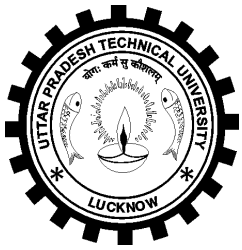
U.P. TECHNICAL UNIVERSITY LUCKNOW



Syllabus

of

Computer Science & Engineering

2nd Year (III & IV Sem.)

[Effective from Session 2009-10]

B.Tech.

U.P. TECHNICAL UNIVERSITY, LUCKNOW

STUDY & EVALUATION SCHEME

B. Tech. Computer Science & Engineering

[Effective From session 2009-10]

YEAR II, SEMESTER-III

S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				Subject Total	Credits
						SESSIONAL EXAM.			ESE		
			L	T	P	CT	TA	Total			
THEORY											
1.	ECS-301	Digital Logic Design	3	1	0	30	20	50	100	150	4
2	EAS-301	Mathematics-III	3	1	0	30	20	50	100	150	4
3.	EHU-301/ EHU-302	Industrial Psychology/ Industrial Sociology	2	0	0	15	10	25	50	75	2
4.	ECS-302	Data Structures Using C	3	1	0	30	20	50	100	150	4
5.	ECS-303	Discrete Mathematical Structures	3	1	0	30	20	50	100	150	4
6.	ECS-304	IT Infrastructure and its Management	3	1	0	30	20	50	100	150	4
7.	*EHU-111*	**Human Values & Professional Ethics*	*2*	*2*	*0*	*15*	*10*	*25*	*50*	*75*	
PRACTICAL/DESIGN/DRAWING											
8.	ECS-351	Logic Design Lab	0	0	2	10	10	20	30	50	1
9.	ECS-352	Data structures Lab	0	0	2	10	10	20	30	50	1
10.	ECS-353	Numerical Techniques	0	0	2	5	5	10	15	25	1
11.	GP-301	General Proficiency	-	-	-	-	-	50	-	50	1
		Total	17	5	6	-	-	-	-	1000	26

*Human values & Professional Ethics will be offered as a compulsory audit course for which passing marks are 40% in theory & 50% in aggregate. Students will be required to audit it with in the period of their study. There will not carry over facility for this course and the failure student will be required to repeat this course (in next-semester).

U.P. TECHNICAL UNIVERSITY, LUCKNOW

STUDY & EVALUATION SCHEME

B. Tech. Computer Science & Engineering
[Effective from Session 2009-10]
YEAR II, SEMESTER-IV

S. No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				Subject Total	Credits
						SESSIONAL EXAM.					
			L	T	P	CT	TA	Total	ESE		
THEORY											
1.	EHU-402/ EHU-401	Industrial Sociology / Industrial Psychology	2	0	0	15	10	25	50	75	2
2.	EOE-041- EOE-048	Science Based Open Elective	3	1	0	30	20	50	100	150	4
3.	EEC-406	Introduction to Microprocessor	3	1	0	30	20	50	100	150	4
4.	ECS-401	Computer Organization	3	1	0	30	20	50	100	150	4
5.	ECS-402	Database Management Systems	3	1	0	30	20	50	100	150	4
6.	ECS-403	Theory of Automata & Formal Languages	3	1	0	30	20	50	100	150	4
7	*EHU-111*	**Human values & Professional Ethics*	*2*	*2*	*0*	*15*	*10*	*25*	*50*	*75*	
PRACTICAL/TRAINING/PROJECT											
8.	EEC-456	Microprocessor Lab	0	0	2	10	10	20	30	50	1
9.	ECS-452	DBMS Lab	0	0	2	10	10	20	30	50	1
10.	ECS-453	Computer Organization Lab	0	0	2	5	5	10	15	25	1
11.	GP-401	General Proficiency	-	-	-	-	-	50	-	50	1
		Total	17	5	6	-	-	-	-	1000	26

Paper Code	**Science Based Open-Electives**
EOE-031/EOE-041	Introduction to Soft Computing (Neural Networks, Fuzzy Logic and Genetic Algorithm)
EOE-032/EOE-042	Nano Sciences
EOE-033/EOE-043	Laser System and Applications
EOE-034/EOE-044	Space Science
EOE-035/EOE-045	Polymer Science & Technology
EOE-036/EOE-046	Nuclear Science
EOE-037/EOE-047	Materials Science
EOE-038/EOE-048	Discrete Mathematics**

** Note : CS & IT Students can not take the Open Elective Course EOE 048 : Discrete Mathematics.

ECS-301 : Digital Logic Design

Unit-I

Digital system and binary numbers: : Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes.
Floating point representation
Gate-level minimization: The map method up to five variable, don't care conditions, POS simplification, NAND and NOR implementation, Quine Mc-Clusky method (Tabular method).

Unit-II

Combinational Logic: Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers

Unit-III

Synchronous Sequential logic: Sequential circuits, storage elements: latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure.
Registers and counters: Shift registers, ripple counter, synchronous counter, other counters.

Unit-IV

Memory and programmable logic: RAM, ROM, PLA, PAL.
Design at the register transfer level: ASMs, design example, design with multiplexers.

Unit-V

Asynchronous sequential logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race free state assignment, hazards.

Text Book: M. Morris Mano and M. D. Ciletti, "Digital Design", 4th Edition, Pearson Education

EAS-301: MATHEMATICS –III

L	T	P
3	1	0

Unit – I : Function of Complex variable

Analytic function, C-R equations, Cauchy's integral theorem, Cauchy's integral formula for derivatives of analytic function, Taylor's and Laurent's series, singularities, Residue theorem, Evaluation of real integrals of the type $\int_0^{2\pi} f(Cos\,\theta, Sin\,\theta)\,d\theta$ and $\int_{-\infty}^{+\infty} f(x)\,dx$ **10**

Unit – II : Statistical Techniques - I

Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc., Correlation, Linear, non –linear and multiple regression analysis, Probability theory. **08**

Unit – III : Statistical Techniques - II

Binomial, Poisson and Normal distributions, Sampling theory (small and large), Tests of significations: Chi-square test, t-test, Analysis of variance (one way) , Application to engineering, medicine, agriculture etc.

Time series and forecasting (moving and semi-averages), Statistical quality control methods, Control charts, $\bar{X}$, R, p, np, and c charts. **08**

Unit – IV : Numerical Techniques – I

Zeroes of transcendental and polynomial equation using Bisection method, Regula-falsi method and Newton-Raphson method, Rate of convergence of above methods.

Interpolation: Finite differences, difference tables, Newton's forward and backward interpolation , Lagrange's and Newton's divided difference formula for unequal intervals. **08**

Unit – V : Numerical Techniques –II

Solution of system of linear equations, Gauss- Seidal method, Crout method. Numerical differentiation, Numerical integration , Trapezoidal , Simpson's one third and three-eight rules, Solution of ordinary differential (first order, second order and simultaneous) equations by Euler's, Picard's and forth-order Runge- Kutta mehthods. **08**

Test Books :-

1. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning, 2007.
2. Jain, Iyenger & Jain, Numerical Methods for Scientific and Engineering Computation, New Age International, New Delhi , 2003.
3. J.N. Kapur, Mathematical Statistics, S. Chand & company Ltd.,2000

Reference Books :-

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House, 2002.

2. Chandrika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.
3. E. Kreysig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
5. Devi Prasad, An introduction to Numerical Analysis, Narosa Publication house, New Delhi 2006.

ECS-302 : DATA STRUCTURES USING - C

L	T	P
3	1	0

Unit - I

Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade-off. Abstract Data Types (ADT)

Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays, Sparse Matrices and their representations.

Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition, Generalized Linked List
.

Unit – II

Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion

Queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

Unit – III

Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

Unit – IV

Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transistive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm, Introduction to Activity Networks

Unit – V

Searching : Sequential search, Binary Search, Comparison and Analysis
Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting.

Search Trees: Binary Search Trees(BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees

Hashing: Hash Function, Collision Resolution Strategies
Storage Management: Garbage Collection and Compaction.

Text books and References:

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication
3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill
4. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education
5. Lipschutz, "Data Structures" Schaum's Outline Series, TMH
6. G A V Pai, "Data Structures and Algorithms", TMH

ECS-303 : DISCRETE MATHEMATICAL STRUCTURES

L T P
3 1 0

Unit-I

Set Theory: Introduction, Combination of sets, Multisets, Ordered pairs. Proofs of some general identities on sets.
Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Recursive definition of relation, Order of relations.
Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions. Growth of Functions.
Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases. Proof Methods, Proof by counter – example, Proof by contradiction.

Unit-II

Algebraic Structures: Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups, Permutation and Symmetric groups, Group Homomorphisms, Definition and elementary properties of Rings and Fields, Integers Modulo *n*.

Unit-III

Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram.
Lattices: Definition, Properties of lattices – Bounded, Complemented, Modular and Complete lattice.
Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean
expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean
algebra.

Unit-IV

Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction,
Algebra of proposition, Theory of Inference.

Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of
predicate logic.

Unit-V

Trees : Definition, Binary tree, Binary tree traversal, Binary search tree.
Graphs: Definition and terminology, Representation of graphs, Multigraphs, Bipartite graphs, Planar graphs,
Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring,
Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.
Combinatorics: Introduction, Counting Techniques, Pigeonhole Principle, Pólya's Counting Theory.

References:

1. Koshy, Discrete Structures, Elsevier Pub. 2008
2. Kenneth H. Rosen, Discrete Mathematics and Its Applications, 6/e, McGraw-Hill, 2006.
3. B. Kolman, R.C. Busby, and S.C. Ross, Discrete Mathematical Structures, 5/e, Prentice Hall, 2004.
4. E.R. Scheinerman, Mathematics: A Discrete Introduction, Brooks/Cole, 2000.
5. R.P. Grimaldi, Discrete and Combinatorial Mathematics, 5/e, Addison Wesley, 2004.
6. Jean Paul Trembley, R Manohar, Discrete Mathematical Structures with Application to Computer Science, McGraw-Hill, Inc. New York, NY, 1975.

ECS-304 : INFORMATION TECHNOLOGY INFRASTRUCTURE *AND* ITS MANAGEMENT

UNIT I:

INTRODUCTION-Information Technology, Computer Hardware, Computer Software, Network and Internet, Computing Resources,
IT INFRASTRUCTURE- Design Issues, Requirements, IT System Management Process, Service Management Process, Information System Design, IT Infrastructure Library

UNIT II:

SERVICE DELIVERY PROCESS- Service Delivery Process, Service Level Management, Financial Management, Service Management, Capacity Management, Availability Management

UNIT III:

SERVICE SUPPORT PROCESS- Service Support Process, Configuration Management, Incident Management, Problem Management, Change Management, Release Management

STORAGE MANAGEMENT- Backup & Storage, Archive & Retrieve, Disaster Recovery, Space Management, Database & Application Protection, Bare Machine Recovery, Data Retention

UNIT IV:
SECURITY MANAGEMENT- Security, Computer and internet Security, Physical Security, Identity Management, Access Management. Intrusion Detection, Security Information Management

UNIT V:
IT ETHICS- Introduction to Cyber Ethics, Intellectual Property, Privacy and Law, Computer Forensics, Ethics and Internet, Cyber Crimes

EMERGING TRENDS in IT- Electronics Commerce, Electronic Data Interchange, Mobile Communication Development, Smart Card, Expert Systems

ECS -351 : Logic Design Lab

Objective: To understand the digital logic and create various systems by using these logics.

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of V_{cc} and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
3. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
4. Implementation and verification of Decoder/De-multiplexer and Encoder using logic gates.
5. Implementation of 4x1 multiplexer using logic gates.
6. Implementation of 4-bit parallel adder using 7483 IC.
7. Design, and verify the 4-bit synchronous counter.
8. Design, and verify the 4-bit asynchronous counter.
9. Mini Project.

ECS-352 : Data Structure Lab

L	T	P
0	0	2

Write Program in C or C++ for following.

- Array implementation of Stack, Queue, Circular Queue, List.
- Implementation of Stack, Queue, Circular Queue, List using Dynamic memory Allocation.
- Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.
- Implementation of Searching and Sorting Algorithms.
- Graph Implementation, BFS, DFS, Min. cost spanning tree, shortest path algorithm.

ECS-353 : Numerical Techniques Lab

L	T	P
0	0	2

Write Programs in 'C' Language:

1. To deduce error envolved in polynomial equation.
2. To Find out the root of the Algebraic and Transcendental equations using Bisection, Regula-falsi, Newton Raphson and Iterative Methods. Also give the rate of convergence of roots in tabular form for each of these methods.
3. To implement Newton's Forward and Backward Interpolation formula.
4. To implement Gauss Forward and Backward, Bessel's, Sterling's and Evertt's Interpolation formula
5. To implement Newton's Divided Difference and Langranges Interpolation formula.
6. To implement Numerical Differentiations.
7. To implement Numerical Integration using Trapezoidal, Simpson 1/3 and Simpson 3/8 rule.
8. To implement Least Square Method for curve fitting.
9. To draw frequency chart like histogram, frequency curve and pie-chart etc.
10. To estimate regression equation from sampled data and evaluate values of standard deviation, t-statistics, regression coefficient, value of R^2 for atleast two independent variables.

EEC-406 : INTRODUCTION TO MICROPROCESSOR

Fourth Semester B.Tech CSE

L	T	P
3	1	0

Unit-I Introduction:

Microprocessor evolution and types, microprocessor architecture and operation of its components, addressing modes, interrupts, data transfer schemes, instruction and data flow, timer and timing diagram. Interfacing devices. Architectural advancement of microprocessor. Typical microprocessor development schemes.

Unit-II *-bit Microprocessors:
Pin diagram and internal architecture of 8085 microprocessor, registers, ALU, Control & statu, interrupt and machine cycle.
Instruction sets. Addressing modes. Instruction formats
Instruction Classification: data transfer, arithmetic operations, logical operations, branching operations, machine control and assembler directives.
Unit-III 16-bit Microprocessor:
Architecture of 8086 microprocessor: register organization, bus interface unit, execution unit, memory addressing, memory segmentation.
Operating modes. Instruction sets, instruction format, Types of instructions.
Interrupts: hardware and software interrupts.
Unit-IV Programming:
Assembly language programming based on intel 8085/8086.
Instructions, data transfer, arithmetic, logic, branch operations, looping, counting, indexing, programming techniques, counters and time delays, stacks and subroutines, conditional call and return instructions
Unit-V Peripheral Interfacing:
Peripheral Devices: 8237 DMA Controller, 8255 programmable peripheral interface, 8253/8254programmable timer/counter, 8259 programmable interrupt controller, 8251 USART and RS232C.

Books

1. Gaonkar , Ramesh S , “Microprocessor Architecture, Programming and Applications with 8085”, Penram International Publishing.
2. Ray A K , Bhurchandi K M , “Advanced Microprocessors and Peripherals”, TMH
3. Hall D V ,”Microprocessor Interfacing’, TMH
4. Liu and Gibson G A , “ Microcomputer System: The 8086/8088 family’’ ,PHI
5. Aditya P Mathur, “ Introduction to Microprocessor”, TMH
6. Brey, Barry B, “INTEL Microprocessors”, PHI
7. Renu Sigh & B.P.Sigh, “Microprocessor, Interfacing and Applications
8. M Rafiqzzaman, “Microprocessors, Theory and Applications”,

ECS-401 : COMPUTER ORGANIZATION

Fourth Semester B.Tech CSE & IT

L	T	P
3	1	0

Unit-I Introduction:

Number representation; fixed and floating point number representation, IEEE standard for floating point representation. Error detection and correction codes: Hamming code.

Digital computer generation, computer types and classifications, functional units and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer.

Unit-II Central Processing Unit:

Addition and subtraction of signed numbers, look ahead carry adders. Multiplication: Signed operand multiplication, Booths algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation

Processor organization, general register organization, stack organization and addressing modes.

Unit-III Control Unit:

Instruction types, formats, instruction cycles and subcycles (fetch and execute etc) , micro-operations, execution of a complete instruction.

Hardwire and microprogrammed control: microprogramme sequencing, wide branch addressing, microinstruction with next address field, pre-fetching microinstructions, concept of horizontal and vertical microprogramming.

Unit-IV Memory:

Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories.

Cache memories: concept and design issues 9 performance, address mapping and replacement)

Auxiliary memories: magnetic disk, magnetic tape and optical disks

Virtual memory: concept implementation.

Unit-V Input / Output:

Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions.

Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors.

Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.

Books

1. Patterson, Computer Organisation and Design, Elsevier Pub. 2009
2. William Stalling, " Computer Organization", PHI
3. Vravice,Hamacher & Zaky, "Computer Organization", TMH
4. Mano," Computer System Architecture", PHI
5. John P Hays, " Computer Organization", McGraw Hill
6. Tannenbaum," Structured Computer Organization', PHI
7. P Pal chaudhry, ' Computer Organization & Design', PHI

ECS-402 : DATA BASE MANAGEMENT SYSTEM
IVth Semester B. Tech. CSE & IT

L	T	P
3	1	0

Unit-I

Introduction: An overview of database management system, database system Vs file system, Database system concept and architecture, data model schema and instances, data independence and database 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, relationship 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 on SQL: Characteristics of SQL, advantage of SQL. SQl data type 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, Triggers, Procedures in SQL/PL SQL

Unit-III

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

Unit-IV

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

Distributed Database: distributed data storage, concurrency control, directory system.

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, case study of Oracle.

Books

1. Date C J, " An Introduction to Database Systems", Addision Wesley
2. Korth, Silbertz, Sudarshan," Database Concepts", McGraw Hill
3. Elmasri, Navathe, " Fudamentals of Database Systems", Addision Wesley
4. O'Neil, Databases, Elsevier Pub.
5. Leon & Leon,"Database Management Systems", Vikas Publishing House
6. Bipin C. Desai, " An Introduction to Database Systems", Gagotia Publications
7. Majumdar & Bhattacharya, "Database Management System", TMH

8. Ramkrishnan, Gehrke, " Database Management System", McGraw Hill
9. Kroenke, " Database Processing Fundamentals , Design and Implementation" Pearson Education.
10. D.Ulman, " Principles of Database and Knowledge base System", Computer Science Press.
11. Maheshwari Jain.'DBMS: Complete Practical Approach", Firewall Media, New Delhi

ECS-403 : THEORY OF AUTOMATA AND FORMAL LANGUAGES

L	T	P
3	1	0

Unit – I

Introduction; Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem

Unit – II

Regular expression (RE) , Definition, Operators of regular expression and therr precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

Unit – III

Context free grammar (CFG) and Context Freee Languages (CFL): Definition, Examples, Derivation , Derivation trees, Ambiguity in Grammer, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Memership, Pumping lemma for CFLs,

Unit – IV

Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA

Unit – V

Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory

Text Books and References:

1. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education

2. K.L.P. Mishra and N.Chandrasekaran, “Theory of Computer Science : Automata, Languages and Computation”, PHI
3. Martin J. C., “Introduction to Languages and Theory of Computations”, TMH
4. Papadimitrou, C. and Lewis, C.L., “Elements of the Theory of Computation”, PHI

EEC-456 : MICROPROCESSOR LAB

L	**T**	**P**
0	**0**	**2**

1. To study 8085 microprocessor System
2. To study 8086 microprocessor System
3. To develop and run a programme to find out largest and smallest number
4. To develop and run a programme for converting temperature from F to C degree
5. To develop and run a programme to compute square root of a given number
6. To develop and run a programme for computing ascending/descending order of a number.
7. To perform interfacing of RAM chip to 8085/8086
8. To perform interfacing of keyboard controller
9. To perform interfacing of DMA controller
10. To perform interfacing of UART/USART

ECS-452 : DBMS LAB

L	T	P
0	0	2

1. Write the queries for Data Definition and Data Manipulation Language.
2. Write SQL queries using logical operations (=,<,>,etc)
3. Write SQL queries using SQL operators
4. Write SQL query using character, number, date and group functions
5. Write SQL queries for relational algebra
6. Write SQL queries for extracting data from more than one table
7. Write SQL queries for sub queries, nested queries
8. Write programme by the use of PL/SQL
9. Concepts for ROLL BACK, COMMIT & CHECK POINTS
10. Creat VIEWS, CURSORS and TRGGERS & write ASSERTIONS.
11. Creat FORMS and REPORTS

Note:
1. The queries to be implemented on DBMS using SQL
2. Students are advised to use Developer 2000/Oracle9i or other latest version for above experiments.. However student may use Power Builder/SQL SERVER . Mini Projects may also be planned & carried out through out the semester to understand important concepts of database.

ECS-453 : COMPUTER ORGANIZATION LAB

L	T	P
0	0	2

1. Bread Board Implementation of Flip-Flops.
2. Experiments with clocked Flip-Flop.
3. Design of Counters.
4. Bread Board implementation of counters & shift registers.
5. Implementation of Arithmetic algorithms.
6. Bread Board implementation of Adder/Subtractor (Half, Full)
7. Bread Board implementation of Binary Adder.
8. Bread Board implementation of Seven Segment Display.

Institute may also develop the experiment based on the infrastructure available with them.