SCHEME OF EXAMINATION

&

SYLLABI

for

B. TECH. COMPUTER SCIENCE & ENGINEERING

SECOND YEAR (III & IV Semester)

(Effective from the session: 2010-2011)

Uttrakhand Technical University,Dehradun

www.uktech.in

Semester-III

Subject Code	Subject	Contact Hrs.	Credit
TCS-301	Discrete Structures	3-1-0	4
TCS-302	Computer Based Numerical & Statistical Techniques	2-0-0	2
TCS-303	Data Structures	3-1-0	4
TEC-301	Digital Electronics & Design Aspect	3-1-0	4
TCS-304	Object Oriented Programming	3-1-0	4
THU-301	Engineering Economics & Costing	2-0-0	2
PRACTICAL:			
PCS-302	Computer Based Numerical & Statistical Techniques Lab	0 0 2	2
PCS-303	Data Structure Lab	0 0 2	2
PEC-350	Digital Electronics	0 0 2	2
PCS-304	Object oriented programming using Java/ C++	0 0 2	2
PD III /GP III	Personality Development/ General Proficiency	0 0 2	-
TOTAL			**28**

Semester-IV

Subject Code	Subject	Contact Hrs.	Credit
TCS-401	Computer Organization	3-1-0	4
TCS-402	Unix & Shell Programming	2-0-0	2
TCS-403	Theory Of Automata & Formal Language	3-1-0	4
TCS-404	Database Management System	3-1-0	4
TCS-405	Microprocessor	3-1-0	4
TCS-406	Software Engineering	2-0-0	2
Practical			
PCS-402	Unix & Shell Programming Lab	0-0-2	2
PCS-404	Database Management System Lab	0-0-2	2
PCS-405	Microprocessor Lab	0-0-2	2
PCS 407	Seminar	0-0-2	2
PD IV /GP IV	Personality Development/ General Proficiency	0 0 2	-
TOTAL			**28**

Semester-III

S. No.	SUBJECT CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
1	TEC-301	Discrete Structures	3	1	0	30	20	50	100	150
2	TCS-302	Computer Based Numerical & Statistical Techniques	2	0	0	15	10	25	50	75
3	TCS-303	Data Structures	3	1	0	30	20	50	100	150
4	TEC-301	Digital Electronics & Design Aspect	3	1	0	30	20	50	100	150
5	TCS-304	Object Oriented Programming	3	1	0	30	20	50	100	150
6	THU-301	Engineering Economics & Costing	2	0	0	15	10	25	50	75
PRACTICALS										
7	PCS-350	Digital Electronics Lab	0	0	2		25	25	25	50
8	PCS-302	Computer Based Numerical & Statistical Techniques Lab	0	0	2		25	25	25	50
9	PCS-303	Data Structure Lab	0	0	2		25	25	25	50
10	PCS-304	Object Oriented programming Lab using Java/C++	0	0	2		25	25	25	50
11	PD III /GP III	Personality Development/ General Proficiency	0	0	2			50		50
		Total								**1000**

Semester-IV

S. No.	SUBJECT CODE	SUBJECT	PERIODS			EVALUATION SCHEME				
						SESSIONAL EXAM			ESE	Subject Total
			L	T	P	CT	TA	Total		
1	TCS-401	Computer Organization	3	1	0	30	20	50	100	150
2	TCS-402	UNIX & Shell Programming	2	0	0	15	10	25	50	75
3	TCS-403	Theory Of Automata & Formal Language	3	1	0	30	20	50	100	150
4	TCS-404	Database Management System	3	1	0	30	20	50	100	150
5	TCS-405	Microprocessor	3	1	0	30	20	50	100	150
6	TCS-406	Software Engineering	2	0	0	15	10	25	50	75
PRACTICALS										
7	PCS-402	UNIX & Shell Programming Lab	0	0	2		25	25	25	50
8	PCS-404	Database Management System Lab	0	0	2		25	25	25	50
9.	PCS-405	Microprocessor Lab	0	0	2		25	25	25	50
10	PCS-407	Seminar-I	0	0	2		50	50	-	50
11	PD IV /GP IV	Personality Development/ General Proficiency	0	0	2			50		50
		Total								**1000**

TCS-301

DISCRETE STRUCTURES

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Unit-I **(10L)**

Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets

Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, equivalence relation, partial ordering relation.

Function: Definition, type of functions, one to one, into and onto function, inverse function, composition of functions, recursively defined functions.

Theorem proving Techniques: mathematical induction (simple and strong), pigeonhole principle, prove by contradiction.

Unit-II **(8L)**

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

Unit-III **(8L)**

Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded I and complemented lattices.

Unit-IV **(8L)**

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

Unit-V **(6L)**

Combinatorics & Graphs: Recurrence Relation, Generating function., Permutation & Combination, Probabilistic Permutation & Combination

Reference Book:

1. Y N Singh, "Discrete Mathematical Structures", Wiley India
2. Liptschutz, Seymour, " Discrete Mathematics", McGraw Hill. 3rd edition
3. Trembley, J.P & R. Manohar, "Discrete Mathematical Structure with Application to Computer Science", McGraw Hill, Reprint 2010

TCS-302

COMPUTER BASED NUMERICAL AND STATISTICAL TECHNIQUES

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Unit-I **(6L)**

Introduction: Numbers and their accuracy, Computer Arithmetic, Mathematical preliminaries, Errors and their Computation, General error formula, Error in a series approximation.

Solution of Algebraic and Transcendental Equation:
Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Methods of finding complex roots, Muller"s method, Rate of convergence of Iterative methods, Polynomial Equations.

Unit-II **(6L)**

Interpolation: Finite Differences, Difference tables Polynomial Interpolation**:** Newton"s forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Stirling"s, Bessel"s, Everett"s formula.

Interpolation with unequal intervals: Langrange"s Interpolation, Newton Divided difference formula, Hermite"s Interpolation

Unit-III(**(6L)**

Numerical Integration and Differentiation: Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson"s 1/3 and 3/8 rule, Boole"s rule, Waddle"s rule.

Solution of differential Equations: Picard"s Method, Euler"s Method, Taylor"s Method, Runge-Kutta Methods, Predictor Corrector Methods, Automatic Error Monitoring and Stability of solution.

Unit-IV **(6L)**

Statistical Computation: Frequency chart, Curve fitting by method of least squares, fitting of straight lines, polynomials, exponential curves etc, Data fitting with Cubic splines, Regression Analysis, Linear and Non linear Regression, Multiple regression, Statistical Quality Control methods.

References:

1. Yang, "Applied Numerical Methods using MATLAB", Wiley India
2. Pradip Niyogi, "Numerical Analysis and Algorithms", TMH, 1st Edition.
3. Gerald & Whealey, "Applied Numerical Analyses", AW
4. Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi.
5. Numerical Method Principles, analysis and algorithms ,Srimamta Pal (Oxford Higher ed)
6. Rajaraman V, "Computer Oriented Numerical Methods", PHI, 3rd edition.

TCS 303

DATA STRUCTURES

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UNIT – I **(10L)**

Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors.

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Recursion: Recursive definition and processes, recursion, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms.

UNIT – II **(8L)**

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues**.**

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Garbage Collection and Compaction.

UNIT –III **(8L)**

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, path length algorithm**.** Huffman Algorithm.
Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm.

UNIT –IV **(8L)**

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys.

UNIT – V **(6L)**

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

Reference books:

1. Shukla, “Data Structures using C and C++”, Wiley India
2. A M. Tenenbaum, “Data Structures using C & C++”, Prentice-Hall of India Pvt. Ltd., New
3. Delhi.(2 nd ed).
4. R. Kruse etal, “Data Structures and Program Design in C”, Pearson Education Asia,
5. Delhi-2002. Reprint 2010.

TEC-301

DIGITAL ELECTRONICS & AND DESIGN ASPECT

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Unit-I : Introduction (8L)

Characteristics of digital system, Types of Digital circuits, Number system: Direct conversion between bases Negative numbers & BCD and their arithmetic"s, Boolean algebra, Minimization of Boolean Functions: K Map upto 6 variable and multiple output circuits error detection & correcting codes, Hamming & cyclic codes quine mcclusky method

Unit-II : Combinational Logic Circuits (8L)

Design Procedure, adders, subtractiors & code conversion, Multiplexers/Demultiplexers, encoder/decoders, decimal adders & amplitude comparators, ROM as decoder, PLA & PAL. DRC, RDC.

Unit-III : Sequential Logic Circuits (8L)

Flip-Flops and their conversions, analysis and synthesis of synchronous sequential circuit, excitation table, state table & diagram. Design of synchronous counters, shift registers and theie applications.

Unit-IV : Logic Families (8L)

Diode, BJT & MOS as a switching element concept of transfer characteristics, Input characteristics and output characteristics of logic gates, TTL, IIL,ECL,NMOS,CMOS Tri-state logic, open collector output, Interfacing between logic families, packing density, power consumption & gate delay.

Unit-V : Hazard ,Fault Detection &Memories (8L)

Hazard and Fault Detection: Static and dynamic Hazard: Gate delay, Generation of spikes, Determination of hazard in combinational circuits, Fault detection methods: Fault Table & Path sensitizing methods.

Memories: Sequential, Random Access, NMOS & CMOS Static and Dynamic Memory elements, one and multi-dimensional selection arrangement, Read-only memories, Formation of memory banks, internal & External address decoding

Reference books:

1. Maini, "Digital Electronics: Principles and Integrated Circuits", Wiley India
2. Digital Systems: Principles and Design, Raj Kamal, Pearson
3. Balbanian, Digital logic design, Wiley India
4. M. Morris Mano and M. D. Ciletti, Digital Design, M. Morris Mano and M. D. Ciletti, 4th Edition, pearson
5. Switching Circuit & Logic Design, Hill & Peterson, Wiley

TCS -304

OBJECT ORIENTED PROGRAMMING

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Unit I **(8L)**

Object Modeling: Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, meta data, candidate keys, constraints.Dynamic Modeling: Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concepts, a sample dynamic model.

Unit II **(8L)**

Functional Modeling: Data flow diagram, specifying operations, constraints, a sample functional model.OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparisons of methodologies, SA/SD, JSD.

Unit III **(8L)**

Java Programming: Introduction, Operator, Data types, Variables, Methods & Classes, Multithread Programming, I/O, Java Applet.

Unit IV **(8L)**

Java Library: String Handling, Input/Output exploring Java.io, Networking, Exception Handling, Event Handling, Introduction to AWT, Working with window, Graphics, AWT Controls, Layout Manager and Menus, Images.

Unit V **(8L)**

Software Development using Java:

Java Swing, Migrating from C++ to java, Application of java, JDBC.

Reference books:

1. Horstmann, Big Java, Wiley India
2. Herbert Schieldt, "The Complete Reference: Java", TMH, 7th Edition.
3. Nino," An Introduction to Programming and Object Oriented Design using Java, w/CD", Wiley India
4. James Rumbaugh etal, "Object Oriented Modeling and Design", PHI
5. Bjarne Stroustrup, "C++ Programming Language", Addison Wesley, 3rd Edition.

THU-301

ENGINEERING ECONOMICS AND COSTING

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Unit I **(6L)**

Time value of money : Simple and compound interest, Time value equivalence, Compound interest factors, Cash flow diagrams, Calculation, Calculation of time –value equivalences.
Present worth comparisons, Comparisons of assets with equal, unequal and infite lives, comparison of deferred investments, Future worth comparison, pay back period comparison.

Unit II **(6L)**

Use and situations for equivalent annual worth comparison, Comparison of assets of equal and unequal life. Rate of return, Internal rate of return, comparison of IIR with other methods, IRR misconceptions.

Unit III **(6L)**

Analysis of public Projects: Benefit/ Cost analysis, quantification of project, cost and benefits, benefit/ cost applications, Cost –effectiveness analysis.

Unit IV **(6L)**

Depreciation, computing depreciation charges, after tax economic comparison, Break-even analysis; linear and non-linear models.
Product and Process Costing, Standard Costing, cost estimation, Relevant Cost for decision making, Cost control and Cost reduction techniques.

Reference books:

1. White, Engineering Economics, Wiley India
2. Horn green, C.T., Cost Accounting, Prentice Hall of India
3. Riggs, J.L., Dedworth, Bedworth, D.B, Randhawa, S.U. Engineering Economics, McGrawHill International Edition, 1996

PCS- 302 : Computer Based Numerical Techniques Lab

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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
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 R2 for atleast two independent variables.

PCS- 303 : Data Structure Lab

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Write Program in C or C++ for following.

1. Program for Stack
2. Program Queue, Circular Queue
3. Program demonstrating Stack operation
4. Program for Stack Using Linked List
5. Program for Queue Using Linked List
6. Traversing of Tree Using Linked List
7. Queue Using Array
8. Program for Tree Structure, Binary Tree, Binary Search Tree
9. Program for Heap Sort
10. Program for Quick Sort
11. Graph Implementation BFS,DFS
12. Deletion in BST
13. Insertion in BST

PEC-350 DIGITAL ELECTRONICS LAB

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1. Bread-board implementation of various flip-flops.
2. Bread-board implementation of counters & shift registers.
3. Determination of Delay time and NAND, NOR, Ex-OR, AND & OR Gates.
4. Bread Board Implementation of Flip-Flops.
5. Experiments with clocked Flip-Flop.
6. Design of Counters.
7. Bread Board implementation of counters & shift registers.
8. Implementation of Arithmetic algorithms.
9. Bread Board implementation of Adder/Subtractor (Half, Full)
10. Transfer characteristics of TTL inverters & TTL Schmitt Trigger inverter.
11. Transfer characteristics of CMOS inverters series and CD40 series and
12. estimation of Gate delay of CD40 series CMOS inverter.
13. Monoshot multivibrators using 74121 and 74123.
14. Clock circuit realization using 555 and CMOS inverter and quartz crystal.
15. Adder/ subtractor operation using IC7483 4 bit/ 8 bit.
16. Demultiplexer / Decoder operation using IC-74138.

PCS- 304 : Object Oriented Programming Using Java

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1. To become familiar with classes that represent entities that can interact with the user.
2. To successfully write simple programs that involve if statements.
3. To gain practice in the use of Boolean operators like && and ||.
4. To construct a class that represents a simple ATM (automatic teller machine).
5. Write a new program called Options.java that will request that the user enter an integer and then will display the message .positive,. .negative,. or zero. if the value that was entered was greater than zero, less than zero, or equal to zero, respectively.
6. Write a simple program called RandomGeneration.java that will request N, the number of values desired, and then generate a list of N random double values. Use a ViewFrame for input and output.
7. Write program for Java Applets.
8. Use Java Servlets for proxy server.

TCS-401

COMPUTER ORGANIZATION

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Unit-I **(8L)**

Register Transfer Language, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Microoperation, Arithmetic Logic Shift Unit, Design of Fast address, Arithmetic Algorithms (addition, subtraction, Booth Multiplication), IEEE standard for Floating point numbers.

Unit-II **(8L)**

Control Design:

Hardwired & Micro Programmed (Control Unit): Fundamental Concepts (Register Transfers, performing of arithmetic or logical operations, fetching a word from memory, Storing a word in memory), Execution of a complete instruction, Multiple-Bus organization, Hardwired Control, Micro programmed control(Microinstruction, Microprogram sequencing, Wide-Branch addressing, Microinstruction with Next-address field, Prefetching Microinstruction).

Unit-III **(8L)**

Processor Design:

Processor Organization: General register organization, Stack organization, Addressing mode, Instruction format, Data transfer & manipulations, Program Control, Reduced Instruction Set Computer.

Input-Output Organization:

I/O Interface, Modes of transfer, Interrupts & Interrupt handling, Direct Memory access, Input-Output processor, Serial Communication.

Unit-IV **(8L)**

Memory Organization:

Memory Hierarchy, Main Memory (RAM and ROM Chips), organization of Cache Memory, Auxiliary memory, Cache memory, Virtual Memory, Memory management hardware.

Unit – V(8L)

Parallel Processing, Pipelining- Arithmetic Pipelining, Instruction Pipelining, RISC Pipelining, Vector Processing, Array Processor. Multiprocessor: Characteristic of Multiprocessor, Interconnection Structure, Interprocessor Arbitration, Cache Coherence

Reference books:

1. Computer Organization, John P.Hayes, McGraw Hill, 3rd Edition.
2. Fundamentals of Computer Organization and Design, Dadamundi, Wiley India
3. Computer System Architecture, M. Mano, Pearson
4. R.S.Gaonkar - Microprocessor architecture – Programming and Application with 8085/8080A - Wiley Eastern Limited.

TCS-402

UNIX AND SHELL PROGRAMMING

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Unit-1 **(6L)**

Introduction

Introduction to UNIX, UNIX system organization (the kernel and the shell), Unix File System, Basic file attributes, Editors (vi and ed).

Unit-2 **(6L)**

General Purpose Utilities: cal, date, echo, script, mailx, passwd, who, uname, tty, sty, cat, cp,rm, mv, more, file, wc, od, cmp, comm, diff, lp, banner, dos2unix, and unix2dos, gzip and gunzip, zip and unzip.

Unit-3 **(6L)**

Unix Shell programming: Types of Shells, Shell Metacharacters, Shell variables, Shell scripts, Shell commands, the environment, Integer arithmetic and string Manipulation, Special command line characters, Decision making and Loop control, controlling terminal input, trapping signals, arrays.

Unit-4 **(6L)**

Unix System Administration: File System, mounting and unmounting file system, System booting, shutting down, handling user account, backup, recovery, security, creating files, storage of Files, Disk related commands, User quota and accounting.

Reference books:

1. Saurabh, "UNIX Programming: The First Drive", Wiley India
2. Sumitabh Das, "Unix Concepts and applications", TMH, 2003
3. Johnson , Shell scripting, Wiley
4. 4.Yashwant Kanitkar, "Unix Shell Programming", BPB, 2009
5. Mike Joy, Stephen Jarvis, Michael Luck, "Introducing Unix and Linux", Palgrave Macmillan.

TCS-403

THEORY OF AUTOMATA & FORMAL LANGUAGES

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Unit I **(8L)**

Introduction to defining language, Kleene closures, Arithmetic expressions, defining grammar, Chomsky hierarchy, Finite Automata (FA), Transition graph, generalized transition graph.

Unit II **(8L)**

Nondeterministic finite Automata (NFA), Deterministic finite Automata (DFA), Construction of DFA from NFA and optimization, FA with output: Moore machine, Mealy machine and Equivalence, Applications and Limitation of FA.

Unit III **(8L)**

Arden Theorem, Pumping Lemma for regular expressions, Myhill-Nerode theorem, Context free grammar: Ambiguity, Simplification of CFGs, Normal forms for CFGs, Pumping lemma for CFLs, Decidability of CFGs, Ambiguous to Unambiguous CFG.

Unit IV **(8L)**

Push Down Automata (PDA): Description and definition, Working of PDA, Acceptance of a string by PDA, PDA and CFG, Introduction to auxiliary PDA and Two stack PDA.

Unit V **(8L)**

Turing machines (TM): Basic model, definition and representation, Language acceptance by TM, TM and Type – 0 grammar, Halting problem of TM, Modifications in TM, Universal TM, Properties of recursive and recursively enumerable languages, unsolvable decision problem, undecidability of Post correspondence problem, Church‟s Thesis, Recursive function theory.

Reference books:

1. Cohen, “Introduction to Computer theory”, Wiley India
2. Hopcroft, Ullman, “Introduction to Automata Theory, Language and Computation”, Nerosa Publishing House, 3rd Edition
3. K.L.P. Mishra and N.Chandrasekaran, “Theory of Computer Science(Automata, Languages and Computation)”, PHI, 3rd Edition
4. Martin J. C., “Introduction to Languages and Theory of Computations”, TMH

TCS 404

DATABASE MANAGEMENT SYSTEM

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Unit- I **(8L)**

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

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

Unit- II **(8L)**

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views, Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

Unit- III **(8L)**

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

Unit- IV **(8L)**

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

Unit- V **(8L)**

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.

Reference books:

1. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill, 5th Edition
2. Elmasri, Navathe, "Fundamentals Of Database Systems", Addision Wesley,5th edition
3. Gillenson, "Fundamentals of Database Management Systems", Wiley India
4. Date C J, "An Introduction To Database System", Pearson, 8th Edition.
5. Bipin C. Desai, "An introduction to Database Systems", Galgotia Publication

TCS-405 MICROPROCESSOR

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3 1 0

Unit I **(8L)**

Introduction – Microprocessors Evolution and types (Intel 4004 – Pentium IV and road maps), Overview of 8085, 8086, 80286, 80386, 80486, Pentium processors and Micontrollers.

Unit II **(8L)**

Architecture of 8086 – Register Organization, Execution unit, Bus Interface Unit, Signal Description, Physical Memory Organization, General Bus Operation, I/O addressing capabilities, Minimum mode and maximum mode timing diagrams, Comparison with 8088

Unit III **(8L)**

8086 programming – Assembly language program development tools (editor, linker, loader, locator, Assembler, emulator and Debugger), Addressing modes, Instruction set descriptions,

Unit IV **(8L)**

Assembler directives and operators, Procedures and Macros. (Writing programs for use with an assembler MASM),8086 Interfacing – Interfacing 8086 with semiconductor memory, 8255, 8254/ 8243, 8251, 8279.

Unit V **(8L)**

A/D and D/A converters, Numeric processor 8087, I/O processor 8089, Bus Interface(USB, PCI).

Reference books:

1. D.V. Hall, "Microprocessors and Interfacing", TMH, 2 Ed. 1991.
2. Barry B Brey, "INTEL Microprocessors", Prentice-Hall.
3. Y.-C. Liu and G. A. Gibson, "Microprocessor Systems: The 8086/8088 family Architecture, Programming & Design", PHI, 2000.

TCS-406

SOFTWARE ENGINEERING

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Unit-I: Introduction (5L)

Introduction to Software Engineering, Software Characteristics, Software Crisis, Software Engineering Processes, 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) (5L)

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),SEI-CMM Model.

Unit-III: Software Design (7L)

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: Coding, Testing & Software Maintenance (7L)

Top-Down and Bottom –Up programming, structured programming, Compliance with Design and Coding Standards.

Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Top-Down and Bottom-Up Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing),

Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Constructive Cost Models (COCOMO),

Reference Books:

1. Pankaj Jalote, Software Engineering , Wiley India
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication, 3rd Edition.
3. K. K. Aggarwal and Yogesh Singh, Software Engineering, New Age International Publishers,3rd Edition.
4. R. S. Pressman, Software Engineering: A Practitioners Approach, McGraw Hill, 6th Edition.
5. Ian Sommerville, Software Engineering, Addison Wesley, 8th Edition.

PCS- 402 : UNIX & Shell Programming Lab

L T P

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1. Use Vi editor to create a file called myfile.txt which contain some text. Correct typing errors during creation, Save the file & Logout of the file
2.Open the file created in Exp 1, Add, Change, delete & Save the changes
3. Use the cat command to create a file containing the following data. Call it mutable use tabs to separate the fields 1425 ravi 15.65, 4320 ramu 26.27, 6830 sita 36.15, 1450 raju 21.86
4. Use the cat command to display the file, my table, use vi command to correct any errors in the file, my table, use the sort command to sort the file my table according to the first field. Call
the sorted file my table(same name) & print the file my table
5. Use the cut & paste commands to swap fields 2 and 3 my table. Call it mytable(same name) & print the new file, my table
6. Use the date and who commands in sequence ?(in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called my file2.Use the more command to check the contents of myfile2.
7. Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word
8. Write A shell script that takes a command –line argument and reports on whether it is directry ,a file,or something else
9. Write a shell script that accepts one or more file name as a arguments and converts all of them to uppercase,provided they exits in the current directory
10. Write a shell script that determines the period for which a specified user is working on the system

PCS- 404 : Database Management System 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. Create VIEWS, CURSORS and TRGGERS & write ASSERTIONS.
11. Create 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 or DB2.

Mini Projects may also be planned & carried out through out the semester to understand important concepts of database.

PCS- 405 : 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