RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

SCHOOL OF COMPUTER SCIENCE & ENGINEERING

Affiliated to JNTUA-Anantapur, Approved by AICTE-New Delhi,

Accredited by NBA-New Delhi, Accredited by NAAC of UGC with A-Grade

NANDYAL-518 501, KURNOOL Dist., A.P.

COMPUTER SCIENCE

ACADEMIC REGULATIONS, COURSE STRUCTURE AND SYLLABI

APPLICABLE FOR STUDENTS ADMITTED INTO

M.TECH (REGULAR) FROM 2012-13

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY,
NANDYAL-518501, KURNOOL (DIST), A.P., INDIA

AUTONOMOUS INSTITUTE
(Affiliated to J.N.T.U.A, Anantapur)

ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI

M.Tech (Regular) from 2012-13

For pursuing Two year Master (post graduate) Degree of study in Engineering (M.Tech), offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET (Autonomous):

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2012-13 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified here after shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

Academic Regulations 2012 for M.Tech (Regular)

(Effective for the students admitted into first year from the Academic Year 2012-2013)
The M.Tech Degree of Jawaharlal Nehru Technological University, Anantapur, shall be conferred on candidates who are admitted to the M.Tech program at RGMCET, Nandyal and they shall fulfil all the requirements for the award of the Degree.

1.0 Eligibility for Admissions:

Admission to the above program shall be made subject to the eligibility, qualifications and specialization prescribed by Andhra Pradesh State Council of Higher Education (APSCHE) from time to time.

Admissions shall be made on the basis of merit rank obtained in GATE examination or PGCET conducted by any University of Andhra Pradesh designated by Govt. of A.P., or on the basis of any other order of merit prescribed by APSCHE, subject to the reservations prescribed by the Government of A.P. from time to time.

2.0 Award of M.Tech Degree:

2.1 The student shall be declared eligible for the award of the M.Tech degree, if he/she pursues a course of study and completes it successfully for not less than prescribed course work duration and not more than double the prescribed course work duration.

2.2 The student, who fails to fulfil all the academic requirements for the award of the degree within double the course work duration from the year of his admission, shall forfeit his seat in M.Tech course.

2.3 The minimum clear instruction days for each semester shall be 95.

3.0 Courses of Study:

The following specializations are offered at present for the M.Tech course of study.

1. Computer Science(CSE)
2. Digital Systems and Computer Electronics(ECE)
3. Embedded Systems(ECE)
4. Machine Design(Mechanical)
5. Power Electronics(EEE)
6. Software Engineering(IT)

and any other course as approved by the appropriate authorities from time to time.

4.0 Course pattern:

4.1 The entire course of study is of four semesters. During the first and second semesters the student has to undergo course work and during the third and fourth semesters the student has to carry out project work.

4.2 The student shall be eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

Table 1: Credits

	Semester			
	Periods / Week	Credits	Internal marks	External marks
Theory	04	04	40	60
Practical	03	02	40	60
Seminar		02	100	
Comprehensive Viva-voce1		02		50
Comprehensive Viva-voce2		02		50
Project		12		

Table:2 Course pattern

Semester	No.of Subjects	Number of Labs	Total credits	
First	06	02 Comprehensive Viva1	6X4=24 2X2=04 1X2=02	30
Second	06	02 Comprehensive Viva2	6X4=24 2X2=04 1X2=02	30
Third	Seminar(3rd semester) Project Work			02 12
Fourth				
Total credits				74

5.0 Attendance:

5.1 The candidate shall be deemed to have eligibility to write end semester examinations if he has secured a minimum of 75% of attendance in aggregate of all the subjects.

5.2 Condonation of shortage of attendance up to 10% i.e. 65% and above and below 75% may be given by the College academic committee consisting of Principal, Head of the Department and a senior faculty member.

5.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence.

5.4 **Shortage of attendance below 65% shall in no case be condoned.**

5.5 The candidate shall not be promoted to the next semester unless he fulfils the attendance requirements of the previous semester.

6.0 Evaluation:

The performance of the candidate in each semester shall be evaluated subject wise, with a maximum of 100 marks for Theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

6.1 For the theory subjects 60 marks shall be for the External End Examination, While 40 marks shall be for Internal Evaluation, based on the better of the marks secured in the two Mid Term-Examinations held, one in the middle of the Semester (I-IV units) and another immediately After the completion of instruction (V-VIII) units with four questions to be answered out of six, evaluated for 40 marks. Each question carries 10 marks. Each midterm examination shall be conducted for duration of 120 minutes. The End Examination will have 08 questions and 5 questions are to be answered and each question carries 12 marks.

6.2 For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks shall be for Internal evaluation based on the day-to-day performance. End practical examinations will be conducted with two Examiners, one of them being Laboratory Class Teacher and second Examiner shall be external from other institution. For this, HOD of the Department shall submit a panel of 5 Examiners, who are eminent in that field. One from the panel will be selected by the principal of the institute as external Examiner for laboratory.

6.3 Student has to undergo a comprehensive viva pertaining to his specialization which carries 50 marks in each semester. He has to secure 50% marks to obtain required credits. Comprehensive viva will be held at the end of I and II semesters by the committee consisting of HOD, senior faculty member and external Examiner from outside the institute. For this, HOD of the Department shall submit a panel of 5 Examiners, who are eminent in that field. One from the panel will be selected by the principal of the institute as external Examiner for comprehensive viva.

6.4 For Seminar 100 marks shall be for Internal evaluation. The candidate has to secure a minimum of 50 marks to be declared successful. The assessment will be made by a board consisting of HOD and two Internal experts at the end of III semester.

6.5 The candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a

minimum aggregate of 50% of the total marks in the End Examination and Internal evaluation taken together.

6.6 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 6.5.) he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the course when next offered or do any other specified subject as may be required.

7.0 Re-registration for improvement of Internal marks:

Following are the conditions to avail the benefit of improvement of Internal marks.

7.1 The candidate should have completed the course work and obtained examinations results for I & II semesters.

7.2 He should have passed all the subjects for which the Internal marks secured are more than 50%.

7.3 Out of the subjects the candidate has failed in the examination due to Internal marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of three Theory subjects for Improvement of Internal marks.

7.4 The candidate has to re-register for the chosen subjects and fulfil the academic requirements as and when they are offered.

7.5 For each subject, the candidate has to pay a fee equivalent to one tenth of the semester tuition fee and the amount is to be remitted in the form of D.D. in favour of the Principal, RGMCET payable at RGMCET Nandyal branch along with the requisition through the HOD of the respective Department.

7.6 In case of availing the Improvement of Internal marks, the Internal marks as well as the End Examinations marks secured in the previous attempt(s) for the reregistered subjects stand cancelled.

8.0 Evaluation of Project / Dissertation work :

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the Department.

8.1 Registration of Project work: The candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of I & II Sem)

8.2 An Internal Department Committee (I.D.C) consisting of HOD, Supervisor and One Internal senior expert shall monitor the progress of the project work.

8.3 The work on the project shall be initiated in the penultimate semester and continued in the final semester. The duration of the project is for two semesters. The candidate can submit Project thesis with the approval of I.D.C. after 36 weeks from the date of registration at the earliest. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institution.

8.4 The student must submit status report at least in three different phases during the project work period. These reports must be approved by the I.D.C before submission of the Project Report.

8.5 The candidate shall be allowed to submit the thesis/dissertation only after passing in all the prescribed subjects (both theory and practical) and then take viva voce examination of the project. The viva voce examination may be conducted once in two months for all the candidates submitted during that period.

8.6 Three copies of the Thesis/Dissertation certified in the prescribed form by the supervisor & HOD shall be submitted to the institute.

8.7 The Department shall submit a panel of 5 experts for a maximum of 5 students at a time. However, the thesis/dissertation will be adjudicated by the board consists of HOD, concerned supervisor and one external Examiner from other institute nominated by the principal from a panel of Examiners submitted by the Department HOD to the Controller of Examinations.

8.8 If the report of the board is favourable in viva voce examination, the board shall jointly report candidates work as:

1. Satisfactory
2. Not satisfactory

If the report of the viva voce is not satisfactory the candidate will retake the viva voce examination after three months. If he fails to get a satisfactory report at the second viva voce examination he will not be eligible for the award of the degree unless the candidate is permitted to revise and resubmit the thesis.

9.0 Award of Degree and Class:

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of M. Tech. Degree he shall be placed in one of the following classes:

Table 3: Award of division

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured from the 74 Credits.
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	

(The marks in Internal evaluation and End Examination shall be shown separately in the marks memorandum)

10.0 Supplementary Examinations:

Apart from the regular End Examinations the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such of the students writing supplementary examinations as supplementary candidates may have to write more than one examination per day.

11.0 Transcripts:

After successful completion of prerequisite credits for the award of degree a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

12.0 Minimum Instruction Days:

The minimum instruction days for each semester shall be 95 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

13.0 Amendment of Regulations:

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted.

14.0 Transfers

There shall be no branch transfers after the completion of admission process.

15.0 With holding of results:

If the candidate has not paid any dues to the institute or if any case of in-discipline is pending against him, the result of the candidate will be with held and he will not be allowed for the next semester. The issue of the degree is liable to be withheld in such cases.

16.0 Transitory Regulations:

Candidates who have discontinued or have been detained for want of attendance are eligible for admission to the same or equivalent subjects as and when subjects are offered, subject to 6.5 and 2.0

17.0 Rules of Discipline:

17.1 Any attempt by any student to influence the teachers, Examiners, faculty and staff of controller of Examination for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

17.2 When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject(s) and grading is done accordingly.

17.3 When the performance of the student in any subject(s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject(s).

17.4 When the student's answer book is confiscated for any kind of attempted or suspected malpractice the decision of the Examiner is final.

18.0 General:

18.1 The Academic Regulation should be read as a whole for the purpose of any interpretation.

18.2 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Council is final.

18.3 The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

18.4 *Where the w*ords "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

COMPUTER SCIENCE

COURSE STRUCTURE

I M.TECH, I-SEMESTER (CS)

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
D0501121	Mathematical Foundations of Computer Science	4	-	4	40	60	100
D0502121	Advanced Data Structures and Algorithms	4	-	4	40	60	100
D0503121	Computer Organization	4	-	4	40	60	100
D0504121	Database Management Systems	4	-	4	40	60	100
D0505121	Software Engineering	4	-	4	40	60	100
D0506121	Java and Web Technologies	4	-	4	40	60	100
D0591121	ADS & DBMS Lab	-	3	2	40	60	100
D0592121	Java & Web Technologies Lab	-	3	2	40	60	100
D0593121	Comprehensive Viva-I			2		50	50
	Total	**24**	**6**	**30**	**320**	**530**	**850**

I M.TECH, II-SEMESTER (CS)

COURSE STRUCTURE

Code	Subject	Theory	Practical	Credits	Scheme of Examination		
					Internal Marks	External Marks	Total Marks
D0507122	Operating Systems	4	-	4	40	60	100
D0508122	Object Oriented Analysis and Design	4	-	4	40	60	100
D0509122	Computer Networks	4	-	4	40	60	100
D0510122	Data Warehousing and Data Mining	4	-	4	40	60	100
	Elective-I	4	-	4	40	60	100
	Elective-II	4	-	4	40	60	100
D0594122	OOAD Lab	-	3	2	40	60	100
D0595122	Data Warehousing and Data Mining Lab	-	3	2	40	60	100
D0596122	Comprehensive Viva-II			2		50	50
	Total	**24**	**6**	**30**	**320**	**530**	**850**

Elective – I

Software Quality Assurance and Testing	D0511122
Advanced Computer Architecture	D0512122
Distributed Databases	D0513122
Storage Area Networks	D0514122

Elective – II

Human Computer Interaction	D2505121
Software Project Management	D0515122
Image Processing	D0516122
Distributed Systems	D0517122

II M.TECH, III-SEMESTER & IV-SEMESTER (CS)

COURSE STRUCTURE

Code	Subject	Credits	Internal Marks	External Marks	Total
D0597123	Seminar	2	100	-	100
D0598124	Project work	12	-	-	-

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem **T C**
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(D0501121) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

UNIT I

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus.

UNIT II

Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus.

UNIT III

Set theory & Relations: Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram. Functions: composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.

UNIT IV

Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

UNIT V

Elementary Combinatorics: Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

UNIT VI

Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT VII

Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs.

UNIT VIII

Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians " J.L. Molt, A.Kandel, T.P.Baker, PHI

REFERENCE TEXTBOOKS:

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra,TMH
2. Discrete Mathematics, Schaum's Outlines,Lipschutz,Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009
4. Discrete Mathematics, Johnsonbaugh, 6th ed., Pearson, 2005
5. Discrete Mathematics, Malik, Sen, 6th ed., Cengage Learning, 2004
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005
7. Discrete Mathematics and Combinatorics, Sengadir, Pearson, 2009
8. Discrete and Combinatorial Mathematics, Grimaldi, Ramana, 5th ed., Pearson. 2006
9. Discrete Mathematics, J K Sharma, 2nd ed., Macmillan, 2005

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem **T 4** **C 4**

(D0502121) ADVANCED DATA STRUCTURES AND ALGORITHMS

UNIT I : Overview of Data Structures
Review of Arrays, Stacks, Queues, linked lists , Linked stacks and Linked queues, Applications

UNIT II: Algorithm Analysis
Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Time complexity of an algorithm using O notation, Polynomial Vs Exponential Algorithms, Average, Best, and Worst Case Complexities, Analyzing Recursive Programs.

UNIT III: Trees and Graphs
Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees and Binary trees, Binary tree Traversals, Threaded binary trees, Graphs-basic concepts, representation and traversals.

UNIT IV: Binary Search Trees, AVL Trees and B Trees
Introduction, Binary Search Trees: Definition, Operations and applications. AVL Trees: Definition, Operations and applications. B Trees: Definition, Operations and applications.

UNIT V: Red – Black Trees, Splay Trees and Hash Tables
Red – Black Trees, Splay Trees and its applications. Hash Tables: Introduction, Hash Tables, Hash Functions and its applications.

UNIT VI: Divide – and – Conquer & Greedy Method
General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Strassen's Matrix Multiplication, Greedy Method**-** General Method, Minimum Cost Spanning Trees, Single Source Shortest Path.

UNIT VII: Dynamic Programming
General Method, All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack problem, Reliability Design, Traveling Sales Person's Problem.

UNIT VIII: Back Tracking and Branch – and – Bound
General Method, 8 – Queen's Problem, Graph Coloring. Branch – and – Bound: The Method, LC Search, Control Abstraction, Bounding, 0 / 1 Knapsack Problem.

TEXT BOOKS:

1. Data Structures and Algorithms by G.A.V. Pai, 2009, TMH.
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press.

REFERENCE BOOKS:

1. Classic Data Structures by D. Samanta, 2005, PHI
2. Design and Analysis of Computer Algorithms by Aho, Hopcraft, Ullman 1998, PEA.
3. Introduction to the Design and Analysis of Algorithms by Goodman, Hedetniemi, TMG.
4. Design and Analysis of Algorithms by E. Horowitz, S. Sahani, 3rd Edition, Galgotia.
5. Data Structures and Algorithms in C++ by Drozdek 2nd Edition, Thomson.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem | **T** | **C**
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(D0503121) COMPUTER ORGANIZATION

UNIT-I

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT-II

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS : Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Mircrooperatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle.

Memory – Reference Instructions. Input – Output and Interrupt. STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT-III

MICRO PROGRAMMED CONTROL : Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Microprogrammed control

UNIT-IV

COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT-V

THE MEMORY SYSTEM : Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance considerations, Virtual memories secondary storage. Introduction to RAID.

UNIT-VI

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt Direct memory Access, Input –Output Processor (IOP) Serial communication; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT-VII

PIPELINE AND VECTOR PROCESSING : Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT-VIII

MULTI PROCESSORS : Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

TEXT BOOKS :

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

REFERENCES :

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Organization, Anjaneyulu, Himalaya Pub house

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem **T 4** **C 4**

(D0504121) DATABASE MANAGEMENT SYSTEMS

UNIT – I

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems.Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model

UNIT – II

Relational Model : Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra and Calculus : Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra Queries – Relational calculus – Tuple relational Calculus – Domain relational calculus.

UNIT – III

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOTR – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT – IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form.

UNIT – V

Overview of Transaction Management : ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery.

UNIT – VI

Concurrency Control : Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking.

Crash recovery : Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing – re3covering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

UNIT – VII

Overview of Storage and Indexing : Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning.

UNIT – VIII

Storing data: Disks and Files : The Memory Hierarchy – Redundant Arrays of Independent – Disks – Disk Space Management – Buffer Manager – Files of records – Page Formats – record formats.

Tree Structured Indexing : Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

Hash Based Indexing : Static Hashing – Extendable hashing – Linear Hashing – Extendable vs. Liner hashing.

TEXT BOOKS :

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, IV edition.

REFERENCES :

1. Introduction to Database Systems, By ITL Education Solutions Ltd.(Pearson Publisher)
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition.Thomson
3. Data base Management System, Elmasri Navrate Pearson Education
4. Data base Management System Mathew Leon, Leon Vikas.
5. Data base Systems, Connoley Pearson education.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

AUTONOMOUS

COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem | **T** | **C**
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(D0505121) SOFTWARE ENGINEERING

UNIT-I : Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.
A Generic view of process : Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

UNIT-II : Process models : The waterfall model, Incremental process models, Evolutionary process models, The Unified process.
Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

UNIT-III : Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT-IV : Design Engineering : Design process and Design quality, Design concepts, the design model.
Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

UNIT-V : Object-Oriented Design : Objects and object classes, An Object-Oriented design process, Design evolution.
Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT-VI : Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. **Product metrics :** Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT-VII : Metrics for Process and Products: Software Measurement, Metrics for software quality. **Risk management :** Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

UNIT-VIII : Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS :

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition.McGrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson education.

REFERENCES :

1. Software Engineering- K.K. Agarwal & Yogesh Singh,New Age International Publishers
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
3. Systems Analysis and Design- Shely Cashman Rosenblatt,Thomson Publications.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem | **T** 4 | **C** 4

(D0506121) JAVA AND WEB TECHNOLOGIES

Unit I:

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script.

Unit II:

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

Unit III:

Review of Applets, Class, Event Handling, AWT Programming.
Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Panes – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.

Unit IV:

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API.

Unit V:

Web servers: Tomcat Server installation & Testing.
Introduction to Servelets: Lifecycle of a Serverlet, JSDK, The Servelet API, The javax.servelet Package, Reading Servelet parameters, Reading initialization parameters.

Unit VI:

More on Servlets: The javax.servelet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.
Introduction to JSP: The Problem with Servelet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC architecture. AJAX.

Unit VII:

JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

Unit VIII:

Database Access: Database Access, Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application – Specific Database Actions Deploying JAVA Beans in a JSP Page

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNIT 1,2)
2. The complete Reference Java 2 Fifth Edition ,Patrick Naughton and Herbert Schildt., TMH (Chapters: 25) (UNIT 2,3)
3. Java Server Pages –Hans Bergsten, SPD O'Reilly (UNITs 3,4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Marty Hall and Larry Brown Pearson

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - I Sem **P** **C**
3 **2**

(D0591121) ADS & DBMS Lab

1). Write a C++ program to implement stack ADT using arrays.

2). Write a C++ program to implement AVL tree.

3). Write a C++ program to implement Stack ADT using linked list.

4). Write a C++ program to implement Queue ADT using arrays.

5). Write a C++ program to implement Binary search tree.

6). Write a C++ program to evaluate any postfix expression.

7). Consider the Insurance database given below. The primary keys are underlined and the data types are specified:

PERSON (driver-id:string,name:string,address:string)
CAR (Regno:string,model:string,year:int)
ACCIDENT (report-number:int,date:date,location:string)
OWNS (driver-id:string,regno:string)
PARTICIPATED (driver-id:string,regno:string,report-number:int,damage-amount:int)

1. create the above tables by properly specifying the primary keys and the foreign keys
2. Enter atleast five tuples for each relation
3. Demonstrate how you
   a. Update the damage amount for the car with a specific regno in accident with report number 12 to 25000
   b. Add a new accident to the database
4. Find the total number of people who owned cars that were involved in accidents in 2006.
5. Find the number of accidents in which cars belonging to a specific model were involved.

8). Consider the following relations for an order processing database application in a company.

CUSTOMER (Cust #: int, Cname: string, City: string)
ORDER (Order #: int, Odate: date, Cust #: int, Ord-Amt: int)
ORDER-ITEM (Order #: int, Item #: int, qty: int)
ITEM (Item #: int, Unit Price: int)
SHIPMENT (Order #: int, Warehouse #: int, Ship-Date: date)
WAREHOUSE (Warehouse #: int, City: string)

i) Create the above tables by properly specifying the primary keys and the foreign keys.
ii) Enter at least five tuples for each relation.
iii) Produce a listing: **CUSTNAME**, **NO_OF_ORDERS**, **AVG_ORDER_AMT**, where the middle column is the total number of orders by the customer and the last column is the average order amount for that customer.
iv) List the **Order#** for the orders that were shipped from all the warehouses that the company has in a specific city.
v) Demonstrate how you delete **Item#** 10 from the **ITEM** table and make that field *null* in the **ORDER-ITEM** table.

9). Consider the following database of student enrollement in courses and books adopted for each course .

STUDENT (regno :string , name : string , major : string , bdate : int)
COURSE (course# : int , cname : string , dept : string)
ENROLL (regno : string , course#: int , sem : int , marks : int)
BOOK_ADAPTION (course#: int , sem : int , book_isbn :int)
TEXT(book_isbn : int , book-title : string , publisher : string , author : string).

i) Create the above tables by properly specifying the primary keys and the foreign key.
ii) Enter atleast five tuples for each relation .
iii) Demonstrate how you add a new text book to the database and make this book be adopted by some department.
iv) Produce a list of text books (include course # ,book_isbn, book-title) in the alphabetical order for courses offered by the cs department that use more than 2 books.
v) List any department that has all its adopted books published by specific publisher.

10). **Consider the following relations for the details maintained by a book dealer.**

AUTHOR (Author-id: int, Name: string, City: string, Country: string)
PUBLISHER (Publisher-id: int, Name: string, City: string, Country: string)
CATALOG (Book-id: int, title: string, author-id: int, Publisher-id: int, Category-id: int, Year: int, Price: int)
CATEGORY (Category-id: int, Description: string)
ORDER-DETAILS (Order-no : int, Book-id: int, Quantity: int)

i. Create the above tables by properly specifying the primary keys and the foreign keys.
ii. Enter at least five tuples for each relation.
iii. Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.
iv. Find the author of the book which has maximum sales.
v. Demonstrate how you increase the price of books published by a specific publisher by 10%.

11). Consider the following database for a banking enterprise

BRANCH (***branch_name***: string, branch_city: string, assets: real)
ACCOUNT (***accno***: int, **branch_name**: string, balance: real)
CUSTOMER (***customer_name***: string, customer_street: string, city:string)
DEPOSITOR (***customer_name***: string, ***accno***: int)
LOAN (***loan_number***: int, **branch_name**: string, amount: real)
BORROWER (***customer_name***: string, ***loan_number***: int)

i) Create the above tables by properly specifying the primary keys and the foreign keys.
ii) Enter at least five tuples for each relation.
iii) Find all the customers who have at least two accounts at the MAIN branch.
iv) Find all the customers who have an account at all branches located in a specific city.
v) Demonstrate how you delete all account tuples at every branch located in a specific city.

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I Year M.Tech(CS) - II Sem **P** **C**

3 **2**

(D0592121) JAVA & WEB TECHNOLOGIES LAB

1. Write an application to implement basic tags in HTML.
2. Write an application to implement lists type in HTML.
3. Write an application to implement forms in HTML.
4. Write an application to implement checkbox in HTML.
5. Write an application to implement radio button in HTML.
6. Write an application to implement frames in HTML.
7. Write an application to implement images in HTML.
8. Write an application to implement table in HTML.
9. Write an application to implement style sheets in HTML.
10. Write an application to implement dropdown lists in HTML.
11. Write an application to implement links in HTML.
12. Write an application to perform addition,average,product,smallest, largest,on 3 numbers using java-script.
13. Write an application to decide a number as even or odd.
14. Write an application to convert a binary number to decimal.
15. Write an application to determine rt.angled triangle or not.
16. Write an application to implement prime number.
17. Write an application to convert celcius to farenheit and vice-versa.
18. Write an application to perform switchcase.
19. Write a java-script program to add elements to list at runtime.
20. Write an application to implement mathematical functions.
21. Write an application to display current year, month and date.
22. Write a simple well formed XML document that contains e-mail contents.
23. Write a simple well formed XML document against DTD.
24. Write a simple well formed XML document against schema.
25. Write an application to implement service method of Generic Servlet Class.
26. Write an application to implement doGet method of HTTP servlet class.
27. Write an application to implement doPost method of HTTP servlet class.
28. Write an application to implement config parameters in servlets.
29. Write an application to implement context parameters in servlets.
30. Write an application to implement request-dispatcher in servlets.

31. Write an application to implement cookies in servlets.
32. Write an application to implement sessions in servlets.
33. Write an application program on JSP by using JSP scripting elements.
34. Write a program to demonstrate include directive.
35. Write a program to demonstrate forward directive.
36. Write a program to demonstrate JSP cookies.
37. Write a program to demonstrate JSP session.
38. Write a JSP program to connect to database by using TYPE-1 DRIVER.
39. Write a JSP program to create table in database.
40. Write a JSP program to insert data into a database tabe.
41. Write a JSP program to retrieve data from database table.

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - II Sem **T** **C**

4 **4**

(D0507122) OPERATING SYSTEMS

UNIT I

Operating Systems Overview: Operating systems functions, Overview of computer operating systems, protection and security, distributed systems, special purpose systems, operating systems structures: operating system services and systems calls, system programs, operating system structure, operating systems generation.

UNIT II

Process Management: Process concepts, threads, scheduling-criteria, algorithms, their evaluation, Thread scheduling, case studies UNIX, Linux, Windows.

UNIT III

Concurrency**:** Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies UNIX, Linux, Windows.

UNIT IV

Memory Management**:** Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement, algorithms, Allocation of frames, Thrashing case studies UNIX, Linux, Windows

UNIT V

Principles of deadlock: system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.

UNIT VI

File system Interface**:** The concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection. File System implementation**:** File system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows

UNIT VII

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure. I/O systems: Hardware, application I/o interface, kernel I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.

UNIT VIII

Protection**:** Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability-Based systems, Language – Based Protection, Security: The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer –security classifications, case studies UNIX, Linux, Windows.

TEXT BOOKS:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems, A Concept based Approach- D.M.Dhamdhere, Second Edition, TMH.

REFERENCES:

1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education.
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
5. Operating Systems, A.S.Godbole, Second Edition, TMH.
6. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
7. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
8. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - II Sem **T** **C**

4 **4**

(D0508122) OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT IV

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

UNIT V

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT VI

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

UNIT VII

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT VIII

Case Study: The Unified Library application.

TEXT BOOKS:

1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.

REFERENCES:

1. Fundamentals of Object Oriented Design in UML, Meilir Page-Jones, Pearson Education.
2. Modeling Software Systems Using UML2, Pascal Roques, WILEY- Dreamtech India Pvt. Ltd.
3. Object Oriented Analysis and Design, Atul Kahate, The McGraw-Hill Companies.
4. Object-Oriented Analysis and Design with the Unified Process, John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
5. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.
6. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
7. UML and C++, R.C.Lee and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis,Design and Implementation, B.Dathan and S.Ramnath, Universities Press.
9. OODesign with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Mark Priestley: Practical Object-Oriented Design with UML, TMH.

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - II Sem **T** **C**

4 **4**

(D0509122) COMPUTER NETWORKS

UNIT 1

Introduction: Network Hardware, Network Software, References Models, Example Networks

UNIT II

The Physical Layer: The Theoretical Basis for Data Communication Guided Transmission Media, Communication Satellites, The public Switched Telephone Network- The Local Loop: Modern ADSL, and wireless, Trunks and Multiplexing, Switching.

UNIT III

The Data Link Layer: Data link Layer Design Issues, Elementry Data Link Protocols, Sliding Window Protocols, HDLC, The data Link layer in the Internet.

UNIT IV

The Medium Access Control Sublayer: The Channel allocation Problem, Multiple Access protocols, Ethernet- Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol. The Binary Exponential Backoff Algorithm, Ethernet Performance, Switched Ethernet, Fast Ethernet. Wireless Lans- The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC SubLayer Protocol, The 802.11 Frame Structure .

UNIT V

The Network Layer**:** Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms. Internetworking, The Network Layer in the Internet.

UNIT VI

The Transport Layer: The Transport Service, Elements of Transport Protocols, The Internet Transport Protocols: UDP, The Internet Transport Protocols: TCP.

UNTI VII

The Application Layer: DNS-The Domain Name System, Electronic Mail. The World Wide web, Multimedia.

UNTI VIII

Network Security**:** Cryptography, Symmetric-Key Algorithms, Public-Key Algorithms, Digital Signatures.

TEXT BOOKS:

1. Computer Networks, Andrew S. Tanenbaum, Fouth Edition, Pearson Education.

REFERENCES:

1. Computer Communications and Networking Technologies, Michael A. Gallo, William M. Hancock, Cengage Learning.
2. Computer Networks: Principles, Technologies and Protocols for Network Design, Natalia Olifer, Victor Olifer, Wiley India.
3. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill.
4. Understanding Communications and Networks, Third Edition, W.A.Shay, Cengage Learning.
5. Computer and Communication Networks, Nader F. Mir, Pearson Education
6. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W.Ross, Third Edition, Pearson Education.
7. Data and Computer Communications, G.S.Hura and M.Singhal, CRC Press, Taylor and Francis Group.

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - II Sem **T 4** **C 4**

(D0510122) DATA WAREHOUSING AND DATA MINING

UNIT – I

Introduction :

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining task primitives, Integration of data mining system with Data base or Data Warehouse system, Major issues in Data Mining.

UNIT – II

Data Warehouse and OLAP Technology:

Overview of Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining

UNIT – III

Data Preprocessing:

Need of preprocessing the data, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT – IV

Mining Frequent patterns, Associations, and Correlations:

Basic Concepts, Efficient and Scalable Frequent Itemset Mining methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT – V

Classification I:

Overview of Classification and Prediction, Issues Regarding Classification and Prediction, Bayesian Classification, Classification by Decision Tree Induction, Rule-Based Classification, Classification by Backpropagation,.

UNIT – VI

Classification II:

Support Vector Machines, **Lazy Learners:** k-Nearest-Neighbor Classifiers,
Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor, Ensemble Methods- Increasing the Accuracy, Model Selection

UNIT – VII

Cluster Analysis I:

Overview of Cluster Analysis, Types of data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods

UNIT – VIII

Cluster Analysis II:

Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, outlier Analysis.

TEXT BOOKS:

6. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India, second Edition.

REFERENCES:

1. Data Mining Introductory and advanced topics–MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION
5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION.

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4 **4**

(D0511122) SOFTWARE QUALITY ASSURANCE AND TESTING
(ELECTIVE -1)

UNIT I

Software Quality Assurance Framework and Standards SQA Framework: What is Quality? Software Quality Assurance, Components of Software Quality Assurance – **Software Quality Assurance Plan:** Steps to develop and implement a Software Quality Assurance Plan – **Quality Standards:** ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma

UNIT II

Software Quality Assurance Metrics and Measurement Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs

UNIT III

Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics – **Software quality indicators** – **Fundamentals in Measurement theory**

UNIT IV

Software Testing Strategy and Environment: Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing

UNIT V

Software Testing Methodology

Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist

UNIT VI

Software Testing Techniques

Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing

UNIT VII

Software Testing Tools

Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus.

UNIT VIII

Testing Process

Eleven Step Testing Process: Assess Project Management Development Estimate and Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes, Evaluate Test Effectiveness.

Testing Specialized Systems and Applications

Testing Client/Server – Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse

TEXT BOOKS:

1. Effective Methods for Software Testing, 2nd Edition, William E. Perry , Second Edition, Wiley India, 2006.
2. Software Quality, Mordechai Ben-Menachem/Garry S. Marliss, Thomson Learning publication,1997.

REFERENCE BOOKS:

1. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
2. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press
3. Managing the Testing Process, by Rex Black, Wiley
4. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press
5. Software Testing and continuous Quality Improvement, by William E.Lewis, Gunasekaran Veerapillai, Second Edition, Auerbach Publications
6. Metrics and Models for Software Quality Engineering, by Stephen H. Kan, by Pearson Education Publication
7. Software Testing Tools, K.V.K.K. Prasad, Dream tech press, 2008.
8. Practical Software Testing, Ilene Burnstein, Springer, 2003.
9. Software Testing, Srinivasan Desikan & Gopalaswamy Ramesh, Pearson Education,2006.
10. Software testing techniques, Scott Loveland & Geoffrey Miller, Shroff Publishers, 2005.
11. Software Quality, Martin Wieczorek & Dirk Meyerhoff, Springer, 2001.

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COMPUTER SCIENCE & ENGINEERING

I Year M.Tech(CS) - II Sem | **T** 4 | **C** 4

(D0512122) ADVANCED COMPUTER ARCHITECTURE
(ELECTIVE-1)

UNIT - I

Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design.

UNIT - II

Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set- instructions for control flow- encoding an instruction set.-the role of compiler

UNIT - III

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP

UNIT - IV

ILP software approach- compiler techniques- static branch protection - VLIW approach - H.W support for more ILP at compile time- H.W verses S.W Solutions

UNIT - V

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

UNIT - VI

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading.

UNIT - VII

Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system.

UNIT - VIII

Inter connection networks and clusters- interconnection network media – practical issues in interconnecting networks- examples – clusters- designing a cluster.

TEXT BOOK :

1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

REFERENCES :

1. "Computer Architecture and parallel Processing" Kai Hwang and A.Briggs International Edition McGraw- Hill.
2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.
3. Parallel Computer Architecture, A Hardware / Software Approach, David E. Culler, Jaswinder Pal singh with Anoop Gupta, Elsevier

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4 **4**

(D0513122) DISTRIBUTED DATABASES
(ELECTIVE - I)

UNIT - I

Features of Distributed versus Centralized Databases, Principles Of Distributed Databases , Levels Of Distribution Transparency, Reference Architecture for Distributed Databases , Types of Data Fragmentation, Integrity Constraints in Distributed Databases.

UNIT – II

Translation of Global Queries to Fragment Queries, Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parametric Queries.

UNIT – III

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

UNIT – IV

The Management of Distributed Transactions, A Framework for Transaction Management , Supporting Atomicity of Distributed Transactions, Concurrency Control for Distributed Transactions, Architectural Aspects of Distributed Transactions.

UNIT - V

Concurrency Control, Foundation of Distributed Concurrency Control, Distributed Deadlocks, Concurrency Control based on Timestamps, Optimistic Methods for Distributed Concurrency Control.

UNIT – VI

Reliability, Basic Concepts, Nonblocking Commitment Protocols, Reliability and concurrency Control, Determining a Consistent View of the Network, Detection and Resolution of Inconsistency, Checkpoints and Cold Restart, Distributed Database Administration, Catalog Management in Distributed Databases, Authorization and Protection

UNIT - VII

Architectural Issues, Alternative Client/Server Architectures, Cache Consistency Object Management, Object Identifier Management, Pointer Swizzling, Object Migration, Distributed Object Storage, Object Query Processing, Object Query Processor Architectures, Query Processing Issues, Query Execution, Transaction Management, Transaction Management in Object DBMSs , Transactions as Objects.

UNIT - VIII

Database Integration, Scheme Translation, Scheme Integration, Query Processing Query Processing Layers in Distributed Multi-DBMSs, Query Optimization Issues. Transaction Management Transaction and Computation Model Multidatabase Concurrency Control, Multidatabase Recovery, Object Orientation And Interoperability Object Management Architecture CORBA and Database Interoperability Distributed Component Model COM/OLE and Database Interoperability, PUSH-Based Technologies

TEXT BOOKS :

1. Distributed Database Principles & Systems, Stefano Ceri, Giuseppe Pelagatti McGraw-Hill

REFERENCES:

1. Principles of Distributed Database Systems, M.Tamer Ozsu, Patrick Valduriez – Pearson Education.

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COMPUTER SCIENCE & ENGINEERING

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(D0514122) STORAGE AREA NETWORKS
(ELECTIVE - I)

UNIT I

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data center infrastructure, role of each element in supporting business activities.

UNIT II

Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment ,Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

UNIT III

Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system.

UNIT IV

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, Understand the need for long-term archiving solutions and describe how CAS fulfills the need, Understand the appropriateness of the different networked storage options for different application environments

UNIT V

List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

UNIT VI

Architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities.

UNIT VII

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center. Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain

UNIT VIII

Virtualization technologies, block-level and file-level virtualization technologies and processes. Case Studies, The technologies described in the course are reinforced with EMC examples of actual solutions. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

TEXT BOOKS:

1. Information Storage and Management, EMC Corporation, Wiley.

REFERENCES:

1. Storage Networks: The Complete Reference, Robert Spalding, Tata McGraw Hill , Osborne, 2003.
2. Building Storage Networks, Marc Farley, Tata McGraw Hill, Osborne, 2001.
3. Storage Area Network Fundamentals, Meeta Gupta, Pearson Education Limited, 2002.

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(D2505121) HUMAN COMPUTER INTERACTION
(ELECTIVE - II)

UNIT - I

Introduction : Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

UNIT - II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT - III

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT - IV

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - V

Windows – Select the proper kinds of Windows: Characteristics, Components of a window, Presentation Styles, Types of Windows, Window Management, Window Operations. Select the Proper Device-Based controls: Characteristics, Selecting the Proper Device-Based Control.

UNIT - VI

Choose the Proper Screen-Based Controls - Operable Controls, Text Entry/Read-Only Controls, Selection Controls, Combination Entry/Selection Controls, Other Operable Controls, Presentation Controls, Selecting the Proper Controls

UNIT - VII

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT - VIII

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOKS :

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES :

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL
2. BEALG, PEARSON.
3. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
4. User Interface Design, SorenLauesen , Pearson Education.

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(D0515122) SOFTWARE PROJECT MANAGEMENT
(ELECTIVE-II)

UNIT - I

Conventional Software Management : The waterfall model, conventional software Management performance.

Evolution of Software Economics : Software Economics, pragmatic software cost estimation.

UNIT - II

Improving Software Economics : Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new : The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - III

Life cycle phases : Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process : The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT - IV

Model based software architectures : A Management perspective and technical perspective.

Work Flows of the process : Software process workflows, Iteration workflows.

UNIT - V

Checkpoints of the process : Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning : Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT - VI

Project Organizations and Responsibilities : Line-of-Business Organizations, Project Organizations, evolution of Organizations.

Process Automation : Automation Building blocks, The Project Environment.

UNIT - VII

Project Control and Process instrumentation : The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Tailoring the Process : Process discriminants.

UNIT - VIII

Future Software Project Management : Modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

TEXT BOOK :

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCES :

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

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(D0516122) IMAGE PROCESSING
(ELECTIVE II)

UNIT - I

Introduction : Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels (p.nos. 15-17, 21- 44, 50-69).

UNIT - II

Image enhancement in the spatial domain : Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods (p.nos 76-141).

UNIT - III

Image restoration : A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function (p.nos 147-167, 220-243, 256-276).

UNIT - IV

Color Image Processing : Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation (p.nos: 282- 339).

UNIT - V

Image Compression : Fundamentals, image compression models, error-free compression, lossypredictive coding, image compression standards (p.nos: 409-467,492-510).

UNIT - VI

Morphological Image Processing : Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms (p.nos:519-550).

UNIT - VII

Image Segmentation : Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation (p.nos: 567-617).

UNIT - VIII

Object Recognition : Patterns and patterns classes, recognition based on decision–theoretic methods, matching, optimum statistical classifiers, neural networks, structural methods – matching shape numbers, string matching (p.nos: 693-735).

TEXT BOOK :

1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

REFERENCES :

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
4. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.
5. Digital Image Processing, William K. Prat, Wily Third Edition
6. Digital Image Processing and Analysis, B. Chanda, D. Datta Majumder, Prentice Hall of India, 2003.

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(D0517122) DISTRIBUTED SYSTEMS
(ELECTIVE-II)

UNIT-I

Introducton Of Distributed System: Goals, Hardware Concepts, Software Concepts, the Client-Server Model.

UNIT-II

Communication: Remote Procedure Call, Remote Object Invocation, Message Oriented Communication, Stream-Oriented Communication.

UNIT-III

Processes: Threads, Clients, Servers, Code Migration, Software Agents. NAMING: Naming Entities, Locating Mobile Entities.

UNIT-IV

Synchronization: Clock Synchronization, Logical Clocks, Global State, Election Algorithms, Mutual Exclusion, Distributed Transactions.

UNIT-V

Consistency And Replication: Introduction, Data-Centric Consistency Models, Client Centric Consistency Models, Distribution Protocols, Consistency Protocols, Examples.

UNIT-VI

Fault Tolerance: Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.

UNIT-VII

Distributed Object-Based Systems: CORBA, Distributed COM

UNIT-VIII

Distributed File Systems: SUN Network File System, The CODA File System, Other Distributed File Systems, Comparison of Distributed File Systems.

TEXT BOOKS

1. Andrew S. Tanenbaum, Maarten Van Steen. Distributed Systems – Principles and Paradigms 2/e, PHI, 2004.

REFERENCE BOOKS

1. Pradeep K. Sinha, "Distributed Operating Systems Concepts and Design", PHI 2002.
2. Randy Chow Theodore Johnson, "Distributed Operating Systems and Algorithm Analysis", PEA, 2009.
3. George Couloris, Jean Dollimore, Tim Kind berg, "Distributed Systems Concepts and Design", 3/e, PEA, 2002.

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(D0594122) OOAD Lab

1. The student should take up the case study of Unified Library application which is mentioned in the theory, and Model it in different views i.e Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.
2. Student has to take up some more case studies of his/her own interest and do the same what ever mentioned in first problem. Some of the ideas regarding case studies are given in reference books which were mentioned in theory syllabus can be referred for some idea.

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(D0595122) DATA WAREHOUSING AND DATAMINING LAB

Implement the following datamining Techniques in C/C++/Java Language

1) Preprocessing
   a)Data Cleaning
   b) Data Integration and Transformation
   c) Data Reduction
   d) Data Discretization and Concept hierarchy Generation
2) Association Rule Mining
   a) Apriori Algorithm(With candidate generation)
   b) FP-Growth Algorithm(Without candidate generation)
3) Classification
   a) Naïve Bayes
   b) Back Propagation
   c) SVM
   d) k-NNC
4) Clustering
   a) k-Means
   b) k-Medoids(Partition Medoids)
   c) BIRCH
   d) DBSCAN