B.E. III Semester

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs per Week	CIE	SEE	SEE Duration in ours	
Theory Courses										
1	5PC301EC	Electronic Devices	3	0	0	3	40	60		3
2	5PC302EC	Signals and Systems	3	0	0	3	40	60		3
3	5PC303EC	Network Theory	3	0	0	3	40	60		3
4	5PC304EC	Switching Theory and Logic Design	3	0	0	3	40	60		3
5	5ES303EC	Probability Theory and Stochastic Processes	3	0	0	3	40	60		3
6	5HS302HS	Managerial Economics and Financial Accountancy	3	0	0	3	40	60		3
7	5MC303HS	Indian Constitution	2	0	0	2	40	60		0
8	5ES304EC	Python Programming	2	0	0	2	40	60		2
Practical/Laboratory Course										
9	5PC351EC	Electronic Devices and Logic Design Lab	0	0	2	2	40	60		1
10	5PC352EC	Network Theorem Lab	0	0	2	2	40	60		1
11	5ES353EC	Python Programming Lab	0	0	2	2	40	60		1
Total			**22**	**0**	**6**	**28**	**440**	**660**		**23**

III - Semester Detailed Syllabus

Course Code	Course Title						Core/Elective
5PC301EC	Electronic Devices						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	0	-	0	40	60	3

COURSE OBJECTIVES :

This course aims to familiarize :

1. The concepts of semiconductor devices like PN junction diode, Transistor, and special diodes.
2. The applications of diodes.
3. To familiarize the students with various two terminal and three terminal electronic devices working and use in the design of real time electronic products.
4. Design DC biasing techniques and evaluate A.C parameters for BJT in Amplifier Applications.
5. Explore V-I characteristics of FETs, MOSFETs and study IC fabrication techniques

COURSE OUTCOMES :

1. Demonstrate understanding of the characteristic behavior of various electronic devices such as Diodes, Transistors etc, and applying them for understanding various circuits.
2. Evaluate the performance parameters of various diode circuits (rectifiers, clippers and clampers). Identify the merits and demerits of various filters, formulate and design rectifier circuits with filters. Calculate ripple factor, efficiency and percentage regulation of rectifier circuits.
3. Discriminate the BJT configurations to recognize appropriate transistor configuration for any given application and design the biasing circuits with good stability.
4. Analyze and design various circuits for different applications in Engineering Field.

UNIT - I

Semiconductor Diode Characteristics: The p-n junction Diode, Energy band diagram, Current equations, V-I characteristics, Temperature dependence, Diode resistance-Static and Dynamic, Transition capacitance, Diffusion capacitance, Zener

diode, Avalanche breakdown, Zener breakdown mechanisms – Zener diode as voltage Regulator, Hall effect.

UNIT - II

Diode Applications: Diode as a circuit element, Clipping and clamping circuits, clamping circuit theorem. Half wave, Full wave and Bridge Rectifiers - their operation, performance characteristics- ripple factor calculations, and analysis; Filters (L, C, LC and CLC filters).

Special Purpose Semi-Conductor Devices: Elementary treatment of Silicon Controlled Rectifier (SCR), UJT, Tunnel diode. Schottky diode, LED, Photodiode, Solar cell.

UNIT – III

Bipolar Junction Transistor : Construction and Operation of Bipolar Junction Transistor, current components, Modes of transistor operation, BJT input and output characteristics of CB, CE, CC configuration, early effect

Biasing and Stabilization: Biasing techniques, Stabilization factors, Compensation techniques, Thermal run away, Thermal Stability

UNIT – IV

Small Signal Transistors equivalent circuits: Small signal low frequency h-parameter model of BJT, Approximate model, Analysis of BJT amplifiers using approximate model for CB, CE and CC configurations.

UNIT - V

Field Effect Transistor: Junction Field Effect Transistor: Principle of Operation - the Pinch-off Voltage, V-I Characteristics of JFET.

MOSFETs : Enhancement & Depletion mode MOSFETs, V-I characteristics, CMOS inverter. Small signal model analysis of FET

TEXT BOOKS :

1. Millman and Halkias , -"Electronic Devices and Circuits", 2nd Edition, McGraw Hill Publication, 2007.
2. Robert L. Boylestad, -"Electronic Devices and Circuit Theory", 10th Edition, PHI, 2009.
3. S.K. Gandhi, -"VLSI Fabrication Principles: Silicon and Gallium Arsenide", Wiley India Pvt. Ltd., New Delhi, 2nd Edition. 1994.

REFERENCE BOOKS :

1. Jacob Millman, Christos Halkias, Chetan Parikh, -"Integrated Electronics", McGraw Hill Publication, 2nd Edition, 2009.
2. David Bell, -"Fundamentals of Electronic Devices and Circuits", Oxford University Press, 5th Edition, 2008.
3. Christian Piguet, -"Low Power CMOS Circuits Technology, Logic Design and CAD Tools", 1st Indian Reprint, CRC Press, 2010.

Course Code	Course Title						Core/Elective
5PC302EC	Signals and Systems						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	0	-	0	40	60	3

COURSE OBJECTIVES :

1. Analyze basic concepts related to continuous time signals and systems, mathematical representation of periodic signals.
2. Familiarize with basic operations on signals and mathematical representation of aperiodic signals using Fourier and Laplace transform.
3. Analyze basic concepts related to discrete time signals and systems, mathematical representation of discrete time signals.
4. Describe the concept of Z- Transform and its properties and illustrate their applications to analyze systems.
5. Define convolution, correlation operations on continuous and discrete time signals.

COURSE OUTCOMES :

1. Define and differentiate types of signals and systems in continuous and discrete time.
2. Apply the properties of Fourier transform to continuous time signals.
3. Relate Laplace transforms to solve differential equations and to determine the response of the Continuous Time Linear Time Invariant Systems to known inputs.
4. Apply Z-transforms to discrete time signals to solve Difference equations.
5. Obtain Linear Convolution and Correlation of discrete time signals with graphical representation.

UNIT - I

Definitions and classifications: Classification of signals. Elementary continuous time signals, Basic operations on continuous-time signals. Classification of continuous-time systems: continuous time & discrete time systems, lumped-parameter & distributed –parameter systems, static & dynamic systems, causal &

non-causal systems, Time-invariant & time-variant systems, stable & unstable systems.

UNIT - II

Representation of Continuous-time signals: Analogy between vectors and signals, orthogonality and completeness.

Fourier series analysis of Continuous-time signals: Fourier series – Existence of Fourier series, Trigonometric and Exponential Fourier series, Computational formulae, Symmetry conditions, Complex fourier spectrum.

UNIT - III

Continuous-time Fourier Transform (FT): The direct and inverse FT, existence of FT, Properties of FT, FT of standard signals, properties of FT, The Frequency Spectrum.

Linear convolution of continuous time signals: Graphical interpretation, properties of convolution, Correlation between continuous-time signals: Auto and Cross correlation, graphical interpretation, properties of correlation.

Laplace Transform (LT) Analysis of signals and systems: The direct LT, Region of convergence, existence of LT, properties of LT. The inverse LT, Solution of differential equations, System transfer function.

UNIT - IV

Discrete-time signals and systems: Sampling, Classification of discrete-time signals, Basic operations on discrete time signals, Classification of discrete time systems, properties of systems.

Linear Convolution of discrete time signals: Graphical interpretation, Properties of discrete convolution.

Fourier analysis of discrete-time signals: Discrete-time Fourier transform (DTFT), properties of DTFT, Transfer function, Discrete Fourier transform properties of DFT.

UNIT - V

Z-Transform analysis of signals & systems: The direct Z-transform, Region of convergence, Z-plane and S-plane correspondence. Inverse Z-transform, Properties of Z-transforms. Solution to linear difference equations, linear constant coefficient systems, System transfer function.

TEXT BOOKS:

1. B. P. Lathi, "Linear Systems and Signals", 2nd Edition, Oxford University Press, 2009.
2. Alan V Oppenheim, A. S. Wlisky, "Signals and System", 2nd Edition, Prentice Hall.

REFERENCE BOOKS :

1. Douglas K. Linder, "Introduction to Signals and Systems", McGraw Hill, 1999.
2. P. Ramesh Babu, R Ananada Natarajan, "Signals and Systems", SCITECH, 3rd edition, 2009.
3. Rodger E. Ziemer, William H Trenter, D. Ronald Fannin, "Signals and Systems", Pearson , 4th Edition, 1998.

Course Code	Course Title						Core/Elective
5PC303EC	Network Theory						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	40	60	3

COURSE OBJECTIVES :

1. Concepts of Two Port networks, study of different two port parameter representations.
2. Concepts of the image impedance a different network, Design of attenuators.
3. Design concepts of equalizers.
4. Design concepts of different filters.
5. Design concepts of network synthesis.

COURSE OUTCOMES :

1. Able to Express given Electrical Circuit in terms of A, B, C, D and Z, Y Parameter Model and Solve the circuits and how they are used in real time applications.
2. Able to learn how to calculate properties of networks and design of attenuators.
3. Able to design of equalizers.
4. Able to design different types of filters using passive elements.
5. Able to synthesize the RL & RC networks in Foster and Cauer Forms.

UNIT - I

Two Port networks: Z, Y, h, g and ABCD parameters, equivalence of two ports networks, T-PI transforms, Reciprocity theorem, Interconnection of two port networks and Brune's test of inter connections.

UNIT-II

Symmetrical and Asymmetrical Networks: Characteristic impedance and propagation constant of symmetrical T and pi networks, Image and iterative impedances, Image transfer constant and iterative transfer constant of asymmetrical L, T and pi networks.

UNIT - III

Constant k- Filters - Low pass, high pass, band pass and band elimination filter design, m- derived low pass and high pass filter design, Composite filter design and notch filter.

UNIT - IV

Attenuators and Equalizers - Design of symmetrical T, pi, Bridge-T and Lattice attenuators, impedance matching networks, Inverse networks, Equalizers, Constant resistance equalizer, full series and full shunt equalizer.

UNIT - V

Network Synthesis : Hurwitz polynomials, positive real functions, Basic Philosophy of Synthesis, L-C Immittance functions, RC impedance functions and RL admittance functions. RL impedance functions and RC admittance functions. Cauer And Foster's forms of RL impedance and RC admittance. Properties of RC, RL Networks.

TEXT BOOKS

1. Ryder J.D, "Network Lines Fields", Prentice Hall of India, 2nd edition, 1991.
2. P.K. Jain and Gurbir Kau, "Networks, Filters and Transmission Lines", Tata McGraw- Hill Publishing Company Limited, 1st edition, 1994.

REFERENCE BOOKS:

1. A. Sudhakar and Shyam mohan, "Circuits Networks: Analysis Synthesis", Tata McGraw Hill, 4th edition, 2010.
2 Van Valkenburg M.E, "Introduction to Modern Network Synthesis", Wiley Eastern, 1st edition, 1994.
3. S.P. Ghosh and A.K. Chakraborty, "Network Analysis and Synthesis", McGraw Hill, 1st edition, 2009.

Course Code	Course Title						Core/Elective
5PC304EC	Switching Theory and Logic Design						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
-	3	0	-	0	40	60	3

COURSE OBJECTIVES :

1. To understand basic number systems, codes and logical gates.
2. To understand the concepts of Boolean algebra.
3. To understand the use of minimization logic to solve the Boolean logic expressions.
4. To understand the design of combinational and sequential circuits.
5. To understand the state reduction methods for Sequential circuits.
6. To understand the various types of memories.

COURSE OUTCOMES :

Students will be able to: -

1. To apply the basic concepts of Boolean algebra for the simplification and implementation of logic functions using suitable gates namely NAND, NOR etc.
2. Make use of the concepts to solve the problems related to the logic circuits.
3. Design simple Combinational Circuits such as Adders, Subtractors, Code Convertors, Decoders, Multiplexers, and Magnitude Comparators etc.
4. Identification of gates – application. Understand and Design – concept of FSM, Mealy and Moore machines.
5. Design Sequential Circuits such as different types of Counters, Shift Registers, Serial Adders, and Sequence Generators. Compare various Programmable logic devices.

UNIT - I

Number System: Binary, decimal, octal, hexa decimal, weighted and un-weighted codes.

Boolean Algebra: Axiomatic definition of Boolean algebra, Binary operators, postulates of and theorems. Boolean addition, subtraction, 1's complement, 2's complement. Switching functions, Canonical forms and Standard forms, Simplification of switching functions using theorems.

Character coding schemes - ASCII. Arithmetic operations on binary octal,

hexadecimal and BCD numbers. Error Detection and Correction – Parity and Hamming code.

UNIT – II

Logic gates: Basic gates and universal gates.

Minimization of Switching Functions: simplification rules, Karnaugh map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Quine-McCluskey Tabular Method, Prime Implicant chart.

UNIT – III

Single output and multiple output combinational logic circuit design, AND-OR, OR-AND, and NAND/NOR realizations, Exclusive-OR and Equivalence functions, Binary adders/subtractors, carry look ahead adder, BCD adder, code converter, magnitude comparator, Encoder, Decoder, Multiplexer, Demultiplexer, MUX realization of switching functions, Parity bit generator, Code-converters, Concepts of threshold logic and threshold gates.

UNIT – IV

Sequential Circuits-1: Classification of sequential circuits (Synchronous, Asynchronous Pulse mode, and Level mode with examples). Basic flip-flops-Triggering and excitation tables. Conversion of flip-flops.

Sequential Circuits-2: The sequential circuit model, Asynchronous counters, Design of simple synchronous sequential circuits such as counters (Design of modulo-N counter, Ring counter, twisted ring counter) and Shift registers

UNIT - V

Programmable Logic Devices: Basic PLD's-ROM, PROM, PLA, and PLD Realization of Switching functions using PLDs.

Algorithmic State Machines: State machines and state diagrams. Design of weighing machine and binary multiplier.

TEXT BOOKS:

1. Morris Mano, -"Digital design" PHI, 2nd Edition.
2. Zvi Kohavi and Niraj K Jha -"Switching & Finite Automata theory"– Cambridge, 3rd Edition.

REFERENCE BOOKS:

1. Fletcher -"An Engineering Approach to Digital Design" – PHI. -2nd edition.
2. Roth, Kenny, -"Fundamentals of Logic Design", Cengage Learning, Seventh Edition.
3. John M. Yarbrough -"Digital Logic Applications and Design"– Thomson Publications, 2006.
4. CVS Rao, -"Switching Theory and Logic Design" Pearson Education, 2005.

Course Code	Course Title						Core/Elective
5ES303EC	Probability Theory and Stochastic Processes						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	0	-	0	40	60	3

COURSE OBJECTIVES :

1. To understand fundamentals of probability and random variables as applicable to Electronics Engineering.
2. To learn one Random variable characteristic function of different variables using their density functions.
3. To learn Two Random variable characteristic functions of different variables using their density functions.
4. To understand elementary concepts of the stochastic processes and their temporal characteristics.
5. To understand elementary concepts of the stochastic process and their spectral characteristics.

COURSE OUTCOMES :

Upon completing this course, the student will be able to

1. To understand different types of Random variables their density and distribution functions.
2. To learn one Random variable characteristics of different variables their density and distribution functions.
3. To extend bi-variate distributions and the operations on.
4. To understand elementary concepts of the stochastic process in to Temporal characteristics.
5. To understand elementary concepts of the stochastic process in to spectral characteristics.

UNIT - I :

Probability & Random Variable: Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Baye's Theorem, Independent Events, Random Variable- Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable.

UNIT - II:

Distribution & Density Functions and Operations on One Random Variable : Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Rayleigh, Methods of defining Conditional Event, Conditional Density, Properties. Expected Value of a Random Variable, Function of a Random Variable g(x) and its distribution, Moments about the Origin, Central Moments, Variance and Skew, Chebyshev's Inequality (no proof), Characteristic Function, Moment Generating Function; Transformations of Random Variables.

UNIT - III :

Two Random Variables and operations : Joint Distribution and Density Functions and their properties, Joint Moments, Joint Characteristic Functions, Conditional Distributions (Point & Interval), Conditional Expected Values. Marginal distribution functions, Statistical independence, Sum of two random variables, Central Limit Theorem (no proof); Engineering application (theoretical discussion) – Mutual information, Channel Capacity and Channel Coding.

UNIT - IV

Stochastic Processes – Temporal Characteristics : Introduction to stationary (First and Second order; WSS; SSS), Statistical independence, Time averages and ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Auto correlation Function and its Properties, Cross-Correlation Function and its Properties, Covariance and its Properties. Linear System Response of Mean and Mean-squared Value.

UNIT - V

Stochastic Processes - Spectral Characteristics : Power Density Spectrum and its properties; Relationship between Power Density Spectrum and Autocorrelation Function; Relationship between Cross-Power Density Spectrum and Cross-Correlation Function; White and colored noise, response to linear systems and stochastic inputs, concept of Markov Processes.

TEXT BOOKS :

1. Henry Stark and John W. Woods, "Probability and Random Processes with Application to Signal Processing", Pearson Education, 3rd edition, 2014.
2. Athanasius Papoulis and S. Unni krishna Pillai, "Probability, Random Variables and Stochastic Processes", McGraw Hill, 4th edition, 2006.

REFERENCE BOOKS:

1. Peyton Z. Peebles, "Probability Random Variables & Random Signal Principles", Tata McGraw Hill, 4th edition, 2001.
2. k. Murugeshan and P.Guruswamy, "Probability statistics and Random processes", Anuradha Agencies, 3rd edition, 2003.
3. Bruce Hajck, "Random processes for Engineers", Cambridge unipress, 2nd edition, 2015.

Course Code	Course Title						Core/Elective
5HS302HS	Managerial Economics & Financial Accounting						HS
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	40	60	3

COURSE OBJECTIVES:

1. To understand responsibilities of a manager of a business undertaking.
2. To analyze various determinants influencing demand and price.
3. To understand the principles of accounting and prepare Journal, Ledger, Trial Balance & Final accounts.
4. To understand Financial statement Analysis.
5. To evaluate & analyze the long term investments.

COURSE OUTCOMES :

1. Determine the responsibilities & decision making in the Organization.
2. Understand the various factors influencing demand & market structure.
3. Understand the principles of Accounting & solve the problems.
4. Analyze the Financial performance.
5. Understand the capital structure & to take decision on selection of projects.

UNIT-I

Introduction to Managerial Economics, its Scope, Importance and relation to other sciences, its usefulness to Engineers-Basic concepts of Managerial Economics.

UNIT-II

Demand Analysis: Introduction to demand, determinants, law of demand, its assumptions, Elasticity of demand-price, income and cross elasticity, demand forecasting, Market, competitive structure, price & output determination under perfect competition and Monopoly.

UNIT-III

Basics of Accounting: Financial Accounting - Definition - Accounting Cycle-Journal - Ledger - Cash book - Trial Balance.

UNIT - IV

Financial statement Analysis: Preparation of Final accounts with simple adjustments (including problems). Ratio Analysis – Importance – Liquidity and profitability ratios.

UNIT-V

Capital management : Significance determinates and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, Time Value of money - Methods: Non-Discounted cash flow methods (pay back, ARR), Discounted (NPV, PI, IRR) with problems.

TEXT BOOKS :

1. Mehta P.L., "Managerial Economics", Sultan Chand & Sons Publishers.
2. Luke M Froeb, "Managerial Economics - A Problem Solving Approach".
3. I.M.Panday, "Financial Management", Vikas Publishing House.
4. Maheswari S.N. "Introduction to Accountancy", Vikas Publishing House.

REFERENCE BOOKS :

1. R.L.Varshney, K.L.Maheshwari, Managerial Economics, Sultan Publishers.
2. D.M.Mithani, Managerial Economics, Himalaya Publishing House.
3. Mukherjee, Hanif, Financial Accounting, Tata McGraw Hill.
4. Ramachandran, Kakani, Financial Accounting for Management, Tata McGraw Hill.

Course Code	Course Title						Core/Elective
5MC303HS	Indian Constitution						MC
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	2	0	-	0	40	60	0

COURSE OBJECTIVES :

1. To create awareness and relevance of the Indian Constitution, its directive principles.
2. To impart understanding of the role, powers and functions of administration at the Central, State and local levels.
3. To expose students to the relations between Central/Federal, State and Provincial units, divisions of executive, legislative and judiciary in them.
4. To impart knowledge about the statutory institutions and their role.

COURSE OUTCOMES:

1. Have a general knowledge and back ground of the Constitution of India and its importance.
2. Will distinguish and understand the working of the Central, state and provincial levels of administration.
3. Will be conscious about the fundamental duties, responsibilities and rights as an ideal citizen of India
4. Will be able to perceive and interpret the functioning and distribution of resources between centre and state.
5. Have an awareness and relate to the existing hierarchy of the social structure, election process and grievance redressal in a democracy.

UNIT-I

Introduction to Constitution- Meaning, reasons for having a constitution. Evolution of the Indian Constitution: History, 1909 Act, 1919 Act and 1935 Act. Constituent Assembly: Composition and Functions; Preable- its importance and key words; Fundamental features of the Indian Constitution. Emergency powers.

UNIT - II

Style of Governance adopted, Structure of the Indian Union, Relationship between bodies in hierarchy.

Union Government: Executive-President, Prime Minister, Council of Minister-role, position and powers.

State Government: Executive: Governor, Chief Minister, and Council of Minister - role, position and powers.

Local Government: Panchayat Raj Institutions, Rural and Urban local bodies-composition, role, position and powers.

UNIT - III

Rights and Duties: Fundamental Rights- importance and salient features,

Directive principles of State Policy-meaning and purpose, classification, importance and implementation

Fundamental duties of a good citizen.

UNIT-IV

Relation between Federal and Provincial units:

Union-State relations: Administrative, legislative and Financial, Inter-State council, NITI Ayog, Finance Commission of India.

Judiciary: Meaning and Functions, Conditions of independence of judiciary, Composition and powers of Supreme court, judicial activism and judicial restraint.

UNIT - V

Constitutional bodies: Finance Commission, UPSC, Election Commission, the CAG, National Commissions for SCs and STs, etc.

Statutory Institutions: Securities & Exchange Board of India, National Human Rights Commission, National Commission for Women, National Commission for Minorities, National Green Tribunal, National Commission for Protection of Child Rights etc.

TEXT BOOKS :

1. Durga Das Basu, "Introduction to the Constitution of India", 25th Edition, English- Hardcover – 1 January 2021, Dr. Durga das Basu (Author), ASIN:B091Q92R7R Publisher:Lexis Nexis, New Delhi, 2021.
2. PM Bhakshi, "The Constitution of India", 1 January 2017, English, Paperback, Publisher Universal Law Publishing - An imprint of Lexis Nexis.

REFERENCE BOOKS:

1. Subhash Kashyap, "National Book Trust Our Parliament", English Medium, ISBN 19788123701479, Publication National Book Trust-New Delhi.
2. Peu Ghosh, "Indian Government and Politics Paperback", (Author) Publisher: Prentice Hall India Learning Private Limited (1 January 2012), English, Paperback, ISBN-10: 8120346491; ISBN-13 : 978-8120346499.
3. Dr. B.L. Fadia, Dr. Kuldeep Fadia, "Indian Government and Politics", Authors: ISBN: 978-93 84885-62-5, Sahithya Bhavan Publications, Agra.

Course Code	Course Title						Core/Elective
5ES304EC	Python Programming						Mandatory
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Basic Mathematics	2	0	-	0	40	60	2

COURSE OBJECTIVES :

1. To learn how to use lists, tuples, and dictionaries in Python programs.
2. To learn how to write loops and decision statements in Python.
3. To learn how to read and write files in Python.
4. To learn how to use exception handling in Python applications for error handling.

COURSE OUTCOMES :

1. Explain basic principles of Python programming language.
2. Create, run, and manipulate Python Programs using core data structures like Lists, Tuple, Set and Dictionaries.
3. Understand and summarize different File handling operations.
4. Handle exceptions in programming.

UNIT - I

Basics of Python: Algorithms, building blocks of algorithms (statements, state, control flow), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms. Python Basics, Features of Python, Python Applications, Installing and running Python with Different IDEs, Comments in Python, Memory Management in Python, Garbage Collection in Python, Python I/O : Printing to the Screen, Reading Keyboard Input.

UNIT - II

Python Operators: Arithmetic, Relational and Comparison Operators, Python Assignment Operators, Logical Operators and Bitwise Operators, Membership Operators, Identity Operators, Operator Precedence and Associativity, Evaluating Expressions. Control Statements: A Word on Indentation, the if Statement, The if … else Statement, The if … elif … else Statement, The while Loop, the for Loop, Infinite

Loops, Nested Loops, Loop manipulation using pass, continue, break and else Statement.

UNIT - III

Variables and Data Types in Python : How Python Sees Variables, Constants, Identifiers and Reserved words in Python, Naming Conventions in Python. Declaring and using Numeric data types: int, float, complex and Boolean, Sequences: Using String data type, Lists and Tuples, Methods and Useful Built-in Functions, Dictionaries and Set Types.

UNIT - IV

Python Programming using functions, modules, and packages: Organizing python codes using functions, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, Default Arguments, Variable Length Arguments, Pass by Object Reference, Local and Global Variables, Scope and Lifetime of variables, Nested Functions, Recursive Functions, Powerful Lambda function.

UNIT - V

Python File Input-Output : Opening and closing file, Various types of file modes, reading and writing to files. Python Exception Handling: Avoiding code break using exception handling, Various keywords to handle exception, try .. exception else … finally, Raising Exceptions, Assertions, Python Custom Exceptions. Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

TEXT BOOKS :

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "Learning with Python: How to Think Like a Computer Scientist", 3rd Edition.
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Shroff O’Reilly Publishers.

REFERENCE BOOKS :

1. Hans Fangohr, "Introduction to Python for Computational Science and Engineering (A beginner's guide)", Edition, top, Publisher.
2. Timothy A. Budd, "Exploring Python", Mc Graw Hill Education.
3. John V Guttag, - "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press.

Course Code	Course Title						Core/Elective
5PC351EC	Electronic Devices and Logic Design Lab						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	2	40	60	1

COURSE OBJECTIVES :

1. The V-I characteristics of diodes and determination of static and dynamic resistances of semiconductor diode.
2. To design the rectifiers and performance of parameters.
3. To understand the characteristics of transistor in various configurations

COURSE OUTCOMES :

1. To demonstrate the characteristic behavior of PN junction diode and Zener diode.
2. To design various non-linear wave shaping circuits using diodes for given specifications.
3. Analyze the behavior of non-linear wave shaping circuits using diodes.
4. Examine the characteristics of BJT and FET in various configurations.
5. Evaluate and compare the significant parameters obtained from the characteristics of BJT and FET.

List of Experiments:

PART-A

1. V-I Characteristics of Silicon and Germanium diodes and measurement of static and dynamic resistances.
2. Zener diode characteristics and its application as voltage regulator.
3. Clipping and Clamping Circuits.
4. Design, realization and performance evaluation of half wave rectifiers without filters and with filters (capacitor filter and p - section filter).
5. Plotting the characteristics of BJT in Common Base configuration and Common Emitter configuration.
6. V-I Characteristics of JFET in CS configuration.
7. Frequency response of Common Source FET amplifier.
8. V-I characteristics of UJT.

PART - B

1. Verification of truth tables of Logic gates and realization of Binary to Gray and Gray to Binary code converters.
2. Realization of Half adder/ and full adder/using universal logic gates.
3. Realization of Full adder/using MUX and Decoder.
4. Design 2's complement Adder/subtractor using IC 74283 and verify experimentally.
5. Verification of truth tables of Flip Flops and Flip flop conversions form one form to the other.

Note :

1. Wherever possible, Analysis and design of circuits shall be carried out using simulation tools.
2. A minimum of 10 experiments should be performed.

Objective

- To get acquainted with the Analog/Digital Training System.
- To get acquainted with different standard integrated circuits (ICs).
- To study the basic logic gates: AND, OR, INVERT, NAND, NOR, and XOR.
- To understand formulation of Boolean function and truth table of logic circuits.

Components

Analog/Digital Training System - IC Type 7400 Quadruple 2-input NAND gates
- IC Type 7402 Quadruple 2-input NOR gates
- IC Type 7404 Hex Inverters
- IC Type 7408 Quadruple 2-input AND gates
- IC Type 7432 Quadruple 2-input OR gates
- IC Type 7486 Quadruple 2-input XOR gate

Experiment No.	Title of the Experiment	Objective of the Experiment
1	To study and verify the truth table of logic gates	Identify various ICs and their specification a. OR gate b. AND gate c. NAND gate d. NOR gate
2	Realization of a Boolean function	To simplify the given expression and to realize it using Basic gates and Universal gate
3	Design and implementation using NAND gate	To realize why NAND gate is known as the universal gate by implementation of: a. NOT using NAND b. AND using NAND c. OR using NAND d. XOR using NAND
4	Adders and Subtractors	To realize a. Half Adder and Full Adder b. Half Subtractor and Full Subtractor by using Basic gates and NAND gates
5	Binary to grey generator	To learn the importance of weighted and non weighted code To learn to generate gray code.
6	Multiplexer and Demultiplexer	a. To design and set up a 4:1 Multiplexer (MUX) using only NAND gates. b. To design and set up a 1:4 Demultiplexer(DE-MUX) using only NAND gates.

7	Realization of a Boolean function using Logisim	To learn the use of Logisim software to design digital electronics circuits.
8	FlipFlop	a. Truth Table verification of 1) RS Flip Flop 2) T type Flip Flop. 3) D type Flip Flop. 4) JK Flip Flop. b. Conversion of one type of Flip flop to another

TEXT BOOKS :

1. R P Jain, - Modern Digital Electronics.
2. William Gothmann H, - Digital Electronics: An Introduction To Theory And Practice.
3. John Morris, - Digital Electronics.
4. Anand Kumar, - Fundamentals of Digital Circuits.

Course Code	Course Title						Core/Elective
5PC352EC	Network Theorem Laboratory						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	2	40	60	1

COURSE OBJECTIVES:

1. To learn the usage of basic electronic components, equipments and meters, used in electronic laboratories.
2. To learn practical electric AC & DC circuits.
3. To learn about PCB making
4. To learn various filters.

COURSE OUTCOMES:

1. Use the basic electronic components and design circuits.
2. Verify various parameters of the circuits by applying theorems.
3. Understand the making of PCB.
4. Design various filters.

List of Experiments :

1. Study of all types of discrete Active & passive devices, display devices, integrated components, electro-mechanical components (switches, sockets, connectors etc.,) electromagnetic components (relays). Study and use of different meters (volt/ammeter, AVO/Multi meter) for the measurement of electrical parameters. Measurement of RLC components using LCR Meter.
2. Study of CRO and its applications.
3. Verification of Superposition and Tellegan's theorem.
4. Verification of of Thevenin's and Maximum Power Transfer Theorem.
5. Measurement of two-port network parameters.
6. Measurement of Image impedance and Characteristics impedance.
7. Design of T-section constant K Low Pass Filter.
8. Design of m-derive High Pass Filter.
9. Verification of Reciprocity theorem.
10. Verification of Norton's theorem.
11. Soldering and De-soldering.
12. PCB Making.

Note : A minimum of 10 experiments should be performed. The students may use any commercial / open-source SPICE programs available such as MULTISIM, PSPICE, TINA, and LABVIEW for simulation.

Course Code	Course Title						Core/Elective
5ES353EC	Python Programming Laboratory						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	2	40	60	1

COURSE OBJECTIVES :

1. To learn how to design and program using lists, Sets, tuples, and dictionaries.
2. To learn how to use indexing and slicing to access data in Python programs.
3. To learn structure and components of Python and to read and write files.
4. To learn how to design object oriented programs with Python classes and Exception handling techniques.
5. To learn how to do report preparation to access data.

COURSE OUTCOMES :

1. Develop solutions to simple computational problems using Python programs.
2. Solve problems using Control statements.
3. Develop Python programs by defining functions and parameters.
4. Use Python data structures for problem solving.
5. Apply file handling and report preparation to access data.
6. Develop Python programs for exception handling.

List of Programs :

1. Installing and running python programs with different environments.
2. Write a program to demonstrate python Input /Output functions and data types.
3. Write a program to use python Operators.
4. Write a program to apply control structures.
5. Write a program to implement List, Tuple, Set, dictionary Data structures in python.
6. Write a program to apply String handling functions.
7. Write a program to demonstrate Functions and parameters passing techniques.

8. Write a program to apply recursion and Lambda functions.
9. Write a program to demonstrate python modules and packages.
10. Write a program to apply python File handling.
11. Write a program to demonstrate python Exception Handling.
12. A case study on Creation of Dynamic OTP generator for Financial Transactions.

TEXT BOOKS :

1. Kenneth A. Lambert, “The Fundamentals of Python: First Programs”, 2nd Edition, 2017, Cengage Learning.
2. John V Guttag. “Introduction to Computation and Programming Using Python”, Prentice Hall of India.

REFERENCE BOOKS:

1. Mark Summerfield, Programming in Python 3: A Complete introduction to the Python Language, Addison-Wesley Professional, 2009.
2. Allen B. Downey, "Think Python: How to think like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/ O’Reilly Publishers, 2016.