STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR I, SEMESTER I

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total	Credit
				Sessional			Exam		
				CT	TA	Total			
1.	EAS-103	Engg. Mathematics-I	3-1-0	30	20	50	100	150	4
2.	EEC-101/EAS-104	Electronics Engg./Professional Communication	3-1-0	30	20	50	100	150	4
3.	EAS-102/EME-102	Engg. Chemistry/ Engg. Mechanics	3-1-0	30	20	50	100	150	4
4.	EEE-101/ECS-101	Basic Electrical Engg./Computer system& programming in c	3-1-0	30	20	50	100	150	4
5.	EAS-101	Engg. Physics-I	2-1-0	15	10	25	50	75	3
6.	EME-101/EAS-105	Basics Manufacturing Processes/ Environment &Ecology	2-0-0	15	10	25	50	75	2
Practical /Training /Project									
7.	EAS-152/EME-152	Engg. Chemistry/ Engg.Mechanics Lab	0-0-2	10	10	20	30	50	1
8.	EEE-151/ECS-151	Basic Electrical Engg./ Computer system & programming in c Lab	0-0-2	10	10	20	30	50	1
9.	EWS-151/ECE-151	Workshop Practice/ Computer Aided Engg. Graphics	0-1-3	10	10	20	30	50	1
10.	EAS-151/EAS-154	Engg. Physics Lab/ Professional Communication lab	0-0-2	10	10	20	30	50	1
11.	GP-101	General proficiency	-	-	-	50	-	50	
		TOTAL	16	6	9			1000	26

L-Lecture
T-Tutorial
P-Practical
CT-Cumulative Test
TA-Teacher's Assessment
ESE-End Semester Examination

STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR I, SEMESTER II

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total	Credit
				Sessional			Exam		
				CT	TA	Total			
1.	EAS-203	Engg. Mathematics-II	3-1-0	30	20	50	100	150	4
2.	EEC-201/EAS-204	Electronics Engg./Professional Communication	3-1-0	30	20	50	100	150	4
3.	EAS-202/EME-202	Engg. Chemistry/Engg.Mechanics	3-1-0	30	20	50	100	150	4
4.	EEE-201/ECS-201	Basic Electrical Engg./Computer system&programming in c	3-1-0	30	20	50	100	150	4
5.	EAS-201	Engg. Physics-II	2-1-0	15	10	25	50	75	3
6.	EME-201/EAS-205	Basics Manufacturing Processes/Environment&Ecology	2-0-0	15	10	25	50	75	2
Practical /Training /Project									
7.	EAS-252/EME-252	Engg. Chemistry/Engg.Mechanics Lab	0-0-2	10	10	20	30	50	1
8.	EEE-251/ECS-251	Basic Electrical Engg./Computer system&programming in c Lab	0-0-2	10	10	20	30	50	1
9.	EWS-251/ECE-251	Workshop Practice/Compute r Aided Engg.Graphics	0-1-3	10	10	20	30	50	1
10.	EAS-251/EAS-254	Engg.Physics Lab/Professional Communication lab	0-0-2	10	10	20	30	50	1
11.	GP-201	General proficiency	-	-	-	50	-	50	
		TOTAL	16	6	9			1000	26

L-Lecture
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CT-Cumulative Test
TA-Teacher's Assessment
ESE-End Semester Examination

ECS-101/ECS-201 Computer System and Programming in C

L	T	P
3	1	0

Unit1

Basics of Computer: Introduction to digital computer, basic operations of computer, functional components of computer, Classification of computers.

Introduction to operating system: DOS, Windows, Linux and Android] purpose, function, services and types.

Number system: Binary, octal and hexadecimal number systems, their mutual conversions, Binary arithmetic.

Basics of programming: Approaches to Problem Solving, Concept of algorithm and flow charts, Types of computer languages:- Machine Language, Assembly Language and High Level Language, Concept of Assembler, Compiler, Loader and Linker.

Unit2

Standard I/O in C, Fundamental data types- Character type, integer, short, long, unsigned, single and double floating point, Storage classes- automatic, register, static and external, Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associativity.

Fundamentals of C programming: Structure of C program, writing and executing the first C program, components of C language. Standard I/O in C.

Unit3

Conditional program execution: Applying if and switch statements, nesting if and else, use of break and default with switch, program loops and iterations: use of while, do while and for loops, multiple loop variables, use of break and continue statements.

Functions: Introduction, types of functions, functions with array, passing values to functions, recursive functions.

Unit 4

Arrays: Array notation and representation, manipulating array elements, using multi-dimensional arrays. Structure, union, enumerated data types

Unit 5

Pointers: Introduction, declaration, applications File handling, standard C preprocessors, defining and calling macros, conditional compilation, passing values to the compiler.

References:

1. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.

2. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition [India Edition], 2007.

ECS-151/ECS-251: Computer Programming Lab

L	T	P
0	0	2

1. WAP that accepts the marks of 5 subjects and finds the sum and percentage marks obtained by the student.
2. WAP that calculates the Simple Interest and Compound Interest. The Principal , Amount, Rate of Interest and Time are entered through the keyboard.
3. WAP to calculate the area and circumference of a circle.
4. WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula C/5=(F-32)/9.
5. WAP that swaps values of two variables using a third variable.
6. WAP that checks whether the two numbers entered by the user are equal or not.
7. WAP to find the greatest of three numbers.
8. WAP that finds whether a given number is even or odd.
9. WAP that tells whether a given year is a leap year or not.
10. WAP that accepts marks of five subjects and finds percentage and prints grades according to the following criteria:
    Between 90-100%----------Print
    'A' 80-90%----------
    Print 'B' 60-80%----------
    ---Print 'C' Below 60%----------
    -----Print 'D'
11. WAP that takes two operands and one operator from the user and perform the operation and prints the result by using Switch statement.
12. WAP to print the sum of all numbers up to a given number.
13. WAP to find the factorial of a given number.
14. WAP to print sum of even and odd numbers from 1 to N numbers.
15. WAP to print the Fibonacci series.
16. WAP to check whether the entered number is prime or not.
17. WAP to find the sum of digits of the entered number.
18. WAP to find the reverse of a number.
19. WAP to print Armstrong numbers from 1 to 100.
20. WAP to convert binary number into decimal number and vice versa.
21. WAP that simply takes elements of the array from the user and finds the sum of these elements.

22. WAP to search an element in a array using Linear Search.
23. WAP to sort the elements of the array in ascending order using Bubble Sort technique.
24. WAP to add and multiply two matrices of order nxn.
25. WAP that finds the sum of diagonal elements of a mxn matrix.
26. WAP to implement strlen (), strcat (),strcpy () using the concept of Functions.
29. Define a structure data type TRAIN_INFO. The type contain

    Train No.: integer type
    Train name: string
    Departure Time: aggregate type TIME
    Arrival Time : aggregate type TIME
    Start station: string
    End station : string

    The structure type Time contains two integer members: hour and minute. Maintain a train timetable and implement the following operations:

    (i) List all the trains (sorted according to train number) that depart from a particular section.
    (ii) List all the trains that depart from a particular station at a particular time.
    (iii) List all he trains that depart from a particular station within the next one hour of a given time.
    (iv) List all the trains between a pair of start station and end station.
30. WAP to swap two elements using the concept of pointers.
31. WAP to compare the contents of two files and determine whether they are same or not.
32. WAP to check whether a given word exists in a file or not. If yes then find the number of times it occurs.

BIET

Syllabus

Of

B.Tech

Computer Science & Engineering

2nd Year (III & IV Semester)

STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR II, SEMESTER III

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total	Credit
				Sessional			Exam		
				CT	TA	Total			
1.	ECS-301	Digital Logic Design	3-1-0	30	20	50	100	150	4
2.	ECS-302	Data Structures Using C	3-1-0	30	20	50	100	150	4
3.	ECS-303	Discrete Mathematical structures	3-1-0	30	20	50	100	150	4
4.	ECS-304	IT Infrastructure and its Management	3-1-0	30	20	50	100	150	4
5.	ECS-305	Computer based numerical & statics techniques	3-1-0	30	20	50	100	150	4
6.	EHU-111	Human Values &Professional Ethics/Cyber Security & Law	2-2-0	15	10	25	50	75	-
Practical /Training /Project									
7.	ECS-351	Digital Logic Design Lab	0-0-2	10	10	20	30	50	1
8.	ECS-352	Data Structures Using C Lab	0-0-2	10	10	20	30	50	1
9.	ECS-353	Computer based numerical & statics techniques Lab	0-0-2	5	5	10	15	25	1
10.	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)

ECS-301 : Digital Logic Design

L	T	P
3	1	0

Unit I.

Digital system and binary numbers: : Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes. Floating point representationGate-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.

References:

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

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 presentations.

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

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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.

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 somegeneral identities on sets.Relations: Definition, Operations on relations, Properties of relations, CompositeRelations, 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, Bipartitegraphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph coloring ,Recurrence Relation & Generating function: Recursive definition offunctions,

Recursivealgorithms, 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

L	T	P
3	1	0

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

References:

1. James Gill etal," Information Technology Infrastructure And Its Management", PHI
2. Robert Schieldt, "Information Technology Infrastructure: Java", TMH.
3. Mini Project.

ECS - 351 : Logic Design Lab

L	T	P
0	0	2

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

ECS-352 : Data Structure Lab

L	T	P
0	0	2

1. Write Program in C or C++ for following.
2. Array implementation of Stack, Queue, Circular Queue, List.
3. Implementation of Stack, Queue, Circular Queue, List using Dynamic memory Allocation.
4. Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.
5. Implementation of Searching and Sorting Algorithms.
6. 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 involved 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 Lang ranges 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
11. Standard deviation, t-statistics, regression coefficient, value of R2 for at least two Independent variables.

STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR II, SEMESTER IV

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total	Credit
				Sessional			Exam		
				CT	TA	Total			
1.	EHU-402 /EHU-401	Industrial Sociology/Industrial Psycholog	2-2-0	15	10	25	50	75	2
2.	ECS-041	Soft Computing	3-1-0	30	20	50	100	150	4
3.	**ECS-404**	Core Java*	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.	ECS-451	Core Java 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

ECS-401 : Computer Organization

L	T	P
3	1	0

Unit-I

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

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

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

Hardwire and micro programmed control: microprogramming sequencing, wide branch addressing, micro instruction with next address field, pre-fetching microinstructions, concept of horizontal and vertical microprogramming.

Unit-IV

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

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.

References

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

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.

References

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

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 Free Languages (CFL): Definition, Examples, Derivation, Derivation trees, Ambiguity in Grammar, 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 Membership, 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 Decidability, 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

EOE-041 Soft Computing

L	T	P
3	1	0

Unit-I:
ARTIFICIAL NEURAL NETWORKS
Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning – Back propagation networks - Kohnen's self organizing networks - Hopfield network.

Unit-II:
FUZZY SYSTEMS
Fuzzy sets, Fuzzy Relations and Fuzzy reasoning, Fuzzy functions - Decomposition – Fuzzy automata and languages - Fuzzy control methods - Fuzzy decision making.

Unit-III:
NEURO - FUZZY MODELING
Adaptive networks based Fuzzy interface systems - Classification and Regression Trees – Data clustering algorithms - Rule based structure identification - Neuro-Fuzzy controls – Simulated annealing – Evolutionary computation.

Unit-IV:
GENETIC ALGORITHMS
Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction – Rank method - Rank space method.

Unit-V:
APPLICATION OF SOFT COMPUTING
Optimiation of traveling salesman problem using Genetic Algorithm, Genetic algorithm based Internet Search Techniques, Soft computing based hybrid fuzzy controller, Intoduction to MATLAB Environment for Soft computing Techniques.

References:
1. Sivanandam, Deepa, " Principles of Soft Computing", Wiley
2. Jang J.S.R, Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Prentice Hall
3. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill
4. Laurene Fausett, "Fundamentals of Neural Networks", Prentice Hall
5. D.E. Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley
6. Wang, "Fuzzy Logic", Springer

ECS-452 : Data Base Management System Lab

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12. Write the queries for Data Definition and Data Manipulation Language.
13. Write SQL queries using logical operations (=,<,>,etc)
14. Write SQL queries using SQL operators
15. Write SQL query using character, number, date and group functions
16. Write SQL queries for relational algebra
17. Write SQL queries for extracting data from more than one table
18. Write SQL queries for sub queries, nested queries
19. Write program by the use of PL/SQL
20. Concepts for ROLL BACK, COMMIT & CHECK POINTS
21. Create VIEWS, CURSORS and TRGGERS & write ASSERTIONS.
22. Create FORMS and REPORTS

ECS-453 : Computer Organization Lab

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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.

BIET

Syllabus

Of

B.Tech

Computer Science & Engineering

3rd Year (V & VI Semester)

STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR III, SEMESTER V

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total
				Sessional			Exam	
				CT	TA	Total		
1.	EHU-501	Engineering & Managerial Economic	3-1-0	30	20	50	100	150
2.	ECS-501	Operating System	3-1-0	30	20	50	100	150
3.	ECS-502	Design &Analysis of Algorithms	3-1-0	30	20	50	100	150
4.	ECS-503	Object Oriented Techniques	3-1-0	30	20	50	100	150
5.	ECS-504	Computer Graphics	2-1-0	15	10	25	50	75
6.	ECS-505	Graph Theory	2-1-0	15	10	25	50	75
Practical /Training /Project								
7.	ECS-551	Operating System lab	0-0-2	-	25	25	25	50
8.	ECS-552	Algorithms Lab	0-0-2	-	25	25	25	50
9.	ECS-553	Mini project	0-0-2	-	25	25	25	50
10.	ECS-554	Computer Graphics Lab	0-0-2	-	25	25	25	50
11.	GP-501	General proficiency	-	-	-	-	-	50

*At least 10 problems are to be considered based on corresponding theory course.

ECS-501: Operating System

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Unit – I

Introduction : Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems.

Unit – II

Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation; Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem; Inter Process Communication models and Schemes, Process generation.

Unit – III

CPU Scheduling: Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram,Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock:System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.

Unit – IV

Memory Management: Basic bare machine, Resident monitor, Multiprogramming with fixed partitions,Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.

Unit – V

I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.

References:

1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley
2. Sibsankar Halder and Alex A Aravind, "Operating Systems", Pearson Education
3. Harvey M Dietel, " An Introduction to Operating System", Pearson Education
4. D M Dhamdhere, "Operating Systems : A Concept based Approach", 2nd Edition, TMH
5. William Stallings, "Operating Systems: Internals and Design Principles ", 6th Edition, Pearson Education

ECS-502: Design and Analysis of Algorithms

L	T	P
3	1	0

Unit-I

Introduction: Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions, Performance measurements, Sorting and order Statistics - Shell sort, Quick sort, Merge sort, Heap sort, Comparison of sorting algorithms, Sorting in linear time.

Unit -II

Advanced Data Structures: Red-Black trees, B – trees, Binomial Heaps, Fibonacci Heaps.

Unit - III

Divide and Conquer with examples such as Sorting, Matrix Multiplication, Convex hull and Searching. Greedy methods with examples such as Optimal Reliability Allocation, Knapsack, Minimum Spanning trees – Prim's and Kruskal's algorithms, Single source shortest paths - Dijkstra's and Bellman Ford algorithms.

Unit - IV

Dynamic programming with examples such as Kanpsack, All pair shortest paths – Warshal's and Floyd's algorithms, Resource allocation problem. Backtracking, Branch and Bound with examples such as Travelling Salesman Problem, Graph Coloring, n-Queen Problem, Hamiltonian Cycles and Sum of subsets.

Unit -V

Selected Topics: Algebraic Computation, Fast Fourier Transform, String Matching, Theory of NP-completeness, Approximation algorithms and Randomized algorithms.

References:

1. Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, "Introduction to Algorithms", Printice Hall of India.
2. RCT Lee, SS Tseng, RC Chang and YT Tsai, "Introduction to the Design and Analysis of Algorithms", Mc Graw Hill, 2005.
3. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms",
4. Berman, Paul," Algorithms", Cengage Learning.
5. Aho, Hopcraft, Ullman, "The Design and Analysis of Computer Algorithms" Pearson Education, 2008.

ECS-503: Object Oriented Techniques

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UNIT I

Introduction: The meaning of Object Orientation, object identity, Encapsulation, information hiding, polymorphism, generosity, importance of modeling, principles of modeling, object Oriented modeling, Introduction to UML, conceptual model of the UML, Architecture.

UNIT II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams. Class &Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams. Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration Diagrams, iterated messages, use of self in messages. Sequence Diagrams: Terms, concepts, Depicting asynchronous messages with/without priority, callback mechanism, broadcast messages. Basic Behavioral Modeling: Use cases, Use case Diagrams, Activity Diagrams, State Machine ,Process and thread, Event and signals, Time diagram, interaction diagram, Package diagram. Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT III

Object Oriented Analysis, Object oriented design, Object design, combining three models, Designing algorithms, design optimization, Implementation of control, Adjustment of inheritance, Object representation, Physical packaging, and Documenting design considerations. Structured analysis and structured design (SA/SD), Jackson Structured Development (JSD). Mapping object oriented concepts using non-object oriented language, Translating classes into data structures, Passing arguments to methods, Implementing inheritance, associations encapsulation. Object oriented programming style: reusability, extensibility, robustness, programming in the large. Procedural v/s OOP, Object oriented language features. Abstraction and Encapsulation.

UNIT IV

Introduction to Java, History, Features, Object Oriented concept of Java, Classes and Objects, Inheritance, Packages, Interface , abstract method and classes, Polymorphism, Inner classes, String Handling, I/O , Networking, Event Handling. Multi-threading, Collection, Java APIs, Java Beans: Application Builder tools, The bean developer kit(BDK), JAR files, Introspection,

Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB).

UNIT V

Java Swing: Introduction to AWT, AWT v/s Swing, Creating a Swing Applet and Application. Utility of Java as internet programming language, JDBC, The connectivity model, JDBC/ODBC Bridge, Introduction to servlets.

References:

1. James Rumbaugh et. al, "Object Oriented Modeling and Design", PHI
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education
3. Naughton, Schildt, "The Complete Reference JAVA2", TMH
4. Mark Priestley "Practical Object-Oriented Design with UML", TMH
5. Booch, Maksimchuk, Engle, Young, Conallen and Houstan, "Object Oriented Analysis and Design with Applications", Pearson Education
6. Pandey, Tiwari, " Object Oriented Programming with JAVA" , Acme Learning

ECS-504: Computer Graphics

L	T	P
2	1	0

Unit – I

Introduction and Line Generation: Types of computer graphics, Graphic Displays- Random scan displays, Raster scan displays, Frame buffer and video controller, Points and lines, Line drawing algorithms, Circle generating algorithms, Midpoint circle generating algorithm, and parallel version of these algorithms.

Unit – II

Transformations: Basic transformation, Matrix representations and homogenous coordinates, Composite transformations, Reflections and shearing. Windowing and Clipping: Viewing pipeline, Viewing transformations, 2-D Clipping algorithms-Line clipping algorithms such as Cohen Sutherland line clipping algorithm, Liang Barsky algorithm, Line clipping against non-rectangular clip windows; Polygon clipping – Sutherland Hodgeman polygon clipping, Weiler and Atherton polygon clipping, Curve clipping, Text clipping.

Unit – III

Three Dimensional: 3-D geometric primitives, 3-D Object representation, 3-D Transformation, 3-D viewing, projections, 3-D Clipping.

Unit – IV

Curves and Surfaces: Quadric surfaces, Spheres, Ellipsoid, Blobby objects, Introductory concepts of Spline, Bspline and Bezier curves and surfaces.Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models – Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.

References:

1. Donald Hearn and M Pauline Baker, “Computer Graphics C Version”, Pearson Education
2. Amrendra N Sinha and Arun D Udai,” Computer Graphics”, TMH
3. Donald Hearn and M Pauline Baker, “Computer Graphics with OpenGL”, Pearson education
4. Steven Harrington, “Computer Graphics: A Programming Approach” , TMH
5. Rogers, “ Procedural Elements of Computer Graphics”, McGraw Hill

ECS-505: Graph Theory

L	T	P
2	1	0

Unit -I

Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

Unit- II

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

Unit -III

Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability, network flows Planer graphs, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

Unit -IV

Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix. Coloring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem Discussion of Graph theoretic algorithm wherever required.

References

1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH
3. Robin J. Wilson, Introduction to Graph Theory, Pearson Education
4. Harary, F, Graph Theory, Narosa

ECS-551 : Operating System Lab

L	T	P
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1. RR(Round Robin) Scheduling
2. SJF(Shortest Job First)
3. FCFS(First Come First Served)
4. Priority Scheduling
5. Sequential File Allocation
6. Indexed File Allocation
7. Linked File Allocation
8. Simulate MVT and MFT
9. MVT(Multiprogramming Variable Task)
10. MFT(Multiprogramming Fixed Task)
11. Banker's Algorithm for Dead Lock Avoidance and Dead Lock Prevention
12. FIFO(First In First Out) Page Replacement
13. LRU(Least Recent Used) Page Replacement
14. Optimal Page Replacement (LFU)
15. Paging Memory Allocation Technique
16. Segmentation Memory Allocation Technique
17. Lexical Analyzer

ECS-552 Algorithms Lab

L	T	P
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Programming assignments on each algorithmic strategy:

1. Divide and conquer method (quick sort, merge sort, Strassen·s matrix multiplication),

2. Greedy method (knapsack problem, job sequencing, optimal merge patterns, minimal spanning trees).

3. Dynamic programming (multistage graphs, OBST, 0/1 knapsack, traveling salesperson problem).

4. Back tracking (n-queens problem, graph coloring problem, Hamiltonian cycles).

5. Sorting: Insertion sort, Heap sort, Bubble sort

6. Searching: Sequential and Binary Search

7. Selection: Minimum/ Maximum, Kth smallest element

ECS-553 Oriented Technique Lab

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1. Write a program in java which prints your name using command line arguments.
2. Write a program in java which enters three number using command line arguments and print sum and average of the number
3. Write a program to swap the value of 2 variables without using 3rd variable
4. Write a program to calculate the sum of digits of a given integer no.
5. Write a program to compute the sum of the first and last digit of a given number.
6. Write a program to calculate and print first n Fibonacci numbers.
7. Write a program to reverse the given number.
8. Write a program in java which enter the number using Data Input Stream and check whether the entered number is even or odd.
9. Write a program that calculate and print the roots of a quadratic equation ax^2+bx+c = 0 and appropriate message should be printed if root are complex
10. Write an application that reads a string and determines whether it is a palindrome.
11. Write a program to enter a sentence form keyboard and also find all the words in that sentence with starting character as vowel.
12. Write a Program in java which creates the array of size 5; find the sum and average of the five numbers.
13. Create a java program that has three version of add method which can add two, three, and four integers
14. Write a Java program that uses an overloaded method volume() that returns volume of different structures.

ECS-554 Computer Graphics Lab

L	T	P
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1. Write a program for 2D line drawing using DDA algorithm.
2. Write a program to draw a line using Bresenham's Algo.
3. Write a program for circle drawing as Raster Graphics Display.
4. Write a program to draw a circle using Midpoint algo. Modify the same for drawing an arc and sector.
5. Write a program to rotate a point about origin.
6. Write a program to rotate a triangle about origin.
7. Write a program to scale the triangle.
8. Write a program to translate the triangle.
9. Write a program to reflect the triangle.
10. Write a program for polygon filling as Raster Graphics Display.
11. Write a program for line clipping.
12. Write a program for polygon clipping.
13. Write a program for displaying 3D objects as 2D display using perspective transformation.
14. Write a program for rotation of a 3D object about arbitrary axis.
15. Write a program for Hidden surface removal from a 3D object.

STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR III, SEMESTER VI

S.No.	Subject Code	Subject	Period	Evaluation Scheme				Total
				Sessional			Exam	
				CT	TA	Total		
1.	EHU-601	Industrial Management	3-1-0	30	20	50	100	150
2.	ECS-601	Computer Network	3-1-0	30	20	50	100	150
3.	ECS-602	Software Engineering	3-1-0	30	20	50	100	150
4.	ECS-603	Compiler Design	3-1-0	30	20	50	100	150
5.	ECS-604	Web Technology	2-1-0	15	10	25	50	75
6.	EIT-505	Information Security and Cyber Laws	2-1-0	15	10	25	50	75
Practical /Training /Project								
7.	ECS-651	Computer Network lab	0-0-2	-	25	25	25	50
8.	ECS-652	Web Technology based software engineering lab	0-0-2	-	25	25	25	50
9.	ECS-653	Compiler Design lab	0-0-2	-	25	25	25	50
10.	ECS-654	Seminar	0-0-2	-	50	50	-	50
11.	GP-601	General proficiency	-	-	-	-	-	50

*At least 10 problems are to be considered based on corresponding theory course.

ECS-601: Computer Network

L	T	P
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Unit -I

Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

Unit-II

Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

Unit - III

Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6.

Unit - IV

Transport Layer: Transport Layer - Design issues, connection management, session Layer-Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.

Unit-V

Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

References :

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education
3. W. Stallings, Data and Computer Communication, Macmillan Press
4. Anuranjan Misra, “Computer Networks”, Acme Learning
5. G. Shanmugarathinam, ”Essential of TCP/ IP”, Firewall Media

ECS-602: Software Engineering

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Unit-I:

Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models

Unit-II:

Software Requirement Specifications (SRS) Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS.
Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model

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Unit-III:

Software Design Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Halestead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

Unit-IV:

Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards.

Unit-V:

Software Maintenance and Software Project Management Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective

Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

References:

1. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers.
4. Pankaj Jalote, Software Engineering, Wiley
5. Carlo Ghezzi, M. Jarayeri, D. Manodrioli, Fundamentals of Software Engineering, PHI Publication.
6. Ian Sommerville, Software Engineering, Addison Wesley.
7. Kassem Saleh,"Software Engineering", Cengage Learning.
8. Pfleeger, Software Engineering, Macmillan Publication.

ECS-603: Compiler Design

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3	1	0

Unit – I

Introduction to Compiler, Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Optimization of DFA-Based Pattern Matchers implementation of lexical analyzers, lexical-analyzer generator, LEX-compiler, Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG.

Unit – II

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables.

Unit – III

Syntax-directed Translation: Syntax-directed Translation schemes, Implementation of Syntax directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions, procedures call, declarations and case statements.

Unit – IV

Symbol Tables: Data structure for symbols tables, representing scope information. Run-Time Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors.

Unit – V

Code Generation: Design Issues, the Target Language. Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Code Generator. Code optimization: Machine-Independent Optimizations, Loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis

References:

1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education
2. V Raghvan, " Principles of Compiler Design", TMH
3. Kenneth Louden," Compiler Construction", Cengage Learning.
4.. Charles Fischer and Ricard LeBlanc," Crafting a Compiler with C", Pearson Education

ECS-604 Web Technology

L	T	P
2	1	0

Unit I: Introduction
Introduction to web, protocols governing the web, web development strategies, web applications, web project, web team .

Unit II: Web Page Designing
HTML: list, table, images, frames, forms, CSS;XML: DTD, XML schemes, presenting and using XML

Unit III: Scripting
Java script: Introduction, documents, forms, statements, functions, objects; Event and event handling; introduction to AJAX, VB Script, CGI

Unit IV: Server Site Programming
Introduction to active server pages (ASP), ASP.NET, java server pages (JSP), JSP application design, tomcat server, JSP objects, declaring variables and methods, debugging, sharing data between JSP pages, Session, introduction to COM/DCOM.

References

1. Xavier, C, " Web Technology and Design" , New Age International
2. Deitel, "Java for programmers", Pearson Education
3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication.
4. Ramesh Bangia, "Internet and Web Design" , New Age International
5. Jackson, "Web Technologies" Pearson Education
6. Patel and Barik, "Introduction to Web Technology & Internet", Acme Learning

EIT-505 Information Security and Cyber Laws

L	T	P
2	1	0

UNIT-I

History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages 18 Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.

UNIT-II

Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards. Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges

UNIT-III

Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

UNIT-IV

Security metrics- Classification and their benefits Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data mining Security, Building Security into Software Life Cycle Ethics- Ethical Issues, Issues in Data and Software Privacy Cyber Crime Types & overview of Cyber Crimes.

References :

1. Godbole,“ Information Systems Security”, Willey
2. Merkov, Breithaupt,“ Information Security”, Pearson Education
3. Yadav, “Foundations of Information Technology”, New Age, Delhi
4. Schou, Shoemaker, “ Information Assurance for the Enterprise”, Tata McGraw Hill
5. Sood,“Cyber Laws Simplified”, Mc Graw Hill
6. Furnell, “Computer Insecurity”, Springer

ECS-651 Computer Network Lab

L	T	P
0	0	**2**

1. Write a program for error detecting code using CRC-CCITT.
2. Write a program for frame sorting technique used in buffers.
3. Write a program for distance vector algorithm to find suitable path for transmission.
4. Write a program for spanning tree algorithm (Kruskal's/Prim's) to find loop less path.
5. Write a program for simple RSA algorithm to encrypt and decrypt the data.
6. Write a program for Hamming Code generation for error detection and correction.
7. Write a program for congestion control using Leaky bucket algorithm.

ECS-652 Web Technology Based Software engineering Lab

L	T	P
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1. Write HTML/Java scripts to display your CV in Web Browser.
2. Creation and annotation of static web pages using any HTML editor.
3. Write a program to use XML and JavaScript for creation of your homepage.
4. Write a program in XML for creation of DTD which specifies a particular set of rules.
5. Create a Stylesheet in CSS/XSL and display the document in Web Browser.
6. Write a Java Servelet for HTTP Proxy Server.
7. Use JSP pages for sharing session and application data of HTTP Server.
8. Write a program to use JDBC connectivity program for maintaining database by sending queries

ECS-653 Compiler Lab

L	T	P
0	0	**2**

1. To check whether a string belongs to a grammar or not.
2. To calculate leading for all the non -terminals of the given grammar.
3. Program for computation of first algorithm.
4. Program to find the number of white spaces and new lines characters.
5. To implement stack using array.
6. Algorithm to identify whether a given string is an identifier or not.
7. Algorithm to check whether a string is a keyword or not
8. Design a lexical analyzer for given language .the lexical analyzer should ignore redundant spaces, tabs and new lines
9. Implement the lexical analyzer using JLex, flex or other lexical analyzer generating tools.
10. Design predictive parser for the given language
11. Design a LALR bottom up parser for the given language
12. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree.
13. A program to generate machine code

BIET

Syllabus
Of
B.Tech
Computer Science & Engineering

4th Year (VII & VIII Semester)

STUDY & EVALUATION SCHEME

B. Tech computer science & Engineering

YEAR IV, SEMESTER VII

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total
				Sessional			Exam	
				CT	TA	Total		
1.	EOE-071 / EOE-074	Open Elective- I	3-1-0	30	20	50	100	150
2.	ECS-701	Advanced Computer Architecture	3-1-0	30	20	50	100	150
3.	ECS-702	Digital Image Processing	3-1-0	30	20	50	100	150
4.	ECS-074	Pattern Recognition	3-1-0	30	20	50	100	150
5.	ECS-075	Data Mining & Data Warehousing	3-1-0	30	20	50	100	150
Practical /Training /Project								
6.	ECS-751	Distributed System lab	0-0-2	-	25	25	25	50
7.	ECS-752	Digital Image Processing lab	0-0-2	-	25	25	25	50
8.	ECS-753	Project	0-0-4	-	50	50	-	50
9.	ECS-754	Industrial Traning Viva-voice	0-0-2	-	50	50	-	50
10.	GP-701	General proficiency	-	-	-	-	-	50

*At least 10 problems are to be considered based on corresponding theory course.

List of Effective for B.Tech

(Computer Science & Technolgy)

CS Elective-I

ECS-071 Computational Geometry
ECS-072 Computational Complexity
ECS-073 Parallel Algorithm
ECS-074 Pattern Recognition

CS Elective-II

ECS-075 Data Mining & Data Warehousing
ECS-076 Distributed Database
EIT-073 Bioinformatics
ECS-077 Data Compression
EIT-074 IT in Forensic Science

CS Elective-III

ECS-081 Real Time System
ECS-082 Software Project Management
ECS-083 Embedded Systems
ECS-084 Cryptography & Network Security

CS Elective-IV

ECS-085 Neural Network
ECS-086 Natural Language Processing
ECS-087 Mobile Computing
ECS-088 Soft Computing

Open Elective- I

HCI-Human Computing Interaction

Note : ECS-088 may be opted be only those students who did not opt EOE-041 as an open elective

ECS-701 DISTRIBUTED SYSTEMS

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Unit–I

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Architectural models, Fundamental Models.

Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks.

Concepts in Message Passing Systems: causal order, total order, total causal order, Techniques for Message Ordering, Causal ordering of messages, global state, termination detection.

Unit-II

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

U nit–III

Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

Distributed Resource Management: Issues in distributed File Systems, Mechanism for building distributed file systems, Design issues in Distributed Shared Memory, Algorithm for Implementation of Distributed Shared Memory.

Unit–IV

Failure Recovery in Distributed Systems: Concepts in Backward and Forward recovery, Recovery in Concurrent systems, obtaining consistent Checkpoints, Recovery in Distributed Database Systems.

Fault Tolerance: Issues in Fault Tolerance, Commit Protocols, Voting protocols, Dynamic voting protocols.

U nit –V

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

References:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Ramakrishna,Gehrke," Database Management Systems", Mc Grawhill
3. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Education
4. Tenanuanbaum, Steen," Distributed Systems", PHI
5. Gerald Tel, "Distributed Algorithms", Cambridge University Press

ECS-702 DIGITAL IMAGE PROCESSING

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U NIT-I

Introduction and Fundamentals

Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization.

Image Enhancement in Frequency Domain

Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

UNIT-II

Image Enhancement in Spatial Domain

Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT-III

Image Restoration

A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-IV

Morphological Image Processing

Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT-V Registration

Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation

Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements

Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

References:

1. Digital Image Processing 2 nd
Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ.

ECS-074 Pattern Recognition

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Unit-I

Introduction: Basics of pattern recognition, Design principles of pattern recognition system,Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

Unit-II

Statistical Patten Recognition: Bayesian Decision Theory, Classifiers, Normal density and discriminant functions,

Unit – III

Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

Unit - IV

Nonparametric Techniques: Density Estimation, Parzen Windows, K-Nearest Neighbor Estimation, Nearest Neighbor Rule, Fuzzy classification.

Unit - V

Unsupervised Learning & Clustering: Criterion functions for clustering, Clustering Techniques: Iterative square - error partition clustering – K means, agglomerative hierarchical clustering, Cluster validation.

References:

1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification”, 2nd Edition, John Wiley, 2006.

2. C. M. Bishop, “Pattern Recognition and Machine Learning”, Springer, 2009.

3. S. Theodoridis and K. Koutroumbas, “Pattern Recognition”, 4th Edition, Academic Press, 2009.

ECS-075 Data Mining & Data Warehousing

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Unit-I

Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data 35 Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation

Unit-II

Concept Description:- Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases

Unit-III

Classification and Predictions: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward

Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbor classifiers, Genetic Algorithm. Cluster Analysis:

Data types in cluster analysis, Categories of clustering methods, partitioning methods.

Hierarchical Clustering- CURE and Chameleon, Density Based Methods-DBSCAN, OPTICS, Grid Based Methods- STING, CLIQUE, Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis

Unit-IV

Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

Unit-V

Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

References:

1. M.H.Dunham,"Data Mining:Introductory and Advanced Topics" Pearson Education
2. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier
3. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World : A Practical Guide for Building Decision Support Systems, Pearson Education
4. Mallach,"Data Warehousing System",McGraw –Hill

ECS-751 Distributed Systems Lab

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1. Simulate the functioning of Lamport's Logical Clock in 'C'.
2. Simulate the Distributed Mutual Exclusion in 'C'.
3. Implement a Distributed Chat Server using TCP Sockets in 'C'.
4. Implement RPC mechanism for a file transfer across a network in 'C'
5. Implement 'Java RMI' mechanism for accessing methods of remote systems.
6. Simulate Balanced Sliding Window Protocol in 'C'.
7. Implement CORBA mechanism by using 'C++' program at one end and 'Java' program on the other

ECS-752 Digital Image Processing Lab

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1. Implement the spatial image enhancement functions on a bitmap image –

(a) Mirroring (Inversion) (b) Rotation (Clockwise) (c) Enlargement (Double Size)

2. Implement (a) Low Pass Filter (b) High Pass Filter

3. Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter

4. Implement Smoothing and Sharpening of an eight bit color image

5. Implement (a) Boundary Extraction Algorithm (b) Graham's Scan Algorithm

6. Implement (a) Edge Detection (b) Line Detection

STUDY & EVALUATION SCHEME
B. Tech computer science & Engineering
YEAR IV, SEMESTER VIII

S. No.	Subject Code	Subject	Period	Evaluation Scheme				Total
				Sessional			Exam	
				CT	TA	Total		
1.	EOE-081/ EOE-084	Open Elective II	3-1-0	30	20	50	100	150
2.	ECS-801	Artificial Intelligence	3-1-0	30	20	50	100	150
3.	ECS-081	Real time system	3-1-0	30	20	50	100	150
4.	ECS-087	Mobile computing	3-1-0	30	20	50	100	150
Practical /Training /Project								
5.	ECS-851	Artificial Intelligence lab	0-0-2	-	25	25	25	50
6.	ECS-852	Project	0-0-12	-	100	100	200	300
7.	GP-801	General proficiency	-	-	-	-	-	50

Note:

Practical Training done after 6th semester would be evaluated in 7th semester through report and viva-voce.
Practical has to be initiated in 7th semester beginning and completed by the end of 8th semester with proper report and demonstration.

*At least 10 problems are to be considered based on corresponding theory course.

ECS-801: Artificial Intelligence

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Unit-I

Introduction : Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

Unit-II

Introduction to Search : Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

Unit-III

Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

Unit-IV

Machine Learning : Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data – EM algorithm, Reinforcement learning,

Unit-V

Pattern Recognition : Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

References:

1. Stuart Russell, Peter Norvig, “Artificial Intelligence – A Modern Approach”, Pearson Education
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, McGraw-Hill
3. E Charniak and D McDermott, “Introduction to Artificial Intelligence”, Pearson Education
4. Dan W. Patterson, “Artificial Intelligence and Expert Systems”, Prentice Hall of India

ECS-081 Real Time System

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UNIT-I: Introduction
Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT-II: Real Time Scheduling
Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) lgorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT-III: Resources Sharing
Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.

UNIT-IV: Real Time Communication
Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols

UNIT-V: Real Time Operating Systems and Databases
Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Charecteristic of Temporal data, Temporal Consistencey, Concurrency Control,Overview of Commercial Real Time databases.

References:
1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Mall Rajib, “Real Time Systems”, Pearson Education
3. Albert M. K. Cheng , “Real-Time Systems: Scheduling, Analysis, and Verification”, Wiley.

ECS-087 Mobile Computing

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Unit – I

Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Unit - II

Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Blue Tooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit – III

Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit - IV

Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit – V

Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

References:

1. J. Schiller, Mobile Communications, Addison Wesley.
2. Charles Perkins, Mobile IP, Addison Wesley.
3. Charles Perkins, Ad hoc Networks, Addison Wesley**.**
4. Upadhyaya, "Mobile Computing", Springer

ECS-851 Artificial Intelligence Lab

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1. AIM:TurboProlog features and format.
2. AIM:WAPusing variables in Prolog.
3. AIM:WAP for Usage of rules in Prolog.
4. AIM:
   (1) WAP for using Inputs, Output and fail predicates in prolog, display:
      (i) List of married and unmarried employees
      (ii) List of male and female employees
      (iii) List of employees for given job location
5. AIM: Create a small set of facts and rules on who is the ancestor of whom, Display:
      (i) Who is ancestor of given person.
      (ii) Complete list i.e. who is ancestor of whom