Programme Structure

School
of
Engineering & Technology

B. Tech. CSE(Hons) /B. Tech. CSE(Hons) with Specialization AI&ML/Cyber Security

Programme Code: ET0101

Batch: 2025-2029

Programme: B. Tech.CSE(Hons)/B. Tech.CSE (Hons) with Specialization AI&ML/Cyber Security

Semester: I **w.e.f. Session:2025-2026**

S. No	Status	Paper Code	Subjects	Study Scheme Lec / Week			Hours	Credits	CIE	ESE	Total	Pass Marks
				L	T	P						
1	CC-1	B010123101	Applied Mathematics-I	3	1	0	4	3	50	50	100	40
2	CC-2	B010123102	Problem Solving with 'C'	4	0	0	4	4	50	50	100	40
3	DSC (minor)-1	B010124103	Fundamental of Electrical and Electronics Engineering	3	0	0	3	3	50	50	100	40
4	MDC-1	B010123104	Applied Chemistry	3	0	0	3	3	50	50	100	40
5	AEC-1	BSGUAE2404	Professional Communication	2	0	0	2	2	50	50	100	40
6	VAC-1	BSGUVA2401	Environmental Education	3	0	0	3	3	50	50	100	40
7	SEC-1	BSGUSE2403	Engineering Graphics	2	0	0	2	2	25	25	50	20
8	CC-3	B010123152	Problem Solving with 'C' lab	0	0	2	2	1	60	40	100	40
9	DSC(minor)-2	B010124153	Fundamental of Electrical and Electronics Engineering lab	0	0	2	2	1	60	40	100	40
10	MDC-2	B010123154	Applied Chemistry Lab	0	0	2	2	1	60	40	100	40
11	SEC-2	BSGUSE2453	Engineering Graphics Lab	0	0	2	2	1	30	20	50	20
			Total	20	1	8	29	24	535	465	1000	400

DETAILED SYLLABUS

Programme: B. Tech.CSE(Hons)/B. Tech. CSE(Hons) with specialization AI&ML / Cyber Security

Applied Mathematics –I

(Course Code: B010123101)

Year: **I**st

Semester: **I**st

L	T	P	C
3	1	0	3

Course Outcome(CO)		Bloom'sKnowledge Level(KL)
At the end of course, the student will be able:		
CO 1	Understand the concept of matrices and apply for solving linear simultaneous equations.	K1, K3
CO 2	Understand the concept of limit , continuity and differentiability and apply in the study of Rolle's , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .	K2, K3
CO 3	Identify the representation and application of vector algebra.	K2, K4
CO 4	Illustrate the working methods of Fourier Transformation, Fourier series, Fourier coefficient.	K2, K3
CO 5	Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.	K3, K2

DETAILEDSYLLABUS

Unit	Topic	Proposed Lecture
I	**Linear Algebra** Linear Algebra-Matrices: Rank of a matrix, Consistency of a system of linear equations, Linear dependence and independence of vectors, Eigen-values and Eigen vectors of a matrix, Cayley-Hamilton theorem, Diagonalization of a matrix.	**09**
II	**Differential Calculus** Limit of a function, Continuity, Differentiability of a function, Rolle's theorem, Lagrange's mean Value theorem, Taylor's theorem, Maclaurin's theorem, Indeterminate Forms, L' Hospitals Rule.	**09**
III	**VectorAlgebra** Introduction, Representation of vector Addition and subtraction of vectors, Doubleand Triple Scalar and Vector Product and its Properties, System of reciprocal ofVectors, Gradient, Divergence andcurlofavector.	**09**
IV	**FourierTransformation** Fourierseries,Fourier coefficients,Half range series, Fourier series of oddandeven functions,Fourierseries ofT-periodic function.	**09**
V	**Multiple Integration** Double and triple integrals, Change of variables, Change of order of integration, Applications to area and volume.	**09**

TextBooks

1. R.K.Jainand S.R.K.Iyengar;Advanced Engineering Mathematics,Narosa Publishing House
2. Thomas and Finney; Calculus and Analytical Geometry, Narosa Publishing House

ReferenceBooks

3. Grewal B.S. Higher engineering mathematics Khanna publisher newdelhi, 43edition

Problem Solving using 'C'
(Course Code: B010123102)

Year: Ist **L T P C**

Semester: Ist **4 0 0 4**

Course Outcome(CO)		Bloom'sKnowledge Level(KL)
At the end of course ,the student will be able:		
CO 1	To Develop Simple Algorithms for Arithmetic and Logical Problems.	K2, K3
CO 2	To Translate the Algorithms to Programs & Execution (in C Language).	K3
CO 3	To Implement Conditional Branching, Iteration and Recursion.	K3, K4
CO 4	To Decompose a Problem into Functions and Synthesize a Complete Program Using Divide and Conquer Approach.	K4, K3
CO 5	To Use Arrays, Pointers and Structures to Develop Algorithms and Programs.	K3, K2

DETAILED SYLLABUS

Unit	Topic	Proposed Lecture
I	**Introduction to Programming** Introduction, Basic block diagram and functions ofvarious components of computer, Concept of Hardware and Software, Types ofsoftware,Compiler and Interpreter. Introduction to Programming: Basic Overview of Procedure Oriented Language,Concepts of Machine level, Assembly level and High level programming, FlowchartsandAlgorithms.	**10**
II	**Fundamentals of 'C'** Features of C language, structure of C program, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions. Control Structures in 'C': Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue statement, goto statement.	**10**
III	**Array, Functions & Recursion** Array & String: Concept of array, One and Two dimensional arrays, declaration and initialization of arrays, String, String storage, Built-in string functions. Functions: Concept of user defined functions, prototype, definition of function, parameters, parameter passing, calling a function, Macros, Preprocessing. Recursion: Definitions, recursive function, Examples, Applications.	**10**
IV	**Pointers** Basics of pointers, pointer to pointer, pointer and array, pointer to array, array of pointers, function returning a pointer. Structure and Union : Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers, unions, bit-fields.	**10**

V	**File Management** Introduction to file management, Simple file management functions for text files, Reading from and writing to files. The Preprocessor: Introduction, Macro substitution, File Inclusion, Compiler Control Directives.	**10**

TextBooks

1. Programming in ANSI C, Fourth Edition, E Balagurusamy, TMH
2. C:The Complete Reference, HerbertSchildt, McGrawHill.

ReferenceBooks:

3. Let us C, Yashwant Kanitkar
4. Computer fundamentals and Programming in C, Pradip dey and Manas Ghosh, Oxford

Fundamental of Electrical and Electronics Engineering
(Course Code: B010124103)

Year: Ist **L T P C**

Semester: Ist **3 0 0 3**

Course Outcome(CO)		Bloom's Knowledge Level(KL)
At the end of course, the student will be able:		
CO1	Apply the concepts of Semiconductor Diodes.	K_1, K_2
CO2	Analyze the behavior of Bipolar Junction Transistors.	K_2, K_3
CO3	The behavior ofOperational Amplifiers.	K_2, K_4
CO4	Illustrate the working of DC & AC circuits.	K_2,K_3
CO5	Describe the components of transformers circuits.	K_3, K_2

DETAILEDSYLLABUS

Unit	Topic	Proposed Lecture
I	**Semiconductor Diodes :** Classification of semiconductors, PN junction diode, V–I characteristics of PN junction diode, Diode Applications: Half-wave rectifier, Full-wave rectifier: Bridge and Centre tape, Clippers, Clampers, Zener diodes, VI characteristics, Zener and Avalanche breakdown, Light emitting Diode (LED).	**09**
II	Bipolar Junction Transistors: Types of transistors, transistor Construction and operation, Common-Base Configuration, Common-Emitter configuration, Transistor as an amplifier, DC Biasing-BJTs: Operating point and DC load line, Fixed-Bias Circuit, Collector to Base Bias, Voltage-Divider bias circuit . Field Effect Transistors: Introduction, Construction and characteristics of JFETs, drain and transfer characteristics, pinch off voltage, parameters of JFET: Transconductance (gm), ac drain resistance (rd), amplification factor(μ), MOSFET: Basic operation and characteristics of depletion type and enhancement type MOSFETs, pinch-off voltage.	**09**
III	Operational Amplifiers: Op-Amp Basic, Practical Op-Amp circuit, Virtual ground, Applications of OperationalAmplifier: InvertingAmplifier, Non-invertingAmplifier,Adder, Subtracter, Integrator, Differentiator, Differential amplifier, Schmitt trigger, Op-amp Comparator, CMRR.	**09**
IV	DC Circuits: Classification of network elements, Ideal and Practical Voltage and Current sources; SourceTransformation, Kirchhoff's laws, Thevenin's and Norton's theorem, Star Delta Transformation; Mesh and Nodal analysis (With DC Independent Sources only). AC Fundamentals: Sinusoidal voltage and currents, their mathematical and graphical representation,conceptofcycleperiod,frequency,instantaneous,peak,average,RMSvalues, peak factor and form factor, phase difference, lagging, leading and in phase quantities and phasor representation. Peak and RMS Value,	**09**

	AC Circuits: Resistive, Inductive, Capacitive, RL, RC & RLC series, parallel combination, Impedance Triangle, Concept of AC power and power factor.	
V	Transformers: Single Phase Transformer: Construction, principle of operation; Equivalent circuit, EMF equation, Losses and Efficiency, basic idea of an auto transformer DC Machines: Electromechanical energy consumption, Principle of operations, Constructions, EMF and Torque equations, Classification, Application of various types of de Motors. Induction Motor: Constructions, Principle of Operation of Single phase and three phase induction motors, Applications of Induction Motors.	**09**

Text Books:

1. Boylestad&Nashelsky: Electronic Devices & Circuit Theory, PHI.
2. Millman &Halkias: Integrated Electronics, TMH.
3. Kennedy, G., Electronic Communication Systems, McGraw-Hill (2008) 4th ed.
4. Lathi. B. P., Modern Digital and Analog Communications Systems 3rd ed.
5. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
6. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", McGraw Hill.
7. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill.
8. J.B. Gupta, "Basic Electrical Engineering", S.K. Kataria& Sons.

Reference Books:

1. B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.
2. E S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.
3. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.
4. S Salivahanan and N Naresh Kumar, Electronics devices and circuits, McGraw Hill,1998.
5. J.B Gupta, “Electronic and Electrical Measurements and Instrumentation”, SK Kataria Bhargav, Kulshreshtha, “Basic Electronics and Linear Circuits”, Tata McGraw Hill
6. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.

AppliedChemistry
(CourseCode:B010123104)

Year: **I**st **L T P C**

Semester: Ist **3 0 0 3**

Course Outcome(CO)		Bloom's Knowledge Level (KL)
At the end of course, the student will be able:		
CO 1	Get an understanding of the theoretical principles of chemistry of molecular structure, bonding and properties, Chemistry of advanced materials (liquid crystals, Nanomaterials, Graphite & Fullerene) as well as the Principles of Green Chemistry.	K2
CO 2	Develop understanding of the sources, impurities and hardness of water, apply the concept of water purification treatments.	K2, K3
CO 3	Develop the understanding of Chemical structure of polymers and its effect on their various properties when used as engineering materials. Understanding the applications of specific polymers and Chemistry applicable in industrial process.	K2, K4
CO 4	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion and develop understanding of Chemistry of Engineering materials (Cement).	K2, K3
CO 5	To enable the students to understand and apply he detailed concept of spectroscopic technique	K3, K2

DETAILEDSYLLABUS

Unit	Topic	Proposed Lecture
I	**ATOMIC AND MOLECULAR STRUCTURE** Atomic and Molecular Structure: Molecular orbital's of diatomic molecules, Bond Order, Magnetic characters and numerical problems. Chemistry of Advanced Materials: Liquid Crystals; Introduction, Types and Applications of liquid crystals, Industrially important materials used as liquid crystals. Graphite and Fullerene: Introduction, Structure and applications. Nanomaterials: Introduction, and applications Green Chemistry: Introduction, 12 principles and importance of green Synthesis, Green Chemicals, Environmental impact of Green chemistry on society.	**09**
II	WATER AND ITS TREATMENT Introduction–Hardness of water- its causes, expression of hardness-units. Types of hardness. Boiler troubles– Scale, sludge and caustic embrittlement. Treatment of boiler feed water: Internal treatment& External treatment. **External treatments:** Ion exchange and Zeolite processes. Desalination of brakish water by Reverse-osmosis. Numerical problems. Potable water	**09**
III	**ENGINEERING MATERIALS** Classification of polymers. Plastics:Thermoplastics & Thermosets, Properties and applications of plastics: Poly-vinyl chloride and Bakelite, Rubbers: Natural rubber and its vulcanization, Synthetic rubbers: Buna-S and Buna –N, Fibers: Properties and applications of Polyester and Nylon. Conducting Polymers and its applications.	**09**

IV	ELECTROCHEMISTRY: Introduction, EMF: Galvanic Cells BATTERIES: Introduction to Primary cells and secondary cells. Applications of batteries. Fuel cells – Hydrogen– Oxygen fuel cell; Advantages and Applications. CORROSION AND ITS CONTROL: Introduction, causes of corrosion. Electrochemical corrosion. Corrosion control methods: Cathodic protection, sacrificial anode, impressed current cathode methods.	**09**
V	**SPECTROSCOPIC TECHNIQUES AND APPLICATIONS** Spectroscopic Techniques and Applications: Elementary idea and simple applications of UV, IR and NMR. **Fuels and Combustion:** Definition, Classification, Characteristics of a good fuel, Calorific Values, Gross & Net calorific value, Determination of calorific value by Bomb Calorimeter	**09**

ReferenceBooks

1.PCJain&MonicaJain,(2010).EngineeringChemistry,DhanpatraiPublishingCompany.New Delhi

2. EngineeringChemistrybyRamaDevi,VenkataRamanaReddyandRathan,Cengage Learning, NewDelhi (2016).

3. S.SDara&Mukkanti,(2006).EngineeringChemistry,S.Chand&Co.NewDelhi.

Reference Books

4. J.C Kuriacase & J Rajaram (2004),Engineering Chemistry, Tata McGraw Hills Co. New Delhi.

5. Engineering Chemistry by M Tirumala Chary &E.Laxminarayana (SecondEdition), Scitech Publications, Chennai.

Environmental Education

(CourseCode:BSGUVA2401)

	L	T	P	C
Year: Ist				
Semester: Ist	**3**	**0**	**0**	**3**

CourseOutcome(CO)		Bloom'sKnowledge Level(KL)
At the end of course, the student will be able:		
CO-1	Gain in-depth knowledge on natural processes that sustain life and govern the economy.	K2
CO-2	Estimate and predict the consequences of human actions on the web of life, global economy, and quality of human life.	K3
CO-3	Develop critical thinking for shaping strategies (scientific, social, economic, and legal) for environmental protection and conservation of biodiversity, social equity, and sustainable development.	K4
CO-4	Acquire values and attitudes towards understanding complex environmental-economic-social challenges, and participate actively in solving current environmental problems and preventing future ones.	K3
CO-5	Adopt sustainability as a practice in life, society, and industry.	K3

DETAILEDSYLLABUS

Unit	Topic	Proposed Lecture
I	**Environment:** Definition,Typesand Segments of Environment, Importanceand Need for Public Awareness,EffectsofHumanActivitieson Environment (Housing,Agriculture,Industry, Mining and Transportation). Sustainable Development and its challenges. Sustainable life style.	**09**
II	**NaturalResources and their Conservation;** Introduction andClassification natural Recourses, Water, Mineral,Forest Resources; Depletion and their Conservation, EnergyResources;ConventionalandNon-conventionalSourcesofEnergy and their impact on Environment.	**09**
III	**Concept of Ecosystem**; Definition, Structure and function of an Ecosystem, Types ofEcosystem, Balanced Ecosystem-Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation-Value of biodiversity, Threats to biodiversity, In-situ and Ex- situ conservation of biodiversity.	**09**
IV	**Environmental PollutionandWaste management** Definitionand types of EnvironmentalPollution,Air, Water, Soil, NoisePollution; cause, effect and control measures. E-waste and Solid Waste; cause,effect and management.	**09**
V	**Current Environmental issues and Protection;** Global Warming and Climate Change, AcidRain and Ozone LayerDepletion, Population Growth and Women Education. Role of Government in Environmental Protection,	**09**

	Environmental Protection Act 1986.	

Text Books:

1. Textbook of Environment and Ecology by Dave, Katewa& Singh, and 2nd Edition, Cengage Learning India Pvt Ltd Delhi.

Reference Books:

- **S. Deswal** – *Environmental Studies*. Dhanpat Rai & Co.
- **V. K. Ahluwalia** (2nd Edition) – *Environmental Studies*. TERI Press, New Delhi.
- **R. Rajgopalan** – *Environmental Studies*. Oxford University Press.
- **Singh & Malviya** – *Environment & Ecology*. Acme Learning.

Engineering Graphics

(Course Code: BSGUSE2420)

Year: **I**st	L	T	P	C
Semester: **I**st	2	0	0	2

Course Outcome(CO)		**Bloom'sKnowledge Level(KL)**
At the end of the course, the student will be able to:		
CO 1	Use scales and draw projections of objects.	K2
CO 2	Explain views of solids and their sectional surfaces.	K2, K3
CO 3	Analyze and draw isometric projections of objects.	K2, K3
CO 4	Demonstrate orthographic representation of perspective views using modern tools.	K2, K3
CO 5	Apply AutoCAD software for creation of engineering drawing and models	K3, K2

DETAILEDSYLLABUS

Unit	**Topic**	**Proposed Lecture**
I	**Introduction** Engineering Graphics/Technical Drawing, Introduction to drawing equipment's and use of instruments, Types of lines and their uses, Introduction to dimensioning and types. Theory of Projections: Projection-Terms, Orthographic System of projections.	**06**
II	**Projection** Projection of Points: Projection of Points in different quadrants.Projection of Lines: Line Parallel to both H.P. and V.P., Parallel to one and inclined to other, line inclined to both planes, traces of line.	**06**
III	**Projection of Planes** Projection of Planes Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, traces of planes.	**06**
IV	**Projection of Solids** Projection of solids in first or third quadrant, Axis parallel to one and perpendicular to other, Axis parallel to one inclined to other, Axis inclined to both the principle plane, Axis perpendicular to profile plane and parallel to both H.P. and V.P.	**06**
V	**Section of Solids** Sectional views of simple right regular solids like prism, pyramid, Cylinder and Cone. Development of Surface: Development of surfaces of Right Regular Solids-Prism, Pyramid, Cylinder and Cone.	**06**

Text Books:

- **Gill, P. S.** (2013). *Engineering Drawing* (2013 Edition). S. K. Kataria & Sons, New Delhi.
- **Bhatt, N. D.** (2017). *Engineering Drawing* (53rd Edition). Charotar Publishing House Pvt. Ltd., Gujarat.
- **Giesecke, F. E., Lockhart, S., Goodman, M., & Johnson, C. M.** (2016). *Technical Drawing with Engineering Graphics* (15th Edition). Prentice Hall, USA.
- **Shah, M. B. & Rana, B. C.** (2009). *Engineering Drawing* (3rd Edition). Pearson Education, New Delhi.

Reference Books:

1. Kirstie Plantenberg,"Engineering Graphics Essentials-Text and Digital Learning",5thEd.,SDCPublications,USA(2016).

Programming in C lab

(Course Code: B010123152)

Year: **I**st	L	T	P	C
Semester: **I**st	0	0	2	1

List of Experiments (Indicative & not limited to)

1. Basic introduction to C program and Turbo C setup (compile/run program).
2. Simple program using `scanf` and `printf`.
3. Program using `if / else`.
4. Program using operators (`++`, `--`, `%`, `&`, `|`, etc.).
5. Switch-case programs.
6. Programs using loops: `while` loop, `do…while` loop
7. Simple programs using one-dimensional and two-dimensional arrays.
8. String programs (using all string functions).
9. Program to implement **union** and **structures**.
10. Program to demonstrate working of **pointers**.
11. Program to read data from a file and write into a file.

Fundamental of Electrical and Electronics Engineering lab

(CourseCode:B010124153)

Year:**I**st	L	T	P	C
Semester:Ist	**0**	**0**	**2**	**1**

List of Experiments (Indicative & not limited to)

To study the VI characteristics of p-n diode in forward and reverse bias and find the threshold voltage from the VI curve.

To study the operation of Zener diode as a voltage regulator.

To study the operation of half-wave and full wave rectifiers and calculate their ripple factor values.

To study the operation of series and parallel Clippers using P-N junction diodes.

To study the operation of clampers using P-N junction diodes.

To experimentally plot the input and output characteristics of a given BJT transistor in CE configuration and calculate its various parameters.

To experimentally plot the input and output characteristics of a given BJT transistor in CB

configuration and calculate its various parameters.

To study the transfer and drain characteristics of JFET and calculate its various parameters.

To study the transfer and drain characteristics of MOSFET and calculate its various parameters.

Understand the basic concept of inverting amplification using an OPAMP.

Explore the non-inverting amplification configuration of an OPAMP.

Learn about the summing amplifier configuration using OPAMPs.

To verify KCL and KVL Law

Verification of Thevenin's and Norton's theorem.

Resonance in series RLC circuit.

To perform short circuit and Open circuit test on a single-phase transformer.

DC Motor Characteristics: Study of the construction and working principle of a DC motor, Measurement of no-load and loaded characteristics and Determination of efficiency and losses.

Induction Motor Performance: Determination of no-load and blocked rotor tests to obtain equivalent circuit parameters, Measurement of efficiency and power factor at various loads and Study of the effect of voltage variation on performance.

Applied Chemistry Lab
(CourseCode:B010123154)

Year: **I**st	L	T	P	C
Semester: **I**st	0	0	2	1

List of Experiments (Indicative & not limited to)

1. Calibration of Analytical Equipment and apparatus.
2. Determination of Hardness of water sample by EDTA method.
3. Determination of Alkalinity of water sample.
4. Determination of pH by titrimetric method.
5. Determination of surface tension of given liquid.
6. Determination of Viscosity of a given liquid by viscometer.
7. Determination of the strength of ferrous ammonium sulphate using external indicator.
8. Determination of the strength of Potassium dichromate using internal indicator.
9. Determination of available chlorine in bleaching powder.
10. Determination of chloride content in a water sample.
11. Preparation of **Phenol-formaldehyde (PF) resin**.
12. Preparation of **Urea-formaldehyde (UF) resin**.
13. Preparation of **Adipic acid / Paracetamol**.
14. Determination of **rate constant** of hydrolysis of esters.
15. Element detection and identification of functional groups in organic compounds.

Digital Electronics
(Course Code: B010124203)

Year: Ist **L T P C**
Semester: IInd **4 0 0 4**

CourseOutcome(CO)		Bloom'sKnowledge Level(KL)
Attheendofcourse ,thestudentwillbe able:		
CO1	Apply concepts of Digital Binary System and implementation of Gates.	K1, K3
CO2	Analyze and design of Combinational logic circuits.	K2, K4
CO3	Analyze and design of Sequential logic circuits with their applications.	K2, K4
CO4	Implement the Design procedure of Synchronous & Asynchronous Sequential Circuits.	K2, K3
CO5	Apply the concept of Digital Logic Families with circuit implementation.	

DETAILEDSYLLABUS		
Unit	**Topic**	**Proposed Lecture**
I	Digital System And Binary Numbers: Number System and its arithmetic Signed binary numbers, Logic simplification and combinational logic design: Binary codes, code conversion, review of Boolean algebra and Demorgans theorem, SOP & POS forms, Canonical forms, Karnaugh maps method up to five variable, Don't care conditions, POS simplification, NAND and NOR implementation, Quine McClusky method (Tabular method).	**10**
II	Combinational Logic: MSI devices like Magnitude comparator, Multiplexers, Demultiplexers, Decoders, Encoders. Multiplexed display, half and full adders, subtractors, serial and parallel adders, BCD adder.	**10**
III	Sequential Logic And Its Applications: Storage elements: latches & flip flops, Characteristic Equations of Flip Flops, Flip Flop Conversion, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters:Johnson & Ring Counter.	**10**
IV	Synchronous & Asynchronous Sequential Circuits: Analysis of clocked sequential circuits with state machine designing, State reduction and assignments, Design procedure. Analysis procedure of Asynchronous sequential circuits, circuit with latches, Design procedure, Reduction of state and flow table,Race-free state assignment, Hazards.	**10**
V	Memory & Programmable Logic Devices: Digital Logic Families: DTL, DCTL, TTL, ECL & CMOS etc., Fan Out, Fan in, Noise Margin; RAM, ROM, PLA, PAL; Circuits of Logic Families, Interfacing of DigitalLogic Families, Circuit Implementation using ROM, PLA and PAL.	**10**

Text Books:

1. M. Morris Mano and M. D. Ciletti, “Digital Design”, Pearson Education.
2. Digital Circuits and Design, S. Salivahanan, Oxford University Press
3. David J. Comer, “Digital Logic & State Machine Design”, Oxford University Press.
4. RP Jain, “Modern Digital Electronics”, McGraw Hill Publication.

Reference Books:

5. A. Anand Kumar, “Fundamental of Digital Circuits,” PHI 4th edition, 2018.
6. D.V. Hall, “Digital Circuits and Systems,” McGraw Hill, 1989.