

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3101N	3	1	0	3 HOURS	40	60	4

ADVANCED COMPUTER ORGANIZATION

UNIT-I BASIC COMPUTER ORGANIZATION AND DESIGN

Computer Organization, Computer Architecture, Machine Language, Organization of a Simple Computer, Interconnection Structures, Bus Interconnection, MAR, MBR, PC, IR, PCI. Data Path of a typical Von Neumann Machine, Instruction Code, Decoding & Execution, The Fetch- Decode-Execute Cycle: Example, Instruction Formats, Stack Organization, architectural classification schemes , SISD , SIMD , MISD , MIMD architectures , multiprocessor and multicomputers , UMS , NUMS , COMS , NORMS models.

UNIT-II ARITHMETIC PROCESSOR DESIGN

Fixed-Point Arithmetic- Addition and Subtraction: addition and subtraction with Signed- Magnitude Data, Hardware Implementation, Hardware Algorithm, addition and subtraction with Signed- 2's Complement Data. Multiplication Algorithm: Hardware Implementation, Hardware Algorithm, Binary Multiplication, Booth Multiplication Algorithm. Division Algorithm, Floating-Point Arithmetic Operations: Basic Considerations, Register Configuration, Addition, subtraction, Multiplication & Division. Decimal Arithmetic Unit: Decimal Multiplication, Decimal division.

UNIT-III CONTROL UNIT ORGANIZATION

The Control Unit: Type of control unit, Control Unit Function, Control Unit Operation, Hardwired Control Unit- Basic Concept, Advantages, Disadvantages. Micro-Programmed Control Unit- Basic Concept, Advantages, Disadvantages. Difference between Hardwired Control Unit and Micro-Programmed Control Unit, Control Memory, Address Sequencing. Micro -Programmed Micro-Instruction Types- Vertical Micro-Programming, Horizontal Micro-Programming, Control Store, Horizontal Versus Vertical, Principle Advantages, Disadvantages, Microinstruction Formats, Microinstruction Sequence, Emulation, Bit Slicing.

UNIT-IV PRINCIPAL OF PIPELINING

Over lapped parallelism , principal of Liner pipelining processor , General pipelining and reservation tables, arithmetic pipelining, Design of pipeline Instruction units , arithmetic pipelining designexample, hazard detection and resolution , JOB sequencing and collision prevention.

UNIT V PRINCIPLES OF MULTITHREADING

Multithreading issue and solution, multiple context processor, multidimensional architecture, Advanced processor technology – RISC & CISC computers, super scalar architecture. Superscalar Processor.

Text Books

1. Computer System Architecture By, M. Morris Mano Prentice- Hall, 1993.
2. Computer Architecture & Organization By John P. Hayes, McGraw Hill-1998
3. Advanced computer Architecture by Kai Hwang.

Reference Books

1. Structured Computer Organization by Andrew S. Tanenbaum.
2. Computer architecture a quantitative approach, Patterson D. A. and Hennessy, J. L.,
3. Computer architecture and parallel processing by Hwang and Briggs.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3102	3	1	3	3 HOURS	40	60	4

OPERATING SYSTEM

UNIT I INTRODUCTION TO OPERATING SYSTEM :

objective and function . The evaluation of the operating system , system components operating system services , system structure ,batch interactive , time sharing and real time operating system , Protection. File system : File concepts , file organization and access mechanism , directory.

UNIT II CONCURRENT PROCESS :

Process concepts , principal of concurrency . the producer consumer problem , the critical section problem , semaphore, classical problem in concurrency , inter process communication , process generation , process scheduling .

UNIT III CPU SCHEDULING :

scheduling concepts, performance criteria scheduling algorithms. algorithm evaluation , multiprocessor scheduling.I/O management and Disk scheduling I/O devices and organization of the I/O functions. I/O buffering disk I/O operating system design issues.

UNIT IV DEAD LOCKS :

system models, deadlock characterization , prevention , avoidance and detection recovery from deadlock , combined approach.

UNIT V MEMORY MANAGEMENT :

Base machine , Residence monitor , multiprogramming with fixed partition , multiprogramming with variable partitions, multiple base register, paging, segmentation, paging segmentation, virtual memory concepts , demand paging performance , page replacement algorithms , allocation of frames, thrashing , cache memory organization impact on performance .

Reference Books

1. Milenkovic M. , “Operating System concepts”, MGH
2. Tanenbaum A. S. “Operating System design and implementation” , PHI
3. Silberschartz A.and Patterson J.I. , “ Operating system concepts”, Wisley.
4. Stilling William “ Operating System “, Maxwell McMillan International Edition 1992.
5. Dectel H.N. , “An introduction to operating system “, Addison Wisley.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3103	3	1	3	3 HOURS	40	60	4

DATA BASE MANAGEMENT SYSTEM

UNIT- I INTRODUCTION:

An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT- II RELATIONAL DATA MODEL AND LANGUAGE:

Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus, **Introduction to SQL:** Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

UNIT- III DATA BASE DESIGN & NORMALIZATION:

Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT- IV TRANSACTION PROCESSING CONCEPTS:

Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

UNIT- V CONCURRENCY CONTROL TECHNIQUES:

Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

Text Books

1. Date C J, "An Introduction To Database System", Addison Wesley
2. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill
3. Elmasri, Navathe, "Fundamentals Of Database Systems", Addison Wesley
4. Leon & Leon, "Database Management System", Vikas Publishing House.

References

1. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication
2. Majumdar & Bhattacharya, "Database Management System", TMH
3. Ramakrishnan, Gehrke, "Database Management System", McGraw Hill
4. Kroenke, "Database Processing: Fundamentals, Design and Implementation", Pearson Education.
5. Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New Delhi

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3104	3	1	3	3 HOURS	40	60	4

MICROPROCESSOR AND INTERFACES

UNIT I MICROPROCESSOR ARCHITECTURE:

Introduction to Microprocessors, Architecture of 8085, internal register & flag register, Generation of Control Signals: Bus Timings: Demultiplexing of address /data bus; Fetch Cycle, Execute Cycle, Instruction Cycle, Architecture of 8086, Pin configuration & functions, Instruction execution timings, Bus Standards.

UNIT II ASSEMBLY LANGUAGE PROGRAMMING :

Instruction format : Data transfer instructions : Arithmetic instructions , Branching and looping instructions , NOP and HLT. Flag manipulation instructions . logical shift and Rotate instructions . Directives and operators . Assembly process . Translation of assembler instructions.

UNIT III MODULAR PROGRAMMING :

Linking and relocation , Stacks and procedures , Interrupts and interrupt routines Macros Program design. Byte and String manipulation : String instructions.

UNIT IV ARCHITECTURE OF PERIPHERAL INTERFACING DEVICES :

Architecture, Pin Diagram and functioning of 8155/8156 (RAM), 8355/8755 (ROM), 8255 (PPI). Programmable Internal Timer 8253/8254: Block Diagram, Pin Configuration, Modes, Initialization Instruction, Interfacing.

UNIT V 80386

Basic Architecture : Memory capacity : 32 – bit architecture , Data types , Tasks address , Calculation , Page-based virtual memory, Segment and page protection , Additional exceptions , Input/Output , Pipelining . General-purpose registers. Real protected and virtual mode operations . Address segmentation , Segment length , Paging segment registers.

Reference Books

1. Microcomputer System 8086/8088 Family – Architecture Programming and design : Y Liu and G. A. Gibson : Prentice Hall
2. Microprocessor 8086 , 80386 & Pentium , Barry B. Brey
3. The 8086 microprocessor : programming and interfacing The PC by Kenneth J Ayala
4. 80386 Microprocessor Handbook C.H. Pappas and W. H. Murray : Osborne McGraw Hill
5. Microprocessor Architecture Programming and Application : R.C. Gaonkar : Wiley Eastern.
6. Programmed Logic and Microprocessor K.L. Short , Prentice Hall of India

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3105N	3	1	0	3 HOURS	40	60	4

ANALYSIS AND DESIGN OF ALGORITHM

UNIT I PERFORMANCE ANALYSIS

Space and Time Complexity, Asymptotic Notations. **Divide and Conquer:** Finding Maxima and Minima Binary search, Merge Sort, Quick Sort, selection sort.

UNIT II GREEDY METHOD

Knapsack problem, Job Sequencing, Optimal Merge Patterns, and Minimum Spanning trees. Dynamic Programming: All pairs shortest path, optimal binary search tree, 0/1 knapsack problem, traveling sales man problem, flow shop scheduling.

UNIT III SEARCH TECHNIQUES

Techniques for binary trees, techniques for graphs –DFS and BFS, connected components and spanning tree, Bi-connected components and DFS. Backtracking: The 8-queen problem, graph coloring, Hamiltonian cycles.

UNIT IV BRANCH AND BOUND

0/1 knapsack problem, traveling sales person problem, efficiency consideration, Algebraic Problems, lower Bound theory.

UNIT V NP HARD AND NP COMPLETE PROBLEM

Basic concepts, problem classes, P, NP, NP hard, NP complete problem, deterministic and non deterministic polynomial time algorithm

REFERENCE BOOKS:

1. Horowitz E & Sahani S, "Fundamentals of Computer algorithms", Galgotia.
2. Aho, Hopcroft & Ullman, "The design and Analysis of computer Algorithms" Addison Wesley
3. Sedgewick, "Algorithms in C"

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3201	3	1	3	3 HOURS	40	60	4

OBJECT ORIENTED SYSTEM AND JAVA PROGRAMMING

UNIT I OBJECT MODELING :

Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, candidates keys, constraints.

UNIT II DYNAMIC MODELING :

Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concept, a sample dynamic model.

UNIT III FUNCTIONAL MODELING :

Data flow diagram, specifying operations, constraints, a sample functional model. OMT (Object modeling techniques) methodologies, SA/SD, JSD

UNIT IV JAVA PROGRAMMING:

Introduction, operators, data types, Variables, Methods & classes, Multithread programming, I/O, java Applet. Java library: Event Handling, AWT, AWT controls, Layout manager and Menus.

UNIT V SOFTWARE DEVELOPMENT WITH JAVA :

Java Beans, Java swing, Java servlets, Migrating from C++ to java, Application of java, Dynamic Billboard applet, Image Menu : An Image based menu, Lavatron Applets, Scrabblets, JDBC.

Text Books

1. James Rumbaugh et al “ object Oriented Modeling and design” PHI
2. Herbert Schildt “ The complete Reference : Java” TMH
3. E. Balagurusamy “ Programming in Java”, TMH

Reference Books :

1. Booch Grady, “ Object Oriented Analysis & design with application 3/e”, Person
2. Bjarne Stroustrup “ C++ Programming Language” Addison Wesley
3. E Balagurusami “ Object Oriented Programming with C++, TMH

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3202	3	1	3	3 HOURS	40	60	4

INTERACTIVE COMPUTER GRAPHICS

UNIT-I OVERVIEW OF GRAPHICS SYSTEM :

I/O devices, Raster scan & Random scan system, line-circle-ellipse generating algorithm, filled area primitives, 2-D & 3-D transformation, Clipping: 2-D Cyrus Beck clipping, 2-D & 3-D Sutherland cohen clipping, Polygon clipping, Hodgeman-sutherland & Weiler-Atherton polygon clipping.

UNIT-II CURVES & SURFACES :

Conics-Parametric forms for circle, ellipse, parabola, Bezier Curves-Need for cubic parametric curves c_0, c_1, c_2 continuity, Generation through Bernstein polynomials, Condition for smooth joining of 2 segments, Convex Hull property, B-Spline Curves: Knot vectors-uniform and open uniform curves, Uniform, Periodic B-splines, Open, Uniform B-splines, Non-uniform, rational B-splines, Beta splines, Subdividing curves, Drawing curves using forward differences.

UNIT-III PROJECTIONS & HIDDEN SURFACE REMOVAL :

3-D Transformation for right handed co-ordinate system (Z-axis towards viewer), Parallel projection on xy plane (including oblique view), Perspective projection-1, 2 and 3 Vanishing points, Reconstruction of 3-D images. Hidden Surface Removal: Back face removal, Floating Horizon method for curved objects, ZBuffer or depth buffer algorithm, Painters algorithm (Depth sorting method), Binary space partitioning trees, Scan-line algorithm, Warnock's algorithm.

UNIT-IV SHADING & COLOR ISSUES :

Illumination model for diffused & specular reflection, Computing reflection vector, Gouraud and Phong tracing, Band Illusion, Lateral inhibition, Texture mapping & their characteristics, Bump mapping, Handling shadows, Radiosity: Lambert's Law, Basic element, Recapitulation, Modeling transparency, Visualization of data sets, volume rendering, Color issues: Additive, Subtractive primaries, Wavelength spectrum, JCM color.

UNIT-V FRACTALS & ANIMATION :

Fractals: self-similar fractals-fractal dimension, Generation of Terrain-random mid point displacement, Grammar based models, Self-squaring fractals. Solid Modelling: Generation through sweep techniques, Constructive solid geometry, B representations, Octrees, Ray Tracing & their Theory, Animation: In-betweening using rotation and translation, Procedural animation, Image Transformation-Translation and rotation, Morphing, Motion Control (Key framing).

Text Books:

1. Computer graphics, Hearn and Baker, PHI
2. Computer Graphics, Foley, PE-LPE,

Reference Books:

1. Procedural Elements of Computer graphics, Rogers, McGraw Hill
2. Computer graphics, Harringtons S., McGraw Hill.
3. Computer Graphics, Schoum Series.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3203	3	1	0	3 HOURS	40	60	4

INTRODUCTION TO INFORMATION SCIENCE

UNIT-I

Uncertainty, Information and Entropy Information Measures: Characteristics on information measure; Shannon's concept of information; Shannon's measure of information; Model for source coding theorem; Communication system; Source coding and line/channel coding; channel models, channel mutual information capacity (Bandwidth).

UNIT-II

Channel coding, Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes; Types of codes; Block codes; Tree codes; Hamming codes; Description of linear block codes by matrices; Description of linear tree code by matrices; Parity check codes; Parity check polynomials.

UNIT-III

Compression: Lossless and lossy; Huffman codes; Binary Image compression schemes; Runlength Encoding; CCITT group-3 1D compression; CCITT group-3 2D compression; CCITT group-4 2D compression.

UNIT-IV

Video Image Compression: Requirement of full motion video compression; CCITT H 261 video coding algorithm; MPEG compression methodology; MPEG-2 compression; Audio (Speech) compression.

UNIT-V

Cryptography: Encryption; Decryption; Cryptogram (cipher text); Concept of cipher; Cryptanalysis; Keys: Single key (Secret key); Cryptography; two-key (Public key) cryptography; Single key cryptography; Ciphers; Block Cipher code; Stream ciphers; Requirements for secrecy; The data Encryption Standard; Public Key Cryptography; Diffie-Hellmann public key distribution; The Rivest-Shamir Adelman (R-S-A) system for public key cryptography; Digital Signature.

Text Books:

1. Digital Communication by Das, Mullick & Chatterjee, New Age Pub.
2. Digital Communication by Proakis, TMH
3. Digital Image Processing by Gonzales & Woods, Pearson (for Unit – III & IV)
4. Local Area Network by G. Keiser, TMH (for Unit – V)

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3204N	3	1	0	3 HOURS	40	60	4

THEORY OF COMPUTATION

UNIT I

Deterministic and non deterministic finite automata , Regular Expression , Two way finite automata , finite automata with output , properties of regular set , pumping lemma , closure properties, My-Hill Nerode Theorem.

UNIT II

Context Free Grammars (CFG), derivation trees, Simplification normal forms, Chomskey Hierarchy: Regular Grammars, Unrestricted Grammars and Relations Between Classes of languages .

UNIT III

Push Down Automata: Definitions relationship between PDA and Context Free Languages, properties of CGL's Decision Algorithms.

UNIT IV

Turing Machine : The Turing machine model , Computable languages and functions, Modification of Turing machines Church's Hypothesis.

UNIT V

Properties of recursive and recursive enumerable languages, Universal Turing machine, Undesirability Post correspondence problem introduction to recursive function theory.

REFERENCE BOOKS:

1. Hopcroft and Ullman " Introduction to Automata Theory Languages and Computation ", Narosa.
2. Mishra and Chandrashekharan, " Theory of Computer Science ", PH.
3. Kohan " Theory of Computer Science".
4. Korral " Theory of Computer Science".

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT3205	3	1	0	3 HOURS	40	60	4

MOBILE COMMUNICATION

UNIT-I INTRODUCTION TO MOBILE & WIRELESS DEVICES:

Mobile and Wireless Devices, History, Applications, Simplified Reference Model; Wireless Transmission, Frequencies for Radio Transmission, Regulations, Signals, Antennas, Signal Propagation, Multiplexing, Modulation, Wireless LANs And Wireless WANs, Spread Spectrum, FHSS and DSSS Spread Spectrum Technology; Cellular Systems, The Radio Spectrum, Cell Size and Achievable Throughput; Medium Access Control, Specialized MAC; SDMA; FDMA; TDMA; CDMA.

UNIT-II TELECOMMUNICATION & BROADCAST SYSTEMS GSM:

Mobile Services, System Architecture, Radio Interface, Protocols, Localization and Calling, Handover, Security, New Data Services; DECT, TETRA, UMTS & IMT-2000; CDPD, Data Over Analog and Digital Cellular, Paging and Two-Way Paging; Satellite Systems, Applications, GEO, LEO, MEO, Routing, Localization, Handover; Broadcast Systems, Cyclic Repetition of Data, Digital Audio Broadcasting.

UNIT-III WIRELESS NETWORKS Wireless LAN:

Hidden Nodes in Wireless Networks, Ordered MAC Techniques and Wireless Networks, Deterministic MACs for Wireless Networks, Comparison Of MAC Techniques for Wireless Networks; Infrared V/S Radio Transmission; IEEE 802.11, Architecture, Layers, Management; HIPERLAN; Bluetooth; Wireless ATM, Services, Reference Model, Functions, RAL, Handover, Location Management, Addressing, QOS, ACP.

UNIT-IV MOBILE NETWORK AND TRANSPORT LAYERS:

Mobile Network Layer; Mobile IP, DHCP, ADHOC Networks; Mobile Transport Layer; Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP; Fast Transmit/Fast Recovery, Transmission/Time Out Freezing, Selective Retransmission, Transaction Oriented TCP.

UNIT-V MOBILE SYSTEM DEVELOPMENT & SUPPORT :

File Systems; World Wide Web, HTTP; HTML; System Architectures; WAP; Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Environment; WML; WMLscript; Wireless Telephony Applications.

Text Book

1. Mobile Communications – Schiller, Jochen; 2nd Indian Reprint, Pearson Education Asia-Addison Wesley Longman PTE. Ltd.

Reference Books:

1. Mobile Data Wireless LAN Technologies – Dayem, Rifaat A.; Prentice Hall International.
2. The Essential Guide To Wireless Communication Applications – Dornan, A.; 1st Indian Reprint, Pearson Education Asia.