SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2101	3	1	3	3 HOURS	40	60	4

NUMERICAL ANALYSIS & COMPUTER APPLICATIONS

UNIT – I Approximations and Errors in Computation: Errors and their analysis**,** Types of errors, General Error – formula, Errors in numerical computation. **Curve fitting** : Method of Least squares , fitting of a straight line , fitting of an exponential cures , polynomial fit : Non linear Regression (second degree parabola) , Least Square Approximation , Method of moments.

UNIT – II Numerical Solution of Algebraic and Transcendental Equations: Graphical method bisection Method, Secant Method ,Regulfalsi Method, Newton Raphson Method, Iteration Method AITKEN'S Method Newton rate of convergence. **Solution of a system of simultaneous linear algebraic Equations Direct method:** Gauss elimination Method, Gauss Jordan method, triangularisation method crout's method choleshy method, Ill conditioned system of equation and refinement of solution. **Iterative methods** .Jacobi Iterative Method, Gauss Seidel Iterative method, Successive over relaxation (SOR) method.

UNIT – III The Calculus of Finite Differences: Finite differences, Difference formula, operators and relation between operators. Differences of a polynomial factorial polynomial, Effect of an error on a difference table. Inverse Operator,
Interpolation with equal intervals: - Newton's forward and backward interpolation formula.
Central difference interpolation formula:-gauss's forward and backward interpolation formula, Sterling's formula Bessel's formula, Lap lace – Everett is formula, choice of interpolation formula. **Interpolation with Unequal intervals**: - Lagrange's interpolation Newton's difference formula, hermit's interpolation, inverse interpolation,

UNIT –IV Numerical Differentiation and Integration: - Numerical Differentiation Newton's forward and Backward difference interpolation formula. Maxima and Minima of a Tabulated function, **Numerical Integration** :- Newton-cote's quardrative formula Trapezoidol rule , simpson is (1/3)rd and (3/8) th rule , Boole's rule, weddle rule ,
Difference Equations -: Definition ,order and degree of a diference equation ., Linear difference equations, Difference equations reducible to Linear form . simultaneous difference equations with constant coefficients . Applications

UNIT – V Numerical solution of ordinary differential equation : Taylor series method , Picard's Method , Euler's method, Modified Euler method Runge's method Runge Kutta method , predict corrctor method , Milne's method , Adam – Bashforth method. **Numerical solution of partial differential Equations :** Classification of P.D.E. of the second order Elliptic equations , solution of Laplace equation , solution of poisson's Equation, solution of elliptic equations by Relaxation method parabolic equations , solution of one two dimensional heat equation Hyperbolic Equations , solution of wave equations .

SUGGESTED BOOKS & REFERENCE:-

1. JAIN & IYNGAR Numerical Methods for Scientific and Engineering Computations.
2. RAO G.S. Numerical Anlysis.
3. Grewal B S Numerical Methods In Engineering and Science.
4. Das K K Advance Engineering Methods.
5. Rajaraman V Computer Oriented Numerical Methods

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2102	3	1	0	3 HOURS	40	60	4

MATEHMATICS – III

UNIT – I Functions of Complex Variables: Limit, Derivative, Analytic function, Cauchy-Riemann equations, Harmonic functions, Geometrical representation, Transformation, Bilinear transformation, Application to Flow problems, Complex integration, Cauchy's integral theorem and integral formula, Taylor's & Laurent's series, Singular point, Poles & residues, Residue theorem & its application to contour integration.

UNIT – II Fourier Series: Periodic functions, Definition of Fourier series, Euler's formulae, Dirichlet conditions, Change of interval, Even and odd functions, Half range Fourier Sine & Cosine series, Parseval's identity, Practical harmonic analysis.

UNIT – III Laplace Transform: Definition, Linearity, Shifting & scaling properties, Transform of elementary functions, Transform of Derivatives and integrals, Multiplication by t & division by t, Inverse Laplace transform, Convolution theorem, Transform of periodic functions, Unit step function & Dirac delta function, Initial value & final value theorems, Application to solution of ordinary differential equations.

UNIT – IV Fourier Transform: Definition of Fourier integrals – Fourier Sine & Cosine integrals, Complex form of Fourier integral, Fourier Sine & Cosine transforms, Complex form of Fourier transform, Linearity, Shifting & scaling properties, Modulation theorem, Inverse Fourier transform, Fourier transform of derivatives.

UNIT – V Wavelet – Transform: Introduction to wavelets, Basic functional Specification, Admissibility condition, Continuous wave transform definition, CWT as a correlation, constant Q Factor , Filtering interpretation and time frequency resolution, Inverse CWT.

SUGGESTED BOOKS & REFERENCE:-

1. H.K.Das, "Advance Engg. Mathematics", S-Chand Publication
2. B.S.Grewal, "Higher Engg. Mathematics", Khanna Publishers
3. Erwin Kreyszig, "Advance Engg. Mathematics", John Wiley & Sons.
4. Louis A.Pipes, "Applied Mathematics for Engineers & Physicists", TMH
5. Rao R.M. & Bopardikar A.S., 'Wavelet Transforms-Introduction to Theory and Applications'
6. Sidney Burrus, Gopinath R.A. & Haitao Guo, Introduction to Wavelets and Wavelet Transforms", Prentice Hall International.
7. Chan Y.T., 'Wavelet Basics', Kluwer Academic Publishers

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2103	3	1	3	3 HOURS	40	60	4

Object Oriented Programming with C++ & application

UNIT I Principles of OOP –A look at procedure oriented programming , OOP paradigm , Basic Concepts of OOPs , Benefits of OOP , object oriented Language. Beginning with C^{++} characters used in C^{++}, Basic Data Types , C^{++} Tokens, Identifiers , Keywords , Constants , Variables , Input / Output statements ,Structure of C^{++} program.

UNIT II Operations and Expressions - Concept, Arithmetic Operations and Expressions, Relational and Logical operators and Expressions ,Order of evaluation of expressions ,Type conversion , Compound assignment Operator ,Standard Library Functions and header files. Flow of control – Compound statement , sequential structure ,selection structure ,simple if ,if … else nested if , ladder ,switch , go to , loop structure , do … while ,for , statement break , continue , function exit ( )

UNIT III Array and Function - Concept of array, Concept of subprogram, Parameter passing in function, Function prototype, Calling function, Call by value, Call by reference, Array parameters, Default argument, Returning values, Scope rules, Storage class, Inline function, Function overloading, Recursive functions.
Structure, Class and Object - Define structure, Returning structure elements, Nested structure, Passing structure to function, User defined data type, Specifying a class, Defining member function, Scope of class and its member, Nested class, Data Hiding and encapsulation, Friend function, Object as function argument, Function returning object, Static member.

UNIT IV Constructors, Destructors, constructor function, parameterised multiple constructor, Default constructor, Copy constructor and Destructor function. Inheritance and aggregation - Derived class, various type of inheritance, Inheriting Constructors, Parts explosion as aggregation, Abstraction and property of aggregation, Constructing aggregations. Polymorphism, overloading and operator overloading.

UNIT V Pointer and virtual function - Pointer variable, dynamic allocation operators, new and delete, this operator Pointers to derived class. Working with files - File & stream, Opening and closing a file, read ( ) and write ( ) functions, detecting end of file.

Reference Books :

Object Oriented Programming With C++ by **M. P. BhaveS. A. Patekar,** Pearson Education
Object Oriented Programming With C++ by E. Balaguruswamy.
Object Oriented Programming in turbo C++ by Robert Lafore.
Programming with C++ by D. Ravichandan.
Programming with C++(SOS) by Hubbard.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2104N	3	1	3	3 HOURS	40	60	4

DATA STURCTURE & PROGRAMMING METHODOLOGY

UNIT I - String algorithms, Arrays algorithms development simple examples of algorithm development, complexity, Divided & conquer binary search, selection sort, insertion sort, merge sort, quick sort, complexity of sorting.

UNIT II - Linear list: Stacks, application of Stacks, arithmetic notations, queues and circular queues , Linked list definition in C, creation and deletion of nodes , circular and doubly linked list .

UNIT III - Trees: Basic Technology , Binary Tree ,Binary tree representation , algebra Expressions , complete Binary Tree, Extended Binary Tree, Array and linked Representation of Binary trees, traversing Binary trees , traversing Threaded Binary trees, Binary search trees(BST) , Insertion and deletion in BST, AVL trees, heap sort.

UNIT IV - Graph and representation: graph algorithms, minimum spanning tree, shortest path, DFS, BFS search, hashing.

UNIT V - Files: File organization, sequential file, direct file organization, index sequential file organization, Data storage and management.

Rference Books

1. Data structures with c, schaum's outline series by seymour lipschutz.
2. Data Structures and Algorithm Analysis in C++, 2/e by Mark Allen Weiss, Pearson Education Wirth Niclaus , "Algorithm + Data Structure = Programs " PHI
3. Horwitz E. and Sahani S. "Fundamentals and Data Structure ", Computer Science Press. Knuth D. "Threat of Computer Programming ", Vol 1-2 Addision - Wesley 1970-80
4. Aho A.V.Hopcraft and Ullman J.E. "Data Structure and Algorithms " addsion Wesley ",1992. Tanonbaum , A.M.and Augenstein , M.J. "Data Structure with Pascal" PHI 1985.
5. Trambley and Sorenson "Data Structure using Pascal " , MGH 1985.
6. Stubbs D. "Data Structure with Abstract Data Type and Modula 2", Brooks & Cole Publication Comp 1987

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2105N	3	1	0	3 HOURS	40	60	4

SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

UNIT I

Software Engineering – What is software, Characteristics of software, Application of software, SDLC, Software Process Models - Linear Sequential model, Prototype model, RAD model, Incremental model, Component Based Development Model,Spiral Model, Fourth Generation Techniques?

UNIT II

Software Requirement Specification-Problem Analysis, Requirement Specification, Validation, metrics, monitoring and control. Models, The Make /Buy Decision. Software Project Management - Cost estimation, project scheduling, Staffing, Software configuration management, Quality assurance, Project Monitoring, Risk management etc.

UNIT III

System Design - Problem portioning, abstraction, top-down and bottom-up design, structured approach, Functional versus Object oriented approach, design specification and verification, metrics, monitoring and control.

MANAGING SOFTWARE PROJECT: The Management Spectrum-People, Product, Process, Software Process and Project Metrics - Measures, Metrics and Indicators, Process and Project Metrics.

UNIT IV

Coding: Top–down and bottom-up structured programming, information hiding, programming style, internal documentation, verification. Metrics, monitoring and control.

Software Measurement-Size Oriented Metrics, Function Oriented Metrics, Metrics For Quality-Overview, Measuring Quality, DRE.

UNIT V

Software testing – software Testing fundamentals, white box testing, Basics path testing, A strategic Issues, Unit testing, Integration testing, validation testing, System Testing software metrics, software evaluation, software maintenance & reliability.

List of Books:

1. Software Engg, Pressmen
2. Software Engg, Pankaj Jalote
3. Software Engg, Shaum’s Outline Series
4. Fundamentals of Software Engineering, Rajib Mal.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2201N	3	1	3	3 HOURS	40	60	4

DIGITAL LOGIC AND DESIGN

UNIT-1 BINARY SYSTEM Binary : Number , Number Base conversion , Octal and Hexadecimal Numbers Complements ,Binary Codes Binary Storage and Registers , Binary Logic , Integrated Circuits**,** Properties of Boolean algebra Boolean Functions.

UNIT – 2 SIMPLIFICATION OF BOOLEAN FUNCTIONS: The K-map method Two –and Three –Variable Maps, Four –Variable Map, Sum of Product and Product of sums Simplification, NAND and NOR implementation, don't – Care Conditions. **COMBINATIONAL LOGIC:** Introduction, Design procedure Adders, half /full adders, half /full Subtractors, Multilevel NAND Circuits, Multilevel NOR Circuits.

UNIT -3 COMBINATIONAL LOGIC WITH MSI AND LSI – Introduction Binary Parallel Adder, Decimal , Adder ,Magnitude Comparator , Decoders and encoder ,BCD to 7 segment decoder , Multiplexers and Demultiplexers ,Read – Only Memory (ROM) , Programmable Logic Array (PLA).

UNIT- 4 SEQUENTIAL LOGIC: Introduction Flip –Flops , triggering of Flips –Flops , Analysis of Clocked Sequential Circuits , State Reduction and Assignment . Flip –Flop Excitation Tables.

UNIT -5 REGISTERS, COUNTERS, AND MEMORY UNIT Introduction, Registers, shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, The Memory Unit Examples of Random Access Memories.

REFERENCES:

1 Digital Logic & Computer Design PH1 M Mano
2 Switching Circuit & Finite automata –ZVI Kohavi (TMH)
3 Fletcher W.I.: An engineering approach to Digital design PH1

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2202N	3	1	0	3 HOURS	40	60	4

Computer network

UNIT I Network topologies, synchronous and asynchronous transmission, error detection techniques like parity Check, LRC and CRC (Cyclic Redundancy check).

UNIT II Circuit switching, circuit switched networks, switching concepts, space division switching, and time division Switching. Packet switching: - Packet switching principles, switching techniques, comparison with circuit switching, routing and congestion control algorithms, introduction to spread spectrum and its applications.

UNIT-III Uses of Computer Network, Network hardware, Layered Architecture, function of the layers, Network Standardization, OSI & TCP/IP Reference model, Physical layer services & hardware protocols.
DATA LINK CONTROL: - Framing, Flow Control: Stop and wait Protocols, Sliding Window Protocols. Error Detection & Error Control, High Level Data Link Control (HDLC),Other Data Link Control Protocols : Pure ALOHA & Slotted ALOHA.

UNIT-IV NETWORK LAYER & TRANSPORT LAYER: - Network Layer Protocols: Design issues : Virtual Circuits and datagram's, Routing Algorithms: Optimality principle, Shortest path routing- Dijkstra's algorithms, Distance Vector routing, Link state routing, Flow and Congestion Control: packet discarding , Traffic shaping, Choke packets, RSVP, IP fragment, RIP, OSPF, Inside router, Transport Layer Protocols : Basic functions, Connection Management: Establishment and releases, TCP & UDP.

UNIT-V UPPER LAYERS: - Session Layer Protocols: Dialog Management, Synchronization, Presentation layer functions: translation, encryption, compression, Cryptography : substitution and Transposition Ciphers, Data Encryption standards (DES), Public Key cryptography, Authentication protocols, Different compression coding techniques. Application layer protocols & services: Email, World Wide Web, file, transfer protocol, remote file server, internet telephony & chatting.

Text Books:

1. Data Communication & Networking by Behrouz A. Forouzan.
2. Data and Computer Communication by William Stalling (Pearson Education)
3. Computer Networks by Andrew S.Tanenbaum

Reference Books:

1. Computer Networking by Ed Tittel (Schaum's series) (TMH)
3. Telecom Switching system & Networking by Thiagrajan viswanathan (PHI)

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2203	3	1	0	3 HOURS	40	60	4

NETWORK ANALYSIS AND SYNTHESIS

UNIT – I Introduction to charge and energy, The relationship of field and circuit concepts: The Capacitance parameter, the Inductance parameter, the Resistance parameter, Dot conventions for coupled circuits, Topological description of N/W, Kirchoff's laws, Loop variable analysis, Node variable analysis, Duality, State variable analysis, **First Order differential equations:** General and Particular solutions, time constants, Integration factor, initial factor, initial conditions in elements,

UNIT – II Second order differential equations; Internal excitation, Network excited by external energy sources, Responses as related to the s-plane location of roots, General solutions in terms of S, Q and Wn, **Laplace transformation:** laplace transform of some important functions, Shifting theorem, Gate function, Wave – form synthesis, the Initial & Final value of f(t) and F(s), the Convolution integral, Convolution as a summation.

UNIT – III Impedence function: Complex frequency, Transform impedance and transform circuits,
Network theorems: Thevenin's & Norton's theorem, Superposition, Reciprocity, Maximum Power transfer and Milliman's theorem. **Poles and Zeros of Network function**, Restrictions on poles and zeros, Locations for transfer function & driving point functions, Time domain behavior from the pole and zero plot, Stability of active networks,

UNIT – IV Two port parameter's: Short circuit admittance parameter, Open circuit impedance parameter, h – parameter, Relation between parameter sets. Sinusoidal steady state analysis & Frequency response plots, Telligen's theorem. **Sinusoidal steady state analysis**: Steady state response of R,C, L elements to sinusoidal excitation, Resonance, Frequency domain Specification , Frequency domain analysis of continuous time systems, Fourier series , Properties, Fourier Transform, Properties and Application to systems

UNIT – V Network Synthesis: Realisibility concept, Hurwitz property positive realness properties of positive real functions, Synthesis of RL, RC and LC, Driving point impedance functions using simple canonical Networks – Foster and Causer form.

SUGGESTED BOOKS & REFERENCE:-

1. Introduction to modern n/w synthesis : ME vanvalkenburg
2. Introduction to circuit synthesis & design : Temes & Laptra (Tata Mcgraw Hill)
3. Network analysis : ME Vanvalkenburg

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2204	3	1	3	3 HOURS	40	60	4

Introduction to Communication

UNIT I

Introduction to communication system, Representation of signals and systems, Modulation, Need for modulation, Amplitude modulation, Modulation Index, Frequency spectrum for AM wave, Power control in AM wave, Balanced modulator, The square law demodulator, DSB-SC modulation.

UNIT II

Phase modulation, Frequency Modulation, and their relationship, frequency deviation, spectrum of FM signals, effect of modulation on BW, Method of FM generation and FM demodulators.

UNIT III

Sampling theorem, Pulse modulation, PAM,PPM, PWM, quantization of signals, Pulse code modulation(PCM), Time division multiplexing (TDM), DPCM, DM, ADPCM, Introduction to ASK,FSK, PSK.

UNIT IV

Spread spectrum, spread spectrum modulation, requirement of spread spectrum signals, classification of pread spectrum systems, Frequency hopped spread spectrum system (slow freq., fast freq.) , Advantages and Limitations of DS & FH system, CDMA spread spectrum system, Application of spread spectrum.

UNIT V

Components & block diagram of satellite communication system, Transponders, up-link, down-link, Budget calculations. Keplea's law and Geostationary orbit, satellite multiple access techniques.
Fiber Optic communication: Principle of light propagation in optical fiber, losses in fiber, dispersion, connectors and splices. Fiber optic communication link.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT2205	3	1	0	3 HOURS	40	60	4

DISCRETE STRUCTURE

UNIT-I:
Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, and partial ordering relation. Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions. Theorem proving Techniques: mathematical induction (simple and strong), pigeonhole principle, prove by contradiction.

UNIT-II:
Algebraic Structures: Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results, Rings and Fields: definition and standard results.

UNIT-III:
Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded I and complemented lattices.
Boolean Algebra: Basic definitions, sum of products and product of sums, form in Boolean Algebra, Logic gates and Karnaugh maps. Tree: Definition, Rooted tree, properties of trees, binary search tree, tree traversal.

UNIT-IV:
Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.

UNIT-V:
Combinatorics & Graphs: Recurrence Relation, Generating function., Simple graph, multi graph, graph terminology, representation of graphs, Bipartite, Regular, Planar and connected graphs, connected components in a graph, Euler graphs, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs.

Text books and Supplementary reading:

1. Liptschutz, Seymour, " Discrete Mathematics", McGraw Hill.
2. Trembley, J.P & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw Hill.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
5. Krishnamurthy, V., "Combinatorics Theory & Application", East-West Press Pvt. Ltd.,