

ACADEMIC REGULATIONS COURSE STRUCTURE & DETAILED SYLLABI

M. Tech Regular Two Year Degree Courses
(For the Batches Admitted From 2012-2013)

COMPUTER SCIENCE & ENGINEERING And COMPUTER SCIENCE



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**SRI VENKATESWARA COLLEGE OF ENGINEERING AND
TECHNOLOGY (AUTONOMOUS)**

R.V.S. Nagar, CHITTOOR – 517 127, A.P

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Vision and Mission of the institute

Vision

- Carving the youth as dynamic, competent, valued and knowledgeable professionals who shall lead the Nation to a better future.

Mission

- Providing quality education, student-centered teaching-learning processes and state-of-art infrastructure for professional aspirants hailing from both rural and urban areas.
- Imparting technical and management education to encourage independent thinking, develop strong domain of knowledge, own contemporary skills and positive attitudes towards holistic growth of young minds.
- Evolving Institution into a Center of Excellence and Research.

Quality Policy

- Sri Venkateswara College of Engineering and Technology strides towards excellence by adopting a system of qualitative policies and processes with continued improvements to enhance students' skills and talents for their exemplary contribution to the society, the nation and the world.

Vision and Mission of the Department

Department Vision

- Evolve as a centre of excellence in Computer Science and Engineering education with national and international reputation and to adapt itself to the rapid advancements in the Computer science and Engineering field.

Department Mission

- To impart high quality professional training in undergraduate and postgraduate level with emphasis on basic principles of Computer Science and Engineering and to foster leading edge research in the fast changing field.
- To inculcate professional behavior, strong ethical values, innovative research capabilities and leadership abilities in the young minds so as to work with a commitment to the progress of the nation.

Programme Educational Objectives

PEO1: To be able to solve wide range of computing related problems in order to cater to the needs of industry and society.

PEO2: To exhibit analytical decision making and problem solving skills by applying research principles for handling dynamic real time challenges.

PEO3: To be able to adapt to the evolving technical challenges and changing career opportunities. Learn to effectively communicate ideas in oral, written, or graphical form to promote collaboration other engineering teams in accordance with social standards and ethical practices.

The Program Outcomes of PG in Computer Science and Engineering

PO1	To obtain sound knowledge in the theory, principles and applications of computer systems.
PO2	Apply knowledge of mathematics and algorithms in the design and development of software systems.
PO3	Configure recent software tools, apply test conditions, and deploy and manage them on computer systems.
PO4	Perform experiments on different software packages either obtain from external parties or developed by themselves and analyze the experimental results.
PO5	Design and develop software projects given their specifications and within Performance and cost constraints
PO6	Identify, formulate and solve software engineering problems and understand the software project management principles.
PO7	Ability to understand the computing needs of inter-disciplinary scientific and engineering disciplines and design and develop algorithms and techniques for achieving these.
PO8	Communicate effectively in oral, written and graphical form to extend entrepreneurship and leadership skills
PO9	Ability to extend the state of art in some of the areas of interest and create new knowledge.
PO10	An understanding of professional, legal, and ethical issues and responsibilities, formulate research problems and explore the current research being done.
PO11	To identify the shortcomings and examine the outcomes of one's actions without depending on external feedback and implement the corrective measures subsequently to develop their career

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTAPUR)
ACADEMIC REGULATIONS
M.TECH REGULAR 2 YEAR DEGREE PROGRAMME
(FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2012-13)

The Jawaharlal Nehru Technological University Anantapur shall confer M.Tech Post Graduate degree to candidates who are admitted to the Master of Technology Programs and fulfill all the requirements for the award of the degree.

1.0 ELIGIBILITY FOR ADMISSIONS:

Admission to the above programme shall be made subject to the eligibility, qualifications and specialization prescribed by the competent authority for each programme, from time to time.

Admissions shall be made either on the basis of merit rank obtained by the qualified candidates at an Entrance Test conducted by the University or on the basis of GATE/PGECET score, subject to reservations and policies prescribed by the Government from time to time.

2.0 ADMISSION PROCEDURE:

As per the existing stipulations of AP State Council for Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year as follows:

- a) Category –A seats are to be filled by Convenor through PGECET/GATE score.
- b) Category-B seats are to be filled by Management as per the norms stipulated by Government of A.P.

3.0 Specializations:

Sl. No	Department	Specializations
1.	CSE	Computer Science & Engg.
2.	CSE	Computer Science
3.	EEE	Power Electronics & Electrical Drives
4.	ECE	VLSI System Design
5.	ECE	Digital Electronics and Communication System
6.	ECE	Embedded systems
7.	IT	Software Engg.
8.	ME	CAD/CAM
9.	CE	Structural Engg.

4.0 COURSE WORK:

- 4.1. A Candidate after securing admission must pursue the M.Tech course of study for Four Semesters duration.
- 4.2. Each semester shall have a minimum of 16 instructional weeks.
- 4.3. A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

5.0 ATTENDANCE:

- 5.1. A candidate shall be deemed to have eligibility to write end semester examinations if he has put in at least 75% of attendance on cumulative basis of all subjects/courses in the semester.
- 5.2. Condonation of shortage of attendance up to 10% i.e., from 65% and above and less than 75% may be given by the college on the recommendation of the Principal.
- 5.3. Condonation of shortage of attendance shall be granted only on medical grounds and on representation by the candidate with supporting evidence.
- 5.4. If the candidate does not satisfy the attendance requirement he is detained for want of attendance and shall reregister for that semester. He shall not be promoted to the next 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% of the marks will be for the External End Examination. While 40% of the marks will 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 five in 2 hours, evaluated for 40 marks.
- 6.2. For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day to day performance (25marks) and practical test at the end of the semester (15marks).
- 6.3. For Seminar there will be an internal evaluation of 50 marks. A candidate has to secure a minimum of 50% to be declared successful. The assessment will be made by a board consisting of HOD and two internal experts.

- 6.4. A 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 Semester Examination and Internal Evaluation taken together.
- 6.5. In case the candidate does not secure the minimum academic requirement in any of the subjects (as specified in 6.4) he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the subject when next offered or do any other specified subject as may be required.
- 6.6. **Revaluation / Recounting:**
Students shall be permitted for request for recounting/revaluation of the year / Semester-End examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the same will be intimated to the students.
- 6.7 **Supplementary Examination:**
In addition to the regular year/ Semester- End examinations conducted, the College may also schedule and conduct supplementary examinations for all the subjects of other year/ semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

7.0 RE-REGISTRATION:

Following are the conditions to avail the benefit of improvement of internal evaluation 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 evaluation marks secured are more than or equal to 50%.
- 7.3. Out of the subjects the candidate has failed in the examination due to Internal evaluation 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 evaluation marks.
- 7.4. The candidate has to re-register for the chosen subjects and fulfill the academic requirements.
- 7.5. For each subject, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the along with the requisition to the Principal of the college.
- 7.6. In the event of availing the Improvement of Internal evaluation marks, the internal evaluation 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 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: A candidate is permitted to register for the project work after satisfying the attendance requirement of I & II Semesters.
- 8.2. An Internal Departmental Committee (I.D.C) consisting of HOD, Supervisor and one internal senior teacher 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 and award internal assessment marks for 120.
- 8.5. A 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 who have submitted thesis during that period.
- 8.6. Three copies of the Thesis / Dissertation certified in the prescribed form by the supervisor and HOD shall be presented to the HOD. One copy is to be forwarded to the Controller of Examinations and one copy to be sent to the examiner.
- 8.7. The Dept shall submit a panel of three experts for a maximum of 5 students at a time. However, the Thesis / Dissertation will be adjudicated by one examiner nominated by the Chief Controller Of Examinations.
- 8.8. If the report of the examiner is favorable viva-voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the thesis / dissertation. The board shall jointly award the marks for 180.
- 8.9. A candidate shall be deemed to have secured the minimum academic requirement in the project work if he secures a minimum of 50% marks in the viva-voce examination and a minimum aggregate of 50% of the total marks in the end viva-voce examination and the internal project report taken together. If he fails to get the minimum academic requirement he has to appear for the viva-voce examination again to get the minimum marks. If he fails to get the minimum marks at the second viva-voce examination he will not be eligible for the award of the degree, unless the candidate is asked to revise and resubmit. If the candidate fails to secure minimum marks again, the project shall be summarily rejected.

9.0 Grades, Grade point Average, Cumulative Grade point Average:

9.1. Grade System: After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a "10 point scale" described below.

% of marks obtained	Grade	Grade Points(GP)
90 to 100	A+	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
50 to 59	D	6
Less than 50 in sum of Internal & External (or) Less than 24 in External	F	0
Not Appeared	N	0

9.2. GPA: Grade Point Average (GPA) will be calculated as given below on a "10 Point scale" as an Index of the student's performance at the end of each semester:

$$\text{GPA} = \frac{\sum(CXGP)}{\sum C}$$

Where C denotes the credits assigned to the subjects undertaken in that semester and GP denotes the grade points earned by the student in the respective subjects

9.3. CGPA: At the end of every semester, a Cumulative Grade Point Average (CGPA) on a 10 Point scale is computed considering all the subjects passed up to that point as an index of overall Performance up to that Point as given below:

$$\text{CGPA} = \frac{\sum(CXGP)}{\sum C}$$

Where C denotes the credits assigned to subjects undertaken upto the end of the current semester and GP denotes the grade points earned by the student in the respective courses.

9.4. Grade sheet: A grade sheet (Marks Memorandum) will be issued to each student Indicating his performance in all subjects registered in that semester indicating the GPA and CGPA. GPA and CGPA will be rounded off to the second place of decimal.

9.5 Transcripts: After successful completion of the entire Program of study, a transcript containing performance of all semesters will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee.

10.0 Award of Degree: The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Anantapur on the recommendation of The Principal of SVCET (Autonomous).

10.1 Eligibility: A student shall be eligible for the award of M.Tech. Degree if he fulfills all the following conditions:

- Registered and successfully completed all the components prescribed in the program of study for which he is admitted.

- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the specialization of study within the stipulated time.
- Obtained CGPA greater than or equal to 6.0 (Minimum requirement for declaring as passed.)

10.2 Award of Class: Declaration of Class is based on CGPA.

Cumulative Grade Point Average	Class
≥7.0	First Class with Distinction
>6.0 and <7.0	First Class
6.0	Second Class

11.0 WITH – HOLDING OF RESULTS: If the candidate has not paid dues to the university/ college or if any case of in-discipline is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

12.0 TRANSITORY REGULATIONS:

Candidates who have discontinued or have been detained for want of attendance or who have failed after having undergone the course in earlier regulations and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to 6.5 and 4.3 sections. Whereas they continue to be in the academic regulations of the batch they join later.

13.0 GENERAL:

- i. The academic regulations should be read as a whole for purpose of any interpretation.
- ii. Disciplinary action for Malpractice/improper conduct in examinations is appended.
- iii. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
- iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
- v. The college may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the college.

Sri Venkateswara College of Engineering & Technology (Autonomous)
R.V.S. Nagar, Chittoor

Identification of Courses

M. Tech

Each course shall be uniquely identified by an alphanumeric code of width 7 characters as given below.

No. of digits	Description
First two digits	Year of regulations Ex:12
Next one letter	Type of program: A: B. Tech B: M. Tech C: M.B.A D: M.C.A
Next two letters	Code of department: HS/CE/CS/EE/EC/IT/ME/MB/MC
Next two letters	Code of program: P.E: Power Electronics & Electric Drives, VL: VLSI, DE: DECS, EM: Embedded Systems, CM: CAD/CAM, CS: Computer Science and Engineering, SE: Software Engineering, CO: Computer Science, ST: Structural Engineering
Last two digits	Indicate serial numbers: ≥ 01

Ex:

12BPE01

12BVL01

12BDE01

12BEM01

12BCM01

12BCS01

12BSE01

12BCO01

12BST01

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTAPUR)
RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT
IN EXAMINATIONS

	Nature of Malpractices / Improper conduct	Punishment
	If the candidate	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled.

3.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the

		candidate is subject to the academic regulations in connection with forfeiture of seat.
6.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that Semester/year. The candidate is also debarred and forfeits of seat.
7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.

8.	<p>Refuses to obey the orders of the Chief Superintendent / Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction or property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.</p>	<p>In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.</p>
9.	<p>If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.</p>	<p>Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.</p> <p>Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.</p>

10.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Examination committee for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.

Sri Venkateswara College of Engineering & Technology (Autonomous)									
Course Structure (2012-2013)									
Computer Science & Engineering (CSE), Computer Science (CS)									
M.Tech I year I semester									
S.No	Course Code	Course Name	Hours/Week			Credits	Scheme of Examination(M Marks)		
			L	T	P		C	Internal	External
1	12BCS01	Advanced Data Structures & Algorithms	4	1	-	4	40	60	100
2	12BCS02	Computer System & Design	4	1	-	4	40	60	100
3	12BCS03	Java & Web Technologies	4	1	-	4	40	60	100
4	12BCS04	Distributed Databases	4	1	-	4	40	60	100
Elective – I									
5	12BCS05	Software Quality Assurance and Testing	4	1	-	4	40	60	100
	12BCS06	Information Retrieval Systems							
	12BCS07	Advanced Compiler Design							
Elective –II									
6	12BCS08	Natural Language Processing	4	1	-	4	40	60	100
	12BCS09	Speech Processing							
	12BCS10	Image Processing and Pattern Recognition							
7	12BCS14	Advanced Data Structures Lab	-	-	2	1	40	60	100
8	12BCS15	Java & Web Technologies Lab	-	-	2	1	40	60	100
9	12BCS16	Seminar-I	-	-	-	2	50	-	50
Total			24	6	4	28	370	480	850

Sri Venkateswara College of Engineering & Technology (Autonomous)									
Course Structure (2012-2013)									
Computer Science & Engineering (CSE), Computer Science (CS)									
M.Tech I year II semester									
S.No	Course Code	Course Name	Hours/Week			Credits	Scheme of Examination (M Marks)		
			L	T	P		C	Internal	External
1	12BCS17	Advanced Computer Networks	4	1	-	4	40	60	100
2	12BCS18	Data Mining & Warehousing	4	1	-	4	40	60	100
3	12BCS19	Computer Simulation & modelling	4	1	-	4	40	60	100
4	12BCS20	Distributed Systems	4	1	-	4	40	60	100
Elective - III									
5	12BCS21	Adhoc and Sensor Networks	4	1	-	4	40	60	100
	12BCS22	Cloud Computing							
	12BCS23	Cryptography & Network security							
Elective -IV									
6	12BCS24	Software Architecture	4	1	-	4	40	60	100
	12BCS25	Software Design							
	12BCS26	Object Oriented Analysis and Design							
7	12BCS28	Data Mining & Warehousing Lab	-	-	2	1	40	60	100
8	12BCS29	Computer Simulation Lab	-	-	2	1	40	60	100
9	12BCS30	Seminar-II	-	-	-	2	50	-	50
10	12BCS31	Comprehensive Viva				2	100	-	100
Total			24	6	4	30	470	480	950

Sri Venkateswara College of Engineering & Technology (Autonomous)**Course Structure (2012-2013)****Computer Science & Engineering(CSE),Computer Science(CS)****M.Tech II Year III & IV Semester**

S.No	Course Code	Course Name	Hours/Week			Credits	Scheme of Examination(M Marks)		
			L	T	P		C	Internal	External
1	12BCS32	Project Work	-	-	-	16	120	180	300
Total						16	120	180	300

Objectives:

The objective of this course is to make students to:

1. Introduce various data structures for representation and manipulation of the data in the real world.
2. Understand and demonstrate the basic concept of an algorithm and its application in combinational mathematics.
3. Get familiar and understand the advanced notions in the design of algorithms.
4. Identify the basic properties of graphs and trees and mathematical modeling of simple applications.

Outcomes:

At the end of the course the student will be able to:

1. Ability to use the concepts of data structures to solve real life problems in the field of computer science and allied fields.
2. Ability to apply Divide and conquer strategies to solve various problems.
3. Ability to write the optimal source code for the given scenario..
4. Ability to analyse the algorithms theoretically and optimize if any

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 Paths, Single Source Shortest Path, 0 / 1 Knapsack problem, Reliability Design, Travelling Sales Person's Problem.

UNIT VIII: Back Tracking and Branch – and – Bound

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

TEXT BOOKS:

1. G.A.V. Pai , *Data Structures and Algorithms* , 2009 TMH.

2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms* , 2nd edition, University Press.

REFERENCE BOOKS:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

L	T	P	C
4	1	0	4

M.Tech- I Semester – CSE & CS

12BCS02 COMPUTER SYSTEM & DESIGN

Objectives:

The objective of this course is to

1. Acquire the knowledge of computer organization and architecture (logical design) and input /output organization.
2. Acquire the knowledge of machine level representation of data, assembly level organization, memory system organization and architecture, system connection, memory, input/output, instruction sets.
3. Understanding the basic concepts of operating systems.
4. Understand the basic concepts of files and directories

Outcomes:

At the end of the course students will be able to,

1. understand memory hierarchy and its impact on computer cost/ performance.
2. Understand the advantage of instruction level parallelism and pipelining for high performance processor design
3. Analyze the basic concepts of operating system concepts and understand the fundamental elements of thread and process..
4. Solve the deadlock problems, which are faced by operating system during the execution.

UNIT I

Computer structure – hardware, software, system software, Von-neumann architecture – case study. IA -32 Pentium: registers and addressing, instructions, assembly language, program flow control, logic and shift/rotate instructions, multiply, divide MMX,SIMD instructions, I/O operations, subroutines.

UNIT II

Input/Output organization, interrupts, DMA, Buses, Interface circuits, I/O interfaces, device drivers in windows, interrupt handlers.

UNIT III

Processing Unit: Execution of a complete instruction, multiple bus organization, hardwired control, micro programmed control.

UNIT IV

Pipelining: data hazards, instruction hazards, influence on instruction sets, data path & control consideration,RISC architecture introduction.

UNIT – V

Memory: types and hierarchy, model level organization, cache memory, performance considerations, mapping, virtual memory, swapping, paging, segmentation, replacement policies.

UNIT –VI

Processes and Threads: processes, threads, inter process communication, classical IPC problems, Deadlocks.

UNIT – VII

File system: Files, directories, Implementation, Unix file system

UNIT - VIII

Security: Threats, intruders, accident data loss, basics of cryptography, user authentication.

TEXT BOOKS:

1. Car Hamacher, Zvonks Vranesic, SafeaZaky, *Computer Organization*, 5th Edition, McGraw Hill.
2. Andrew S Tanenbaum , *Modern Operating Systems*, 2nd edition Pearson/PHI

REFERENCE BOOKS:

1. William Stallings, *Computer Organization and Architecture* ,Sixth Edition, pearson/PHI
2. Morris Mano ,*Computer System Architecture* ,3rd Edition,Pearson Education .
3. Abraham Silberchatz, Peter B. Galvin, Greg Gagne ,*Operating System Principles*, 7th Edition, John Wiley
4. William Stallings,*Operating Systems – Internals and Design Principles* , Fifth Edition–2005, Pearson Education/PHI

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(Autonomous)

M.Tech- I Semester – CSE & CS

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12BCS03

JAVA & WEB TECHNOLOGIES

Objectives:

1. Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.
2. To build web applications using ASP and client side script technologies use with Microsoft's IIS.
3. To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.
4. It also concentrates on the usage of recent platforms used in developing web applications such as the .Net environment like C#, XML.

Outcomes:

1. ability to Create and publish advanced HTML pages with the help of frames, scripting languages, and CSS.
2. Ability to Use JavaScript XML Technologies such as XML Schemas, XSLT
3. Ability to develop server-Side Programming using servlets and JSP's.
4. Ability to develop Java Event handler and Java beans.

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 Pains – 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, JDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API.

UNIT V:

Web servers: Tomcat Server installation & Testing.

Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servelet Package, Reading Servlet 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 Servlet. 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. Chris Bates, *Web Programming- building internet applications*, 2nd edition, WILEY Dreamtech (UNIT 1,2)
2. Patrick Naughton and Herbert Schildt, *The complete Reference Java 2 Fifth Edition*, TMH (Chapters: 25) (UNIT 2,3)
3. Hans Bergsten, *Java Server Pages*, SPD O'Reilly (UNITs 3,4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta,Pearson Core SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES, Marty Hall and Larry Brown Pearson
2. Sebesta, *Programming world wide web*, Pearson
3. Marty Hall and Larry Brown, *SERVLETS AND JAVA SERVER PAGES VOLUME 1: CORE TECHNOLOGIES*, Pearson
4. Dietel and Nieto, *Internet and World Wide Web – How to program*, PHI/Pearson.
5. Jakarta Struts Cook book, Bill Siggelkow, S P D O'Reilly for chap 8.
6. Murach, *Murach's beginning JAVA JDK 5*, SPD
7. Wang, *An Introduction to web Design and Programming*, Thomson
8. S.Allamaraju, *Professional Java Server Programming*, and others Apress(dreamtech).
9. Ivan Bayross and others, *Java Server Programming*, The X Team, SPD
10. Bai/Ekedaw, *Web Warrior Guide to Web Programmimg-* -Thomas
11. Jon Duckett WROX, *Beginning Web Programming*.
12. Pekowsky, *Java Server Pages*, Pearson.
13. D.Flanagan, *Java Script*, O'Reilly, SPD.

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M.Tech- I Semester - CSE & CS

12BCS04

Distributed Databases

Objectives

1. To learn the data models and to conceptualize a database system using ER diagrams.
2. To know the concepts of parallel and distributed databases.
3. To gain knowledge about the emerging database technologies.
4. to get knowledge in detection and Resolution of Inconsistency in distributed Data base

Outcomes

1. Ability to assess the different features involved in distributed and centralized databases.
2. Ability to design framework for various query optimization techniques.
3. Ability to apply Locking Protocols, Deadlocks, and Timestamps in various distributed database applications.
4. Ability to apply distributed database concepts in commercial systems.

UNIT-I:

Introduction

Features of Distributed databases, Features of Centralized databases, Level of Distributed Transparency, Reference Architecture, Types of Data Fragmentation, Distribution Transparency, access primitives, integrity constraints

UNIT-II:

Distributed Database Design

A framework for Distributed Database Design, Design of Database Fragmentation, Allocation of fragments

UNIT-III:

Global And Fragment Queries

Global Queries, fragment Queries, Equivalence Transformations for Queries, transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation, Parameter Queries

UNIT-IV:

Optimization Of Access Strategies

Frame Work for Query Optimization, Join Queries, General Queries

UNIT-V:

Management Of Distributed Transactions

Framework for Transaction Management, Atomicity of Distributed Transactions, Concurrency Control for Centralized Database.

UNIT-VI:

Concurrency

Concurrency Control for Distributed databases, Foundations, Locking Protocols, Deadlocks, Timestamps.

UNIT-VII:

Reliability

Basic concepts, Commitment Protocols, reliability and Concurrency Control, Consistent View of Network, detection and Resolution of Inconsistency, Checkpoints and cold restart

UNIT-VIII:

Distributed Database Systems Commercial Systems

Commercial Systems, Tanden's ENCOMPASS Distributed Database systems, IBM's Inter system Communication, features of Distributed, INGRESS HETEREGENEOUS DATABASE : General problems, brief study of MULTIBASE.

TEXT BOOKS:

1. Ceri. S. Pelagatti G, "*Distributed Databases : Principles and Systems*", 1985, MCG
2. Ozsu, "*Principles of Distributed Database Systems*" , 1e, 2002, PEA.

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(Autonomous)

M.Tech- I Semester - CSE & CS

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12BCS05

SOFTWARE QUALITY ASSURANCE & TESTING

Objectives:

To enable the students to

1. Understand the importance of Software Quality and various Software Quality standards.
2. Understand the concepts of Software Quality assurance and documentation.
3. Understand the strategies in software testing
4. understand the process, techniques and tools involved in software testing.

Outcomes:

At the end of the course, the students would be able to

1. Ability to understand the software quality police and standards involved.
2. Appreciate the purpose of establishing software quality goals and gain knowledge in documentation.
3. Understand structured approach to software testing
4. Apply appropriate techniques and tools for software testing.

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

REFERENCE BOOKS:

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

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M.Tech- I Semester - CSE & CS

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12BCS06

ELECTIVE – I - INFORMATION RETRIEVAL SYSTEMS

Objective

1. The domain of Information Retrieval is concerned with the extraction of relevant information from large collections of documents.
2. It has applications to proprietary retrieval systems as well as the WWW, Digital Libraries and commercial recommendation systems.
3. This course will aim to provide students with an overview of the main principles and methods underlying the domain of Information Retrieval.
4. A number of advanced topics will be covered to address more recent developments in IR such as collaborative filtering and Latent Semantic Indexing

Outcomes

1. Students will be able to Learn history and development of information retrieval systems
2. Students will be able to understand core concepts of retrieval models, basic algorithms involved in processing and retrieval of information
3. ability to identify the essential components and functions of an information retrieval system

UNIT I

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, **Information Retrieval System Capabilities** - Search, Browse, Miscellaneous.

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure

UNIT III

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages-**Document and Term Clustering:** Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters

UNIT IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext

UNIT V

Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

UNIT VI

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT VII

Multimedia Information Retrieval – Models and Languages – Data Modeling, Query Languages, Indexing and Searching

UNIT VIII

Libraries and Bibliographical Systems – Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

1. Gerald, Mark T Maybury Kluwer Kowalski , *Information Storage and Retrieval Systems: Theory and Implementation* , Academic Press, 2000.
2. Ricardo Baeza-Yates , *Modern Information Retrieval* , Pearson Education, 2007.
3. David A Grossman and Ophir Frieder, *Information Retrieval: Algorithms and Heuristics* , 2nd Edition, Springer International Edition, 2004.

REFERENCE BOOKS:

1. William B Frakes, Ricardo Baeza-Yates , *Information Retrieval Data Structures and Algorithms* , Pearson Education, 1992.
2. Robert Korfhage , *Information Storage & Retrieval* – John Wiley & Sons.
3. Christopher D. Manning and Prabhakar Raghavan , *Introduction to Information Retrieval* , Cambridge University Press, 2008.

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M.Tech- I Semester - CSE & CS

12BCS07

ELECTIVE – I -ADVANCED COMPILER DESIGN

Objectives:

The objective of this course is to make students to:

1. Understand the programming skills involved in the design of a compiler.
2. Have the practical Knowledge essential for compiler construction.
3. Classify compilers by their efficiency to process different programming languages.
4. Apply the different types of parsers to solve problems in computing by using C language.

Outcomes:

At the end of the course the student will be able to:

1. Ability to understand code optimization with both global and local perspectives.
2. Ability to substantiate every phase of the compiler with C Programming Examples.
3. Able to Design top-down and bottom-up parsers.
4. Able to Develop syntax directed translation schemes with advanced methodologies.

UNIT I :

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

UNIT II : Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

Bottom up parsing: - Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

UNIT III : Semantic analysis: Intermediate forms of source Programs – abstract syntax tree, Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

UNIT IV

Symbol Tables: Symbol table format, organization for block structured languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

UNIT V: Code Generation- Processing the intermediate Code- Interpretation, Code generation, Simple code generation, code generation for basic blocks, BURS Code generation and dynamic programming, Register allocation by graph coloring, Evaluation of code generation techniques preprocessing the intermediate code, post processing the target code, machine code generation.

UNIT VI

Code optimization: Consideration for Optimization, Machine dependent and machine independent code optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

UNIT VII: Data flow analysis: Dataflow Analysis, Intermediate representation for flow analysis, Various dataflow analysis, Transformations using dataflow analysis Speeding up dataflow analysis , Alias analysis.

UNIT VIII

Loop Optimizations – Dominators, Loop-invariant computations, Induction variables, Array bounds checks, Loop unrolling

TEXT BOOKS :

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.

REFERENCE BOOKS :

1. S.S.Muchnick, *Advanced Compiler Design Implementation* ,Elsevier.
2. A.V.Aho,Ravi Sethi& J.D. Ullman ,*Compilers principles techniques and tools* ,Pearson ed.
3. John R. Levine, Tony Mason, Doug Brown, *LEX &YACC* , O'reilly
4. Andrew N. Appel, *Modern Compiler Implementation in C*, Cambridge University Press.
5. Cooper & Linda,*Engineering a Compiler*, Elsevier.
6. Louden , *Compiler Construction*, Thomson..

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M.Tech- I Semester - CSE & CS

12BCS08

ELECTIVE – II- NATURAL LANGUAGE PROCESSING

Objectives:

The objective of this course is to make students to:

1. Design and build computer systems that are able to analyze natural languages and that generate their outputs in a natural language.
2. Acquire basic understanding of linguistic concepts and natural language complexity: variability (the possibility to express the same meaning in many different ways) and ambiguity (the fact that a single expression can refer to many different meanings in different contexts).
3. Understand levels of linguistic description (word, sentence, text; morphology, syntax, semantics, pragmatics)
4. Know natural language processing techniques such as word and sentence tokenization, parts of speech tagging etc

Outcomes:

Upon successful completion of this course, students will be able to

1. Ability to apply applications of Part-of-speech tagging, Parsing, Semantic analysis, Discourse processing and Dialog models.
2. apply cooperative group skills and critical-thinking skills germane to natural language processing
3. Ability to understand and explain research papers in natural language processing
4. Able to Compare and contrast approaches to natural language processing

UNIT I

Introduction and Overview What is Natural Language Processing, hands-on demonstrations. Ambiguity and uncertainty in language. The Turing test. **Regular Expressions** Chomsky hierarchy, regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools.

UNIT II

Programming in Python An introduction to programming in Python. Variables, numbers, strings, arrays, dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) **String Edit Distance and Alignment** Key algorithmic tool: dynamic programming, a simple example, use in optimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

UNIT III

Context Free Grammars Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions **Non-probabilistic Parsing** Efficient CFG parsing with CYK, another dynamic programming algorithms. Earley parser. Designing a little grammar, and parsing with it on some test data.

UNIT IV

Probability Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in natural language. **Information Theory** The "Shannon game"--motivated by language! Entropy, cross-entropy, information gain. Its application to some language phenomena.

UNIT V

Language modeling and Naive Bayes

Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models , Viterbi Algorithm for Finding Most Likely HMM Path , Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

UNIT VI

Probabilistic Context Free Grammars

Weighted context free grammars. Weighted CYK. Pruning and beam search.

Parsing with PCFGs

A treebank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse? Experiments with eye-tracking. Modern parsers.

UNIT VII

Maximum Entropy Classifiers

The maximum entropy principle, and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

Maximum Entropy Markov Models & Conditional Random Fields

Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

UNIT VIII

Lexical Semantics Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomials.

Information Extraction & Reference Resolution- Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for coreference.

Text Books:

1. Jurafsky and Martin , "*Speech and Language Processing*" , Prentice Hall
2. Manning and Schutze , "*Statistical Natural Language Processing*" , MIT Press
3. James Allen , "Natural Language Understanding" , The Benajmins/Cummings Publishing Company

References Books:

1. Cover, T. M. and J. A. Thomas: *Elements of Information Theory*. Wiley.
2. Charniak, E.: *Statistical Language Learning*. The MIT Press.
3. Jelinek, F : *Statistical Methods for Speech Recognition*. The MIT Press.
4. Lutz and Ascher - "*Learning Python*", O'Reilly

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M.Tech- I Semester - CSE & CS

12BCS09

ELECTIVE – II- SPEECH PROCESSING

Objectives:

1. To introduce the fundamentals of speech signal processing.
2. To present basic principles of speech analysis and speech recognition.
3. To study speech enhancement, speech coding and speech recognition.

Course Outcomes:

Students should be able to

1. Express the speech signal in terms of its time and frequency domain representations and the different ways in which it can be modeled.
2. Gain the knowledge of simple features used in speech classification applications.
3. Implement components of speech processing systems like speaker recognition etc. in MATLAB.

UNIT I

INTRODUCTION Production of speech, sound perception, speech Analysis, speech coding, speech Enhancement, speech Synthesis, speech and speaker Recognition.

UNIT II

Signals and Linear Systems: Simple signal, Filtering and convolution, Frequency Analysis : Fourier Transform, spectra and Correlation, Laplace Transform: Poles and Zeros, Discrete –Time Signal and Systems: Sampling, Frequency Transforms of Discrete-Time Signals, Decimation and Interpolation Filter: Band pass Filter, Digital Filters, Difference Equations and Interpolation

UNIT III

SPEECH ANALYSIS

Introduction, Short-Time speech Analysis: Windowing, Spectra of Windows: Wide-and Narrow – Band Spectrograms, Time-domain Parameters: Signal Analysis in the Time Domain, Short – Time Average Energy and Magnitude, Short –Time Average Zero-Crossing Rate (ZCR), short-Time Autocorrelation Function , Frequency–Domain (Spectral) Parameters: Filter–Bank Analysis, Short-Time Fourier Transform Analysis, Spectral Displays, Formant Estimation and Tracking .

UNIT IV

SPEECH PRODUCTION AND ACOUSTIC PHONETICS :

Anatomy and Physiology of the speech Organs: the Lungs and the Thorax, Larynx and Vocal Folds(cords), Vocal Tract, Articulatory phonetics: Manner of Articulatory, Structure of the Syllable, Voicing, Place of the Articulation, Phonemes in Other Language, Articulatory Models, Acoustic Phonetics : Spectrograms, Vowels, Diphthongs, glides and Liquids, Nasals, Fricatives, stops (Plosives), Variants of Normal Speech.

UNIT V

LINEAR PREDICTIVE CODING (LPC) ANALYSIS

Basic Principles of LPC, Least –Squares Autocorrelation Method, Least –Squares Covariance Method, Computation Considerations, Spectral Estimation Via LPC, Updating the LPC Model Sample by Sample, Window Considerations.

Cepstral Analysis: Mathematical details of Cepstral analysis, Applications for the spectrum, Mel-Scale Cepstrum, F0 Pitch estimation:Time domain F0 estimation methods, short-time Spectral methods

UNIT VI

Speech synthesis: Introduction, Principles of speech synthesis: Types of stored speech units to concatenate, Memory size, Synthesis method, Limited text voice response system, unrestricted-text TTS systems. Synthesizer methods: Articulatory synthesis, Formant synthesis, LPC synthesis.

UNIT VII

Introduction: Variability in speech signals, segmenting speech into smaller units, Performance evaluation, Database for speech recognition, pattern recognition methods, pre-processing, parametric representation: parameters used in speech recognition, feature extraction, Evaluation of similarity of speech patterns: frame-based distance measures, Making ASR decisions, HMMs

UNIT VIII

Speaker recognition: Introduction, Verification Vs. Recognition, Recognition techniques: Model evaluation, text dependence, static Vs. dynamic features, stochastic models, vector quantization, similarity and distance measures, cepstral analysis, Features that distinguish the speakers: measures of the effectiveness of features, techniques to choose features, spectral features, prosodic features

Text Books:

1. Douglas O' Shaughnessy, *Speech Communication*, Universities Press

Reference Books:

1. Lawrence Rabiner, Biing-Hwang Juang, *Fundamentals of Speech Recognition*, Pearson Education
2. Daniel Jurafsky, James H. Martin, *Speech and Language processing*, Pearson Education

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M.Tech- I Semester - CSE & CS

12BCS10 ELECTIVE – II- IMAGE PROCESSING AND PATTERN RECOGNITION

OBJECTIVES:

To introduce the student to various Image processing and Pattern recognition techniques.

1. To study the Image fundamentals.
2. To study the mathematical morphology necessary for Image processing and Image segmentation.
3. To study the Image Representation and description and feature extraction.
4. To study the principles of Pattern Recognition.

Outcomes

Upon Completion of the course students will be able to,

1. The students will be able To represent the images in different forms
2. To segment the various types of Images.
3. To know the basic concepts in Image Processing.
4. To develop algorithms for Pattern Recognition and to implement the features of Image processing in application.

UNIT – I

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

UNIT – II

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

UNIT III

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

UNIT- IV

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and laplace operators, edge linking and boundary detection, thresholding, regionbased segmentation, segmentation by morphological watersheds.

UNIT V

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

UNIT –VI

Representation and Description

Chain codes, Ploygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description, Relational Descriptors.

UNIT VII

Pattern Recognition Fundamentals: Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model.

UNIT VIII

Pattern classification:

Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

TEXT BOOKS :

1. Rafael C. Gonzalez, Richard E , *Digital Image Processing*, Third edition, Pearson Education. Woods
2. Julius T. Tou, and Rafael C. Gonzalez , *Pattern recognition Principles*, Addison-Wesley Publishing Company

REFERENCE BOOKS :

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, *Image Processing, Analysis and Machine Vision*, Second Edition, Thomson learning.
2. Williamk. Pratl , *Digital Image Processing* ,John wiley edition
3. A.K. Jain , *Fundamentals of digital image processing*, PH
4. Richard Duda, Hart and David strok , *Pattern classification*, John Weily publishers.
5. S.Jayaraman, S.Esakkirajan, T.Veerakumar , *Digital Image Processing*, TMH.
6. R.Shinghal , *Pattern Recognition*, Oxford University Press.

1. Write a C++ programs to implement the following using an array.
(a) Stack ADT b) Queue ADT
2. Write C++ programs to implement the following using a singly linked list.
a) Stack ADT b) Queue ADT
3. Write C++ programs to implement the dequeue (double ended queue) ADT using a doubly linked list and an array.
4. Write a C++ program to perform the following operations:
a) Insert an element into a binary search tree.
b) Delete an element from a binary search tree.
c) Search for a key element in a binary search tree.
5. Write C++ programs that use non-recursive functions to traverse the given binary tree in a) Preorder b) In order and c) Post order.
6. Write C++ programs for the implementation of BFS and DFS for a given graph.
7. Write C++ programs for implementing the following sorting methods
a) Merge sort b) Heap sort
8. Write a C++ program to perform the following operations
a) Insertion into a B-tree b) Deletion from a B-tree
9. Write a C++ program to perform the following operations
a) Insertion into an AVL-tree b) Deletion from an AVL-tree
10. Write a C++ program to implement various operations on R-B trees.
11. Write a C++ program to implement to generate a minimum cost spanning tree using
(i) Kruskal's algorithm (ii) Prim's algorithm
12. Write a C++ program to implement all the functions of a dictionary (ADT) using hashing.
13. Write a C++ program to implement 0/1 KNAPSACK PROBLEM using the following techniques
(i) Dynamic Programming (ii) Branch and Bound
14. Write a C++ program to implement TRAVELLING SALES PERSON PROBLEM using the following techniques
(i) Dynamic Programming (ii) Branch and Bound
15. Write a C++ program to implement 8-QUEEN'S PROBLEM by using Backtracking technique.
16. Write a C++ program to implement GRAPH COLORING algorithm

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M.Tech- I Semester - CSE & CS
12BCS15

Java & Web Technologies Lab

- 1 Develop Rational number class in Java. Use JavaDoc comments for documentation. Your implementation should use efficient representation for a rational number, i.e. (500 / 1000) should be represented as ($\frac{1}{2}$).
- 2 Develop Date class in Java similar to the one available in java.util package. Use JavaDoc comments.
- 3 Implement Lisp-like list in Java. Write basic operations such as 'car', 'cdr', and 'cons'. If L is a list [3, 0, 2, 5], L.car() returns 3, while L.cdr() returns [0,2,5].
- 4 Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
- 5 Design a Vehicle class hierarchy in Java. Write a test program to demonstrate Polymorphism.
- 6 Design classes for Currency, Rupee, and Dollar. Write a program that randomly generates Rupee and Dollar objects and write them into a file using the object Serialization. Write another program to read that file, convert to Rupee if it reads a Dollar, while leaving the value as it is if it reads a Rupee.
- 7 Design a scientific calculator using event-driven programming paradigm of Java.
- 8 Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe. Design another thread that generates Fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers Common to both
- 9 Develop a simple OPAC system for the library using even-driven and concurrent Programming paradigms in Java. Use JDBC to connect to a back-end database.
- 10 Design the following static web pages required for an online bookstore web site.
 - 1) **HOME PAGE:**
The static home page must contain three **frames**.

Top frame : Logo and the college name and links to the Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link "**CSE**" the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages of the links in the left frame must be loaded here*. Initially this page contains a description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

2) LOGIN PAGE:

This page looks like below:



Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	<p>Login : <input type="text"/></p> <p>Password: <input type="password"/></p> <p><input type="button" value="Submit"/> <input type="button" value="Reset"/></p>			

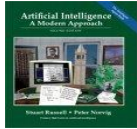





3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE		Book : XML Bible Author : Winston Publication : Wiely	\$ 40.5	

CIVIL		Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	
		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	\$ 50	

12 CART PAGE:

The cart page contains the details about the books which are added to the cart. The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Book name	Price	Quantity	Amount
	Java 2	\$35.5	2	\$70
	XML bible	\$40.5	1	\$40.5
	Total amount -			\$130.5

5) REGISTRATION PAGE:

Create a "registration form" with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes)
- 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8) Address (text area)

13 VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contain alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)

4. Phone number (Phone number should contain 10 digits only).
Note : You can also validate the login page with these parameters.

- 14** Design a web page using **CSS (Cascading Style Sheets)** which includes the following:
1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red, font-size:22px, font-family:arial, text-
decoration:underline}
</style>

</HEAD>

<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
</BODY>

</HTML>
```

2) Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif),}
```

3) Control the repetition of the image with the background-repeat property. As background-repeat: repeat Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

```
A:link  
A:visited  
A:active  
A:hover
```

Example:

```
<style type="text/css">  
A:link {text-decoration: none}  
A:visited {text-decoration: none}  
A:active {text-decoration: none}  
A:hover {text-decoration: underline, color: red,}  
</style>
```

5) Work with layers:

For example:

LAYER 1 ON TOP:

```
<div style="position:relative, font-size:50px, z-index:2,">LAYER 1</div> <div  
style="position:relative, top:-50, left:5, color:red, font-size:80px, z-  
index:1">LAYER 2</div>
```

LAYER 2 ON TOP:

```
<div style="position:relative, font-size:50px, z-index:3,">LAYER 1</div> <div  
style="position:relative, top:-50, left:5, color:red, font-size:80px, z-  
index:4">LAYER 2</div>
```

6) Add a customized cursor:

```
Selector {cursor:value}
```

For example:

```
<html>  
<head>  
<style type="text/css">  
.xlink {cursor:crosshair}  
.hlink{cursor:help}  
</style>  
</head>  
  
<body>  
<b>  
<a href="mypage.htm" class="xlink">CROSS LINK</a>  
<br>  
<a href="mypage.htm" class="hlink">HELP LINK</a>  
</b>  
</body>  
</html>
```

15 Write an XML file which will display the Book information which includes the following:

- 1) Title of the book
- 2) Author Name
- 3) ISBN number
- 4) Publisher name
- 5) Edition
- 6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and

should be capitalized and in bold. Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.
Note: Give at least for 4 books. It should be valid syntactically.
Hint: You can use some xml editors like XML-spy

16 Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page .

Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

M.Tech- II Semester – CSE & CS

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12BCS17

ADVANCED COMPUTER NETWORKS

Objectives:

The objective of this course is to make students to:

- 1 Understand the basic concept of computer networks (e.g., different network types, applications, protocols, OSI layered architecture model, packet switching)
- 2 Understand Routing and Internetworking in Network layer.
- 3 Understand functions of each layer in a network model.
- 4 Know various security concepts, DNS, E-mail, WWW and Multimedia.

Outcomes:

After completing this course the student must demonstrate the knowledge and able to:

1. Ability to Understand concepts of the OSI reference model and the TCP- IP reference model and the function(s) of each layer.
2. able to understand the routing and internet protocols.
3. Ability to understand the application layer protocols like DNS, SMTP, Https.
4. ability to design routing protocols for adhoc Networks

UNIT I

Review of Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet - **Foundation of Networking Protocols:** 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM

UNIT II

Networking Devices: Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure. **The Link Layer and Local Area Networks:** Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization

UNIT III

Routing and Internetworking: Network-Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer. **Logical Addressing:** IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 - **Multicasting Techniques and Protocols:** Basic Definitions and Techniques, Intradomain Multicast Protocols, Interdomain Multicast Protocols, Node-Level Multicast algorithms

UNIT IV

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control **Application Layer:** Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, Building a Simple Web Server

UNIT V

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs)

UNIT VI

Optical Networks and WDM Systems: Overview of Optical Networks, Basic Optical Networking Devices, Large-Scale Optical Switches, Optical Routers, Wavelength Allocation in Networks, Case Study: An All-Optical Switch

UNIT VII

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony, VoIP Signalling Protocols, Real-Time Media Transport Protocols, Distributed Multimedia Networking, Stream Control Transmission Protocol

UNIT VIII

Mobile Ad-Hoc Networks: Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks – **Wireless Sensor Networks:** Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols

TEXT BOOKS:

1. *James F. Kurose, Keith W. Ross , Computer Networking: A Top-Down Approach Featuring the Internet*, Third Edition, Pearson Education, 2007
2. *Nader F. Mir , Computer and Communication Networks*, Pearson Education, 2007

REFERENCE BOOKS:

1. *Behrouz A. Forouzan , Data Communications and Networking*, Fourth Edition, Tata McGraw Hill, 2007
2. *Greg Tomsho, Ed Tittel, David Johnson, Guide to Networking Essentials*, Fifth Edition, Thomson.
3. *S. Keshav , An Engineering Approach to Computer Networking* , Pearson Education.
4. *Diane Teare, Catherine Paquet , Campus Network Design Fundamentals*, Pearson Education (CISCO Press)
5. *Andrew S. Tanenbaum, Computer Networks*, Fourth Edition, Prentice Hall.
6. *A. Farrel , The Internet and Its Protocols* , Elsevier.

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(Autonomous)

M.Tech- II Semester - CSE & CS

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12BCS18

DATA MINING & WAREHOUSING

OBJECTIVES:

1. To expose the students to the concepts of Data warehousing Architecture and Implementation
2. To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
3. To learn to use association rule mining for handling large data
4. To understand the concept of classification for the retrieval purposes and To know the clustering techniques in details for better organization and retrieval of data.

OUTCOMES: after Completion of the course, the students will be able

1. ability to understand the need for data warehouse in addition to traditional operational database systems.
2. To understand the need for data mining and to analyse difference between traditional statistical techniques and data mining.
3. understand the details of different algorithms made available by popular commercial data mining software.
4. solve real data mining problems by using the right tools to find interesting patterns.

UNIT-I:

Introduction : Data Mining, Kinds of Data, Data Mining Functionalities, Classification of Data Mining Systems, Primitives, Major Issues in Data Mining.

UNIT-II:

Data Preprocessing: Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT-III:

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.

UNIT-IV:

Mining Frequent Patterns and Associations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining Various Kinds of Association Rules.

UNIT-V:

Classification and Prediction: Issues regarding classification and prediction, classification by decision tree induction, Bayesian classification, Rule based classification, Prediction, Accuracy and Error Measures.

UNIT-VI:

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density based Methods, Grid based methods, model based clustering methods, Clustering high dimensional data, Outlier analysis.

UNIT-VII:

Mining Stream, Time-Series, and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Biological Data.

UNIT-VIII:

Applications and Trends in Data Mining: Data Mining Applications, : Data Mining for Financial Data Analysis, Data Mining for the Retail Industry, Data Mining for the Telecommunication Industry, Data Mining for Biological Data Analysis, Data Mining in Other Scientific Applications, Data Mining for Intrusion Detection, Social Impacts of Data Mining.

TEXT BOOKS:

1. Jiawei Han and Micheline Kamber, *Data Mining, Concepts and Techniques*, Elsevier, II Edition, 2008.

REFERENCE BOOKS:

1. Margaret H Dunham, *Data Mining Introductory and Advanced Topics*, Pearson Education, 2e, 2006.
2. Amitesh Sinha, *Data Warehousing*, Thomson Learning, 2007.

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M.Tech- II Semester - CSE & CS

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COMPUTER SIMULATION & MODELING

12BCS19

OBJECTIVES:

- 1.To obtain sufficient knowledge to model any given system,
- 2.To simulate the modeled system for performance study.
- 3.To study different statistical models in simulation.
4. To study various verification and validation modeling techniques.

Outcomes:

Upon successful completion of this course, students will be able to

1. Able to Understand types of models and steps involved in simulation study.
- 2 Ability to model the real life scenarios effectively and most appropetly using simulation tools.
3. Ability to analyze the system behavior under varieties of inputs and outputs
- 4.Ability to Verify and validated simulation models.

UNIT I

Introduction to Simulation: System and System environment, Components of a system, Type of systems, Type of models, Steps in a simulation study, Advantages and Disadvantages of simulation.

UNIT II

Simulation Examples: Simulation of Queueing systems, Other examples of Simulation- General Principles: Concepts of discrete event simulation, List processing,

Simulation Software: History of simulation software, Desirable software features, General-purpose simulation packages, Object oriented simulation, Trends in simulation software.

UNIT III

Statistical Models in Simulation: Useful statistical model, Discrete distribution, Continuous distribution, Poisson process, Empirical distribution. - **Queueing Models:** Characteristics of Queueing systems, Queueing notations, Long run measures of performance of Queueing systems, Steady state behaviour of infinite population Markovian models, Steady state behavior finite population model, Network of Queues.

UNIT IV

Random Number Generation: Properties of random numbers, Generation of pseudo random numbers, Techniques for generating random numbers, Tests for random numbers.

Random Variate Generation: Inverse transforms technique, Convolution method, Acceptance rejection techniques.

UNIT V

Input modelling: Data Collection, Identifying the Distribution of data, Parameter estimation, Goodness of fit tests, Selection input model without data, Multivariate and Time series input models.

UNIT VI

Verification and Validation of Simulation Model: Model building, Verification, and Validation, Verification of simulation models, Calibration and Validation of models.

Output Analysis of a Single Model: Types of simulations with respect to output analysis, stochastic nature of output data, Measure of performance and their estimation, Output analysis of terminating simulators, Output analysis for steady state simulation

UNIT VII

Comparison and Evaluation of Alternative System Design: Comparison of two system design, Comparison of several system design, Meta modelling, Optimization via simulation.

UNIT VIII

Case Studies: Simulation of manufacturing systems, Simulation of computer systems, Simulation of supermarket, Simulation of pert network

Text Books:

1. Jerry Banks, John Carson, Barry Nelson, David Nicol, "*Discrete Event System Simulation*"
2. Averill Law, W. David Kelton, "*Simulation Modelling and Analysis*", McGraw-HILL.

Reference Books:

1. Geffery Gordon, "*System Simulation*", PHI
2. Bernard Zeigler, Herbert Praehofer, Tag Gon Kim, "*Theory of Modeling and Simulation*", Academic Press.
3. Narsing Deo, "*System Simulation with Digital Computer*", PHI
4. Donald W. Body, "*System Analysis and Modeling*", Academic Press Harcourt India
5. W David Kelton, Randall Sadowski, Deborah Sadowski, "*Simulation with Arena*", McGRAW-HILL.

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(Autonomous)

L	T	P	C
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M.Tech- II Semester - CSE & CS

12BCS20

DISTRIBUTED SYSTEMS

Objectives:

- 1.ability to understand hardware and software concepts,message oriented communication in Distributed system.
- 2.ability to understand process,synchronizoin in distributed systems.
- 3.To recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- 4.ability to understand the Distributed Object-Based Systems, Distributed File Systems.

Outcomes

After completing this course, students will be able to explain

1. gain a clear understanding of the concepts that underlie distributed computing systems along with design and implementation issues.
2. understand key mechanisms and models for distributed systems including logical clocks, vector timestamps, distributed hash tables, consistent global states, election algorithms, distributed mutual exclusion ,consistency replication , fault tolerance, distributed deadlocks, recovery , agreement protocols
3. gain how to design and implement distributed algorithms
4. practice with mechanisms such as client /server , remote procedure call (RPC/RMI), multicasting, consistency , cloud computing

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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M.Tech- II Semester - CSE & CS

12BCS21

ELECTIVE – III- ADHOC AND SENSOR NETWORKS

Objectives:

The objective of this course is to make students to:

1. *In To teach the constraints of the wireless physical layer that effect the design and performance of ad hoc networks, protocols and applications.*
2. *To understand MAC, Routing protocols that have been proposed for ad hoc networks*
3. *To understand the energy issues in Adhoc networks and how they can be addressed using scheduling, media access control, and special hardware.*
4. *To understand the design and security issues in MANET.*

Outcomes:

At the end of the course the student will be able to:

1. *Understand need for ad hoc networks.*
2. *Know design issues for ad hoc networks.*
3. *Familiar security issues and QoS requirements.*
4. *Realize design and security issues in MANET.*

UNIT- I

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and challenges of MANETs .

UNIT-II

Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms; Position based routing algorithms, other routing algorithms.

UNIT III

Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting
TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT IV

Basics of Wireless, Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT -V

Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots –

UNIT- VI

Security: Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

UNIT -VII

Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms.

UNIT -VIII

Operating System: TinyOS - **Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – *Theory and Applications*, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3

2. *Wireless Sensor Networks: An Information Processing Approach*, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

M.Tech- II Semester - CSE & CS

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12BCS22

ELECTIVE – III- CLOUD COMPUTING

Objectives:

The Objective of this course is to make students to

1. *Learn fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges;*
2. *Learn about cloud storage technologies and relevant distributed file systems;*
3. *Understand the emerging area of "cloud computing" and how it relates to traditional models of computing.*
4. *Gain competence in MapReduce as a programming model for distributed processing of large datasets.*

Outcomes:

At the end of course student should be able to

1. *Understanding the systems, protocols and mechanisms to support cloud computing*
2. *Develop applications for cloud computing.*
3. *Understanding the hardware necessary for cloud computing*
4. *Design and implement a novel cloud computing application*

UNIT – I

Introduction to virtualization and virtual machine, Virtualization in cluster/grid context Virtual network, Information model & data model for virtual machine, Software as a Service (SaaS), SOA, On Demand Computing.

UNIT – II

Cloud computing: Introduction, What it is and What it isn't, from Collaborations to Cloud, Cloud application architectures, Value of cloud computing, Cloud Infrastructure models, Scaling a Cloud Infrastructure, Capacity Planning, Cloud Scale.

UNIT – III

Data Center to Cloud: Move into the Cloud, Know Your Software Licenses, The Shift to a Cloud Cost Model, Service Levels for Cloud Applications.

UNIT IV

Security: Disaster Recovery, Web Application Design, Machine Image Design, Privacy Design, Database Management, Data Security, Network Security, Host Security, Compromise Response.

UNIT – V

Defining Clouds for the Enterprise- Storage-as-a-Service, Database-as-a-Service, Information-as-a-Service, Process-as-a-Service, Application-as-a-Service.

UNIT -VI

Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service, Infrastructure-as-a-Service

UNIT – VII

Disaster Recovery, Disaster Recovery, Planning, Cloud Disaster Management.

UNIT-VIII

Case study: Types of Clouds, Cloudcentres in detail, Comparing approaches, Xen OpenNEbula, Eucalyptus, Amazon, Nimbus

Text Books:

1. Michael Miller, *Cloud Computing – Web Based Applications That Change the way you Work and Collaborate Online*, Pearson Education.
2. George Reese , *Cloud Application Architectures*, 1st Edition by O'Reilly Media.

Reference Book:

1. David S. Linthicum, *Cloud Computing and SOA Convergence in Your Enterprise: A Step-by-Step Guide*, Addison-Wesley Professional.
2. Krishna Sankar, Susan A. Bouchard, *Enterprise Web 2.0 Fundamentals*, Cisco Press

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M.Tech- II Semester – CSE & CS

12BCS23 ELECTIVE – III- CRYPTOGRAPHY & NETWORK SECURITY

Objectives:

The objective of this course is to make students to:

1. Understand the importance and application of each of confidentiality, Integrity,
2. Understand Conventional Encryption Principles & Algorithms
3. Understand various cryptographic algorithms.
4. Understand the basic categories of threats to computers and networks

Outcomes:

At the end of the course the student will be able to:

1. understand Various cryptographic standards and algorithms.
2. Designing the security system for small scale business applications
3. Designing authorization systems for verification purpose
4. Design firewalls and trusted systems.

UNIT I

Security Goals, Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT II

Mathematical Tools for Cryptography: Introduction to number theory, prime & relative numbers, modular arithmetic, Fermat's and Euler's theorems, testing for primality, Chinese remainder theorem, Discrete logarithms.

UNIT III

Conventional Encryption Principles & Algorithms(DES, AES, RC4), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution, Public key cryptography principles, public key cryptography algorithms(RSA, RABIN, ELGAMAL, Diffie-Hellman, ECC), Key Distribution.

UNIT IV

Approaches of Message Authentication, Secure Hash Functions(SHA-512, WHIRLPOOL) and HMAC - **Digital Signatures:** Comparison, Process- Need for Keys, Signing the Digest, Services, Attacks on Digital Signatures, Kerberos, X.509 Directory Authentication Service.

UNIT V

Network Management, Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3.

UNIT VI

OS Security, OS Security Functions, Separation, Memory Protection, Access Control, Trusted Operating System: MAC, DAC, Trusted path, Trusted Computing Base.

UNIT VII

Viruses and related threats, Anatomy of Virus, Virus Counter Measures - **Software Flaws:** Buffer Overflow, Incomplete Mediation, Race Conditions, Malware: Brain, Morris Worm, Code Red, Malware Detection.

UNIT VIII

Firewalls, Design principles, Types of Firewalls, Firewall Architectures, Trusted Systems.

TEXT BOOKS:

1. William Stallings , *Network Security Essentials (Applications and Standards)* , Pearson Education.
2. Mark Stamp, *Information Security Principles & Practice*, WILEY INDIA 2006.

REFERENCES:

1. Stallings , *Cryptography and network Security*, Fourth edition, PHI/Pearson
2. Behrouz A. Forouzan , *Cryptography & Network Security* , TMH 2007.
3. Robert Bragg , *Network Security: The complete reference*, Mark Rhodes, TMH
4. Rick Lehtinen, Deborah Russell & G.T.Gangemi ,*Computer Security Basics* , SPD O'REILLY 2006.
5. Wenbo Mao , *Modern Cryptography* , Pearson Education 2007.

Objectives:

The objective of this course is to make students to:

1. Introduce architectural design and discuss its importance.
2. Discuss reference architectures are used to communicate and compare architectures.
3. Discuss the concept of patterns and the Catalog.
4. Discuss the Presentation tier design patterns and their effect on: sessions, client access, Validation and consistency.

Outcomes:

After completing this course, the student should be able to:

1. Design and understand software architecture for large scale software systems
2. Describe a software architecture using various documentation approaches and architectural description languages.
3. Understand the role of software architecture in the software lifecycle
4. Understand the architecture, creating it and moving from one to any, different structural patterns..

UNIT-I:

Introduction To Software Architecture

An Engineering Discipline for Software, Status of S/W Arch. Architecture Business Cycle, Where do Architectures come from. Software Processes and the Architecture Business Cycle, Features of Good Architecture.

UNIT-II:

Architecture Styles

Pipes and Filters, Data Abstraction and Object Oriented organization, Even-based Implicit Invocation, Layered Systems, Registers, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures.

UNIT-III:

Shared Information Systems

Database Integration, Interpretation in Software Development Environments, Architectural Structures for Shared Information Systems.

UNIT-IV:

Architectural Design Guidance

Guidance for User Interface Architectures, Case Study in Inter Operability: World Wide Web.

UNIT-V:

Pattern Types

Architectural Patterns, Structural Patterns, Patterns for Distribution, Patterns for Interactive Systems.

UNIT-VI:

Formal Models And Specifications

Finalizing the Architectural of a Specific System. Architectural Style. Architectural Design Space. Case Study of an Industry Standard Computing. Infrastructure: CORBA

UNIT-VII:

Architectural Description Languages

ADL's today, capturing Architectural Information in an ADL, Application of ADL's in system Development, Choosing an ADL, Example of ADL.

UNIT-VIII:

Reusing Architectural Assets Within An Organization

Creating Products and Evaluating a Product Line, Organizational Implications of a Product Line, Component Based Systems. Software Architectures in Figure: Legacy Systems. Achieving an Architecture, from Architecture to System.

TEXT BOOKS:

1. Mary Show, David Garlan, "*S/W Arch. Perspective: on an Emerging Discipline*", 1996, PHI.
2. Len Bass, Paul Elements, Rick Kazman, "*Software Architecture in Practice*", 1998, PEA.

REFERENCE BOOKS:

1. Garmus, Herros, "*Measuring the Software Process: A Practical Guide to Functional Measure*", 1996, PHI.
2. Florac, Carleton, "*Meas. Software Process: Stat. Proce. Cont. for Software process Improvemnts*", 1999, PEA.
3. W.Humphery, "*Introduction to Team Software Process*", 2002, PEA.
4. Peters, "*Software Design: Methods and Techniques*", 1981, Yourdon.
5. Buschmann, "*Pattern Oriented Software Architecture*", 1996, Wiley.
6. Gamma et al, "*Design Patterns*", 1995, PEA.
7. Gamma, Shaw, "*An Introduction to Software Architecture*", 1995, World Scientific.
8. Shaw, gamma, "*Software Architecture*", 1996, PHI.

12BCS25

ELECTIVE – IV- SOFTWARE DESIGN

Objectives:

The objective of this course is to make students to:

1. learn a problem-solving process
2. Understand the quality concept, Assessing design quality, Quality attributes of the design product in software design,.
3. Understand architecture concept, Design methods in Design Patterns
4. Understand Incremental Design, Structured Systems Analysis And Structured Design

Outcomes:

After completing this course, the student should be able to:

1. Identifies needs to which software solutions are appropriate
2. Develop unit and system-level test suites, and evaluate their effectiveness using simple notions of specification and code coverage.
3. Students will be able to use design patterns when developing software
4. Identify key entities and relationships in the problem domain; using object oriented framework.

UNIT-I:

The Nature of Design Process

What is design?, The role of the design activity, Design as a problem-solving process, Design as a 'wicked' problem.

The Software Design Process

What is software?, Building models, Transferring design knowledge, Constraints upon the design process and product, Recording design decisions, Designing with others

UNIT-II:

Design In The Software Development Process

A context for design, Linear development processes, Incremental development processes, Economic factors, The longer term.

Design Qualities

The quality concept, Assessing design quality, Quality attributes of the design product, Assessing the design process.

UNIT-III:

Describing A Design Solution

Representing abstract ideas, Design viewpoints for software, Forms of notation.

Transferring Design Knowledge

The need to share knowledge, The architecture concept, Design methods, Design Patterns, A unified interpretation.

UNIT-IV:

Some Design Representations

A problem of selection, Black box notations, White box notations, Development a diagram.

The Rationale For Method

What is a software design method? The support that design methods provide, Why methods don't work miracles, Problem domains and their influence.

UNIT-V:

Design Process And Design Strategies

The role of strategy in methods, Describing the design process-the D- Matrix, Design by top-down decomposition, Design by composition, Organizational influences upon design.

Design Patterns

Design by template and design reuse, The design patterns, Designing with Patterns, Patterns in the wider design context.

UNIT-VI:**Stepwise Refinement**

The historical role of stepwise refinement, Architecture consequences, Strengths and weaknesses of the stepwise strategy.

Incremental Design

Black box to white box in stages, Prototyping, An example-DSDM.

Structured Systems Analysis And Structured Design

Origins, development and philosophy, Representation forms for SSA/SD, The SSA/SD process, The role of heuristics in SSA/SD, External forms of SSA/SD, SSA/SD: an outline Example.

UNIT-VII:**Jackson Structured Programming (JSP)**

Some background to JSP, JSP representation forms, The JSP process, Some JSP heuristics.

Jackson System Development (JSD)

The JSD model, JSD representation forms, The JSD Process, JSD heuristics

UNIT-VIII:**Design With Objects**

The 'object concept', Design Practices for the object-oriented paradigm, Object-Oriented frameworks, Object-based design, Object-Oriented design.

Component-Based Design

The component concept, Designing with components, Designing components, At the extremity-COTS.

A Formal Approach to Design

The case for rigour, Model-based strategies, Property-based strategies

TEXT BOOKS:

1. David Budgen , *Software Design*, 2/e Pearson Education.
2. *Software Design Methods for Concurrent and Real-Time Systems*, 1/e Pearson Education.

12BCS26 ELECTIVE – IV- OBJECT ORIENTED ANALYSIS AND DESIGN

Objectives:

1. To learn the concept of Object Oriented Software Development Process
2. Ability to learn class & Object, Collaboration, Sequence diagrams.
3. Ability to understand The Unified process and Architecture-centric process.
4. Ability to understand Inception, Elaboration, Construction, Transition phase.

Outcome:

1. ability to familiarize with standard UML notation
2. Understand how to model requirements with Use Cases
3. able to describe the dynamic behavior and structure of the design.
4. Understand concepts in the area of modeling techniques

UNIT I

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

UNIT II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT III

Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.
Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, callback mechanism, broadcast messages.

UNIT IV

Basic Behavioral Modeling: Use cases, Use case Diagrams, Activity Diagrams.
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT V

The Unified process: use case driven, architecture centric, iterative, and incremental
The Four Ps: people, project, product, and process
Use case driven process: why use case, capturing use cases, analysis, design, and implementation to realize the use cases, testing the use cases
Architecture-centric process: architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

UNIT VI

Iterative incremental process: Iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.
The Generic Iteration workflow: Phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed, assess the iteration and phases

UNIT VII

Inception phase: Early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, requirements to test.
Elaboration Phase: Elaboration phase in brief, early in the elaboration phase, the architectural elaboration iteration workflow, execute the core workflows-Requirements to test.

UNIT VIII

Construction phase: Early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.

Transition phase: Early in the transition phase, activities in transition phase

Case Studies: Automation of a Library, Software Simulator application (2-floor elevator simulator)

TEXT BOOKS :

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

REFERENCE BOOKS :

1. Meilir Page-Jones , *Fundamentals of Object Oriented Design in UML* , Pearson Education
2. Atul Kahate ,*Object Oriented Analysis & Design*, The McGraw-Hill.
3. Mark Priestley ,*Practical Object-Oriented Design with UML* , TATA McGrawHill
4. Brett D McLaughlin, Gary Pollice and David West , *Object Oriented Analysis & Design* , O'REILY .
5. Simon Bennet, Steve McRobb and Ray Farmer,*Object-Oriented Analysis and Design using UML* , 2nd Edition, TATA McGrawHill.
6. John W. Satzinger Robert B Jackson and Stephen D Burd , *Object-Oriented Analysis and Design with the Unified Process* , THOMSON Course Technology.
7. R.C.Lee, and W.M.Tepfenhart ,*UML and C++*, PHI.

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M.Tech- II Semester – CSE & CS

Data Mining & Warehousing Lab

12BCS28

The objective of the lab exercises is to use data mining techniques to identify customer segments and understand their buying behavior and to use standard databases available to understand DM processes using WEKA (or any other DM tool)

1. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.
2. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.
3. Using Teradata Warehouse Miner – Create mining models that are executed in SQL.
(BI Portal Lab: The objective of the lab exercises is to integrate pre-built reports into a portal application).
4. Publish cognos cubes to a business intelligence portal.
Metadata & ETL Lab: The objective of the lab exercises is to implement metadata import agents to pull metadata from leading business intelligence tools and populate a metadata repository. To understand ETL processes.
5. Import metadata from specific business intelligence tools and populate a meta data repository.
6. Publish metadata stored in the repository.
7. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

Case study

8. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.
9. Design and build a Data Warehouse using a bottom up approach titled 'Citizen Information System'. This should be able to serve the analytical needs of the various government departments and also provide a global integrated view.

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M.Tech- II Semester – CSE & CS
12BCS29

Computer Simulation Lab

Objectives:

- Introduce computer simulation technologies and techniques, provides the foundations for the student to understand computer simulation needs, and to implement and test a variety of simulation and data analysis libraries and programs. This course focuses what is needed to build simulation software environments, and not just building simulations using preexisting packages.
- Introduce concepts of modeling layers of society's critical infrastructure networks.
- Build tools to view and control simulations and their results.

1	Simulate a coin toss in a spreadsheet model?																																			
2	<p>Single-channel Queue A small grocery store has only one checkout counter. Customers arrive at this checkout counter at random times that are from 1 to 8 minutes apart. Each possible value of interarrival time has the same probability of occurrence. The service times vary from 1 to 6 minutes, with the probabilities as shown below:</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>Time between Arrivals (Minutes)</th> <th>Probability</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.125</td></tr> <tr><td>2</td><td>0.125</td></tr> <tr><td>3</td><td>0.125</td></tr> <tr><td>4</td><td>0.125</td></tr> <tr><td>5</td><td>0.125</td></tr> <tr><td>6</td><td>0.125</td></tr> <tr><td>7</td><td>0.125</td></tr> <tr><td>8</td><td>0.125</td></tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th>Service Time(Minutes)</th> <th>Probability</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.10</td></tr> <tr><td>2</td><td>0.20</td></tr> <tr><td>3</td><td>0.30</td></tr> <tr><td>4</td><td>0.25</td></tr> <tr><td>5</td><td>0.10</td></tr> <tr><td>6</td><td>0.05</td></tr> </tbody> </table> <p>The problem is to analyze the system by simulating the arrival and service of 100 customers.</p>		Time between Arrivals (Minutes)	Probability	1	0.125	2	0.125	3	0.125	4	0.125	5	0.125	6	0.125	7	0.125	8	0.125	Service Time(Minutes)	Probability	1	0.10	2	0.20	3	0.30	4	0.25	5	0.10	6	0.05		
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3	<p>The Able-Baker Call Center Problem (Two servers)</p> <p>Consider a computer technical support center where personnel take calls and provide service. The time between calls ranges from 1 to 4 minutes, with distribution as shown below:</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>Time between Arrivals (Minutes)</th> <th>Probability</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.25</td></tr> <tr><td>2</td><td>0.40</td></tr> <tr><td>3</td><td>0.20</td></tr> <tr><td>4</td><td>0.15</td></tr> </tbody> </table> <p>The Distributions of their service times are shown below:</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th colspan="2">Service Distribution of Able</th> </tr> <tr> <th>Time between Arrivals</th> <th>Probability</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th colspan="2">Service Distribution of Baker</th> </tr> <tr> <th>Time between Arrivals</th> <th>Probability</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		Time between Arrivals (Minutes)	Probability	1	0.25	2	0.40	3	0.20	4	0.15	Service Distribution of Able		Time between Arrivals	Probability									Service Distribution of Baker		Time between Arrivals	Probability								
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	(Minutes)		(Minutes)	
	1	0.25	1	0.30
	2	0.40	2	0.28
	3	0.20	3	0.25
	4	0.15	4	0.17

The problem is to find how well the current arrangement is working. Estimate the system measures of performance, a simulation of the first 100 callers is made?.

4	Using Inverse-Transform technique generate random variates for the following distributions: 1. Continuous Uniform Distribution 2. Continuous Exponential random variates
5	Using Inverse-Transform technique generate random variates for the following distributions: a) Continuous triangular random variates b) Weibull Distribution
6	Using Inverse-Transform technique generate random variates for the following distributions: a) Empirical Continuous Distribution b) Empirical Discrete Distribution
7	Using Inverse-Transform technique generate random variates for the following distributions: a) Discrete Uniform Distribution b) Discrete Geometric Distribution
8	a) Using Acceptance-Rejection Technique generate random variates for the following distributions: 1. Poisson Distribution 2. Gamma Distribution
9	Application of Direct Transformations for generating random variates for the Normal and Lognormal Distributions
10	Application of Convolution method for generating random variates for Erlang Distribution