Penram International Publishing, 6th edition (2013).
2. The 8051 Microcontroller and Embedded Systems by Mazidi, Muhammad Ali, Pearson, 2nd edition (2009)

Reference Books:

1. Microprocessor and Interfacing by Hall Douglas V., TMH, 3rd edition (2012) .
2. The 8051 Microcontroller by K. J. Ayala, CENGAGE, 3rd edition (2008).
3. Fundamentals of Microprocessor and microcomputers by B. Ram, Dhanpat rai Publications, 6th Edition (2006)

Prerequisite:

1. Digital Electronics
2. C programming

Name of the Program: B.Tech. in Electronics and Communication Engg.

Name of the Program: B.Tech. in Electronics and Communication Engg.	**Year**: II Year	**Semester**: IV
Course Name: **Electronics Measurement and Instrumentation Lab**	**Course Code**: ECUP425	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 2 Hrs	**Teaching Scheme:** 0L+0T+2P	

Module No.	List of Experiments
1	To measure the earth's resistance using fall of potential method.
2	To plot V-I characteristics and measure open circuit voltage and short current circuit of a solar panel.
3	a) To measure unknown inductance capacitance resistance using Anderson bridge. b) To measure unknown inductance using Maxwell Inductance Bridge.
4	To measure the given unknown frequency and capacitance using Wein's bridge.
5	To measure the distance with the help of ultrasonic transmitter and receiver.
6	To measure displacement with the help of LVDT.
7	To draw the characteristics of following temperature transducers- a) Resistance Temperature Detector (RTD, Pt. - 100) b) Thermistor c) Thermocouple
8	To calibrate a Single Phase Energy meter by Phantom Loading at different Power Factor by using Auto transformer.
9	To measure strain using Strain Gauge.
10	To study the working of Q-meter and measure Q-meter of coil.

Text Books:

3. Electronic Instrumentation by H.S. Kalsi, Tata McGraw Hill, 3rd Edition, 2011.
4. A course in Electrical and Electronic measurement and instrument by Sawhney, Dhanpat Rai Publications, 18th Edition, 2007

Reference Books:

3. Electronic Instrumentation and Measurement by Bell David, Oxford, 3rd Edition, 2013
4. Electronic Measurements & Instrumentation by Bernard Oliver, MGH (2010)

Name of the Program: B.Tech. in Electronics and Communication Engg.

Prerequisites

1. Knowledge of basic electronic components.