ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS
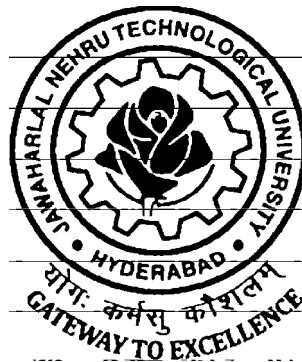
M.TECH SOFTWARE ENGINEERING

(Applicable for the batches admitted from 2013-14)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

KUKATPALLY, HYDERABAD – 500 085.

ACADEMIC REGULATIONS R13 FOR M. TECH. (REGULAR) DEGREE COURSE

Applicable for the students of M. Tech. (Regular) Course from the Academic Year 2013-14 and onwards

The M. Tech. Degree of Jawaharlal Nehru Technological University Hyderabad shall be conferred on candidates who are admitted to the program and who fulfil all the requirements for the award of the Degree.

1.0 ELIGIBILITY FOR ADMISSIONS

Admission to the above program shall be made subject to eligibility, qualification and specialization as prescribed by the University from time to time.

Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University or on the basis of any other order of merit as approved by the University, subject to reservations as laid down by the Govt. from time to time.

2.0 AWARD OF M. TECH. DEGREE

2.1 A student shall be declared eligible for the award of the M. Tech. Degree, if he pursues a course of study in not less than two and not more than four academic years. However, he is permitted to write the examinations for two more years after four academic years of course work.

2.2 A student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the year of his admission, shall forfeit his seat in M. Tech. course.

2.3 The student shall register for all 88 credits and secure all the 88 credits.

2.4 The minimum instruction days in each semester are 90.

3.0 A. COURSES OF STUDY

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

1. Advanced Manufacturing Systems
2. Aerospace Engineering/ Aeronautical Engineering
3. Automation
4. Biomedical Signal Processing and Instrumentation
5. Bio-Technology
6. CAD/CAM
7. Chemical Engineering
8. Communication Systems
9. Computer Networks
10. Computer Networks and Information Security
11. Computer Science
12. Computer Science and Engineering
13. Computers and Communication Engineering.
14. Construction Management
15. Control Engineering
16. Control Systems
17. Cyber Forensic / Cyber Security & Information Technology
18. Design for Manufacturing/ Design and Manufacturing
19. Digital Electronics and Communication Engineering.
20. Digital Electronics and Communication Systems
21. Digital Systems and Computer Electronics
22. Electrical Power Engineering
23. Electrical Power Systems
24. Electronics & Instrumentation

25. Electronics and Communication Engineering
26. Embedded Systems
27. Embedded Systems and VLSI Design
28. Energy Systems
29. Engineering Design
30. Environmental Engineering
31. Geoinformatics and Surveying Technology
32. Geotechnical Engineering.
33. Heating Ventilation & Air Conditioning.
34. Highway Engineering
35. Image Processing
36. Industrial Engineering and Management
37. Information Technology
38. Infrastructure Engineering
39. Machine Design
40. Mechatronics.
41. Microwave & Radar Engineering
42. Nano Technology
43. Neural Networks
44. Parallel Computing
45. Power and Industrial Drives
46. Power Electronics
47. Power Electronics and Electrical Drives
48. Power Engineering and Energy Systems
49. Power Plant Engineering & Energy Management
50. Power System Control and Automation
51. Power System with Emphasis H.V. Engineering / H.V. Engineering
52. Production Engineering.
53. Real Time Systems
54. Software Engineering
55. Structural Engineering
56. Systems & Signal Processing
57. Thermal Engineering.
58. Transportation Engineering
59. VLSI
60. VLSI and Embedded System/ Electronics Design Technology
61. VLSI Design
62. VLSI System Design
63. Web Technologies
64. Wireless and Mobile Communication

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

3.0 B. Departments offering M. Tech. Programmes with specializations are noted below:

Civil Engg.	Construction Management
	Environmental Engineering
	Geoinformatics and Surveying Technology
	Geotechnical Engineering
	Highway Engineering
	Infrastructure Engineering
	Structural Engineering
	Transportation Engineering
EEE	Control Engineering
	Control Systems
	Electrical Power Engineering
	Electrical Power Systems
	Power and Industrial Drives
	Power Electronics
	Power Electronics and Electrical Drives
	Power Engineering and Energy Systems
	Power Plant Engineering & Energy Management
	Power System Control and Automation
	Power System with Emphasis H.V. Engineering / H.V. Engineering
ME	Advanced Manufacturing Systems
	Automation
	CAD/CAM
	Design for Manufacturing/ Design and Manufacturing
	Energy Systems
	Engineering Design
	Heating Ventilation & Air Conditioning
	Industrial Engineering and Management
	Machine Design
	Mechatronics.
	Power Plant Engineering & Energy Management
	Production Engineering
	Thermal Engineering.
ECE	Biomedical Signal Processing and Instrumentation
	Communication Systems
	Computers and Communication Engineering.
	Digital Electronics and Communication Engineering.
	Digital Electronics and Communication Systems
	Digital Systems and Computer Electronics
	Electronics & Instrumentation
	Electronics and Communication Engineering
	Embedded Systems
	Embedded Systems and VLSI Design

	Microwave & Radar Engineering Systems & Signal Processing VLSI VLSI and Embedded System/ Electronics Design Technology VLSI Design VLSI System Design Wireless and Mobile Communication	
CSE	Computer Networks Computer Networks and Information Security Computer Science Computer Science and Engineering Cyber Forensic / Cyber Security & Information Technology Image Processing Information Technology Neural Networks Parallel Computing Real Time Systems Software Engineering Web Technologies	
Aeronautical Engg.	Aerospace Engineering / Aeronautical Engineering	
Bio-technology	Bio-Technology	
Chemical Engg.	Chemical Engineering	
Nano Technology	Nano Technology	

4.0 ATTENDANCE

The programs are offered on a unit basis with each subject being considered a unit.

4.1   A student shall be eligible to write University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

4.2   Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester shall be granted by the College Academic Committee.

4.3   Shortage of Attendance below 65% in aggregate shall not be condoned.

4.4   Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration shall stand cancelled.

4.5   A prescribed fee shall be payable towards condonation of shortage of attendance.

4.6   A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

4.7   A candidate shall put in a minimum required attendance at least in three (3) theory subjects in the present semester to get promoted to the next semester. In order to qualify for the award of the M. Tech. Degree, the candidate shall complete all the academic requirements of the subjects, as per the course structure.

4.8   A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the previous semester including the days of attendance in sports, games, NCC and NSS activities.

5.0 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.

5.1 For the theory subjects 60 marks shall be awarded based on the performance in the End Semester Examination and 40 marks shall be awarded based on the Internal Evaluation. The internal evaluation shall be made based on the average of the marks secured in the two Mid Term-Examinations conducted-one in the middle of the Semester and the other immediately after the completion of instruction. Each mid term examination shall be conducted for a total duration of 120 minutes with Part A as compulsory question (16 marks) which consists of four sub-questions and carries 4 marks each and Part B with 3 questions to be answered out of 5 questions each question for 8 marks. If any candidate is absent from any subject of a mid-term examination, an on-line test will be conducted for him by the University. The details of the Question Paper pattern for End Examination (Theory) is given below:

- The End semesters Examination will be conducted for 60 marks which consists of two parts viz. i).Part-A for 20 marks, ii). Part –B for 40 marks.

- Part-A is compulsory question where it consists of five questions one from each unit and carries four marks each. This will be treated as Question 1.

- Part-B consists of five Questions (numbered from 2 to 6) carries 8 marks each. Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer only one question)

5.2 For practical subjects, 60 marks shall be awarded based on the performance in the End Semester Examinations and 40 marks shall be awarded based on the day-to-day performance as Internal Marks.

5.3 There shall be two seminar presentations during I year I semester and II semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Departmental Academic Committee consisting of Head of the Department, Supervisor and two other senior faculty members of the department. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.

5.4 There shall be a Comprehensive Viva-Voce in II year I Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the students' understanding of various subjects he has studied during the M. Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

5.5 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 semester Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

5.6 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.5) he has to reappear for the End semester Examination in that subject.   A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and so has failed in the end examination. In such a case, the candidate must re-register for the subject(s) and secure the required minimum attendance. The candidate's attendance in the re-registered subject(s) shall be calculated separately to decide upon his eligibility for writing the end examination in those subject(s). In the event of the student taking another chance, his internal marks and end examination marks obtained in the previous attempt stand cancelled.

5.7 In case the candidate secures less than the required attendance in any subject, he shall not be permitted to write the End Examination in that subject. He shall re-register the subject when next

offered.

5.8   Laboratory examination for M. Tech. courses must be conducted with two Examiners, one of them being the Laboratory Class Teacher and the second examiner shall be another Laboratory Teacher.

6.0   EVALUATION OF PROJECT/DISSERTATION WORK

Every candidate shall be required to submit a thesis or dissertation on a topic approved by the Project Review Committee.

6.1   A Project Review Committee (PRC) shall be constituted with Principal as Chairperson, Heads of all the Departments offering the M. Tech. programs and two other senior faculty members.

6.2   Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.

6.3   After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the Departmental Academic Committee for approval. Only after obtaining the approval of the Departmental Academic Committee can the student initiate the Project work.

6.4   If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the Departmental Academic Committee. However, the Departmental Academic Committee shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.

6.5   A candidate shall submit his status report in a bound-form in two stages at least with a gap of 3 months between them.

6.6   The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of theory and practical course with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Principal through Head of the Department and make an oral presentation before the PRC.

6.7   Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/School/Institute.

6.8   The thesis shall be adjudicated by one examiner selected by the University.   For this, the Principal of the College shall submit a panel of 5 examiners, eminent in that field, with the help of the guide concerned and head of the department.

6.9   If the report of the examiner is not favourable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavourable again, the thesis shall be summarily rejected.

6.10   If the report of the examiner is favourable, Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the Thesis. The Board shall jointly report the candidate's work as one of the following:

   A.   Excellent
   B.   Good
   C.   Satisfactory
   D.   Unsatisfactory

The Head of the Department shall coordinate and make arrangements for the conduct of Viva- Voce examination.

If the report of the Viva-Voce is unsatisfactory, the candidate shall retake the Viva-Voce examination only after three months. If he fails to get a satisfactory report at the second Viva- Voce examination, he will not be eligible for the award of the degree.

7.0 AWARD OF DEGREE AND CLASS

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

Class Awarded	% of marks to be secured
First Class with Distinction	70% and above
First Class	Below 70% but not less than 60%
Second Class	Below 60% but not less than 50%
Pass Class	Below 50% but not less than 40%

The marks in internal evaluation and end examination shall be shown separately in the memorandum of marks.

8.0 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the university or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

9.0 TRANSITORY REGULATIONS

9.1 Discontinued, detained, or failed candidates are eligible for admission to two earlier or equivalent subjects at a time as and when offered.

9.2 The candidate who fails in any subject will be given two chances to pass the same subject; otherwise, he has to identify an equivalent subject as per R13 academic regulations.

10. GENERAL

10.1 Wherever the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

10.2 The academic regulation should be read as a whole for the purpose of any interpretation.

10.3 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

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

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / 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 and sent to the University.
3.	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 imposter is an outsider, he will be handed over to the police and a case is registered against him.

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 performance in that subject and all the 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.	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.
6.	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 of 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.	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.
7.	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 performance in that subject and all the 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.

8.	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 the seat.
9.	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.	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. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	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 for the remaining examinations of the subjects of that semester/year.
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 University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
    (i)   A show cause notice shall be issued to the college.
    (ii)   Impose a suitable fine on the college.
    (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.

M.TECH - SOFTWARE ENGINEERING

COURSE STRUCTURE AND SYLLABUS

I Year I Semester

Code	Group	Subject	L	P	Credits
		Advanced Data Structures and Algorithms	3	-	3
		Web Technologies and Services	3	-	3
		Software Requirements and Estimation	3	-	3
		Software Development Methodologies	3	-	3
	Elective -I	Secure Software Engineering Cyber Security and Cyber Laws Information Security and Audit	3	-	3
	Elective -II	Parallel Algorithms Advanced Data Mining Object Oriented Modeling	3	-	3
	Lab	Web Technologies and Services Lab	-	3	2
		Seminar	-	-	2
		Total Credits	18	3	22

I Year II Semester

Code	Group	Subject	L	P	Credits
		Software Architecture and Design Patterns	3	-	3
		Software Process and Project Management	3	-	3
		Software Quality Assurance and Testing	3	-	3
		Component Based Software Engineering	3	-	3
	Elective -III	Scripting Languages Information Retrieval Systems Semantic Web and Social Networks	3	-	3
	Elective -IV	Cloud Computing Advanced Databases Business Process Management	3	-	3
	Lab	Software Testing Lab	-	3	2
		Seminar	-	-	2
		Total Credits	18	3	22

II Year   - I Semester

Code	Group	Subject	L	P	Credits
		Comprehensive Viva	-	-	2
		Project Seminar	0	3	2
		Project work	-	-	18
		Total Credits	-	3	22

II Year - II Semester

Code	Group	Subject	L	P	Credits
		Project work and Seminar	-	-	22
		Total Credits	-	-	22

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

ADVANCED DATA STRUCTURES AND ALGORITHMS

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.
- Significance of algorithms in the computer field
- Various aspects of algorithm development
- Qualities of a good solution

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists.

Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, LinkedList, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching–Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable.

Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-DFS and BFS, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT V

Search trees- Binary search tree-Binary search tree ADT ,insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees –Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util-TreeSet, TreeMap Classes, Tries(examples only),Comparison of Search trees.

Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1.   Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.

2.   Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage learning.

3   Data structures and Algorithm Analysis in Java, M. A. Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1.   Java for Programmers, Deitel and Deitel, Pearson education.

2   Data structures and Algorithms in Java, R.Lafore, Pearson education.

3.   Java: The Complete Reference, 8th edition, Herbert Schildt, TMH.

4.   Data structures and Algorithms in Java, M. T. Goodrich, R. Tomassia, 3rd edition, Wiley India Edition.

5.   Data structures and the Java Collection Frame work, W. J. Collins, Mc Graw Hill.

6.   Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).

7.   Data structures with Java, Ford and Topp, Pearson Education.

8.   Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.

9.   Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.

10.   Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

WEB TECHNOLOGIES AND SERVICES

Objectives:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. She / He should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML, CSS, Javascript, Ajax, JQuery and JSON

Server Side: Servlets, JSP

Database: MySQL with Hibernate and Connection Pooling

Framework: Struts with validation framework, Internationalization (I18N)

SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT I

Client Side Technologies:

Overview of HTML - Common tags for text formatting, Lists, Tables, Images, Forms, Frames etc., XHTML

Cascading Style sheets, linking to HTML Pages, Classes in CSS, General CSS statements for Text, Table, List and Page formatting

Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/ Document Object Model), accessing elements by ID, Objects in JavaScript

Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events, JQuery.

UNIT II:

Introduction to Java Servlets:

Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions

Steps involved in Deploying an application.

Database Access with JDBC and Connection Pooling.

Introduction to XML, XML Parsing with DOM and SAX Parsers in Java.

Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it.

Introduction to Hibernate.

UNIT III:

Introduction to JSP:

JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP.

UNIT IV:

Introduction to Struts Framework:

Introduction to MVC architecture, Anatomy of a simple struts application, struts configuration file, Presentation

layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT V:

Service Oriented Architecture and Web Services

Overview of Service Oriented Architecture – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA.

Introduction to Web Services– The definition of web services, basic operational model of web services, basic steps of implementing web services.

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models.

Describing Web Services –Web Services life cycle, anatomy of WSDL.

Introduction to Axis– Installing axis web service framework, deploying a java web service on axis.

Web Services Interoperability **–** Creating java and .Net client applications for an Axis Web Service.

(Note: The Reference Platform for the course will be open source products Apache Tomcat Application Server, MySQL database, Hibernate and Axis).

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech.
2. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
3. Java Server Pages,Hans Bergsten, SPD, O'Reilly.
4. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.
5. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp – 2008.
6. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition – 2009
7. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming,S.Allamaraju & othersApress(dreamtech).
7. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett ,WROX.
10. Java Server Pages, Pekowsky, Pearson.
11. Java Script,D.Flanagan,O'Reilly,SPD.
12. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
13. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
14. McGovern, et al., Java Web Services Architecture, Morgan Kaufmann Publishers,2005.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

SOFTWARE REQUIREMENTS AND ESTIMATION

Objectives:

- Students will demonstrate knowledge of the distinction between critical and non- critical systems.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- Students will author a software requirements document.
- Students will demonstrate an understanding of the proper contents of a software requirements document.
- Students will author a formal specification for a software system.
- Students will demonstrate an understanding of distributed system architectures and application architectures.
- Students will demonstrate an understanding of the differences between real-time and non-real time systems.
- Students will demonstrate proficiency in rapid software development techniques.
- Students will demonstrate proficiency in software development cost estimation
- Students will author a software testing plan.

UNIT I

Software Requirements: What and Why

Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management.

Software Requirements Engineering

Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

UNIT II

Software Requirements Management

Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain.

Software Requirements Modeling

Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames.

UNIT III

Software Estimation

Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation.

Size Estimation

Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures.

UNIT IV

Effort, Schedule and Cost Estimation

What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation.

UNIT V

Tools for Requirements Management and Estimation

Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation.

Software Estimation Tools:

Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools.

TEXT BOOK:

1. Software Requirements and Estimation by *Rajesh Naik and Swapna Kishore*, Tata Mc Graw Hill.

REFERENCE BOOKS:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
4. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.
5. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.
6. Measuring the software process, William A. Florac & Anita D. Carleton, Pearson Education, 1999.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

SOFTWARE DEVELOPMENT METHODOLOGIES

Objectives:

Your studies will enable you to develop:

- a broad and critical understanding of all the processes for engineering high quality software and the principles, concepts and techniques associated with software development.

- an ability to analyze and evaluate problems and draw on the theoretical and technical knowledge to develop solutions and systems.

- a range of skills focused on the analysis of requirements, design and implementation of reliable and maintainable software, with strong emphasis on engineering principles applied over the whole development lifecycle.

- an awareness of current research in software development, the analytical skills and research techniques for their critical and independent evaluation and their application to new problems.

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering - A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process.

UNIT II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT III

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

Modeling component-level design: Designing class-based components, conducting component-level design, Object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT V

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

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

Configuration Management: Configuration Management planning, Change management, Version and release management, System building, CASE tools for configuration management.

TEXT BOOKS:

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition.   McGraw Hill International Edition, 2005

2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.

2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008

3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005

4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.

6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.

7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.

8. Software Engineering 3: Domains, Requirements and Software Design, D.Bjorner, Springer, International Edition.

9. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, Wiley India edition.

10. Introduction to Software Engineering, R.J.Leach,CRC Press.

11. Software Engineering Fundamentals, Ali Behforooz and Frederick J.Hudson, Oxford University Press, rp2009.

12. Software Engineering Handbook, Jessica Keyes, Auerbach, 2003.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

SECURE SOFTWARE ENGINEERING

(ELECTIVE-I)

Objectives:

- Students will demonstrate knowledge of the distinction between critical and non-critical systems.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- Students will author a software requirements document.
- Students will demonstrate an understanding of the proper contents of a software requirements document.
- Students will author a formal specification for a software system.
- Students will demonstrate an understanding of distributed system architectures and application architectures.
- Students will demonstrate an understanding of the differences between real-time and non-real time systems.
- Students will demonstrate proficiency in rapid software development techniques.
- Students will be able to identify specific components of a software design that can be targeted for reuse.
- Students will demonstrate proficiency in software development cost estimation.
- Students will author a software testing plan.

UNIT – I

Security a software Issue:

Introduction, the problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security

What Makes Software Secure:

Properties of Secure Software, Influencing the security properties of software, Asserting and specifying the desired security properties?

UNIT – II

Requirements Engineering for secure software:

Introduction, the SQUARE process Model, Requirements elicitation and prioritization

UNIT – III

Secure Software Architecture and Design:

Introduction, software security practices for architecture and design: architectural risk analysis, software security knowledge for architecture and design: security principles, security guidelines and attack patterns

Secure coding and Testing:

Code analysis, Software Security testing, Security testing considerations throughput the SDLC

UNIT – IV

Security and Complexity:

System Assembly Challenges: introduction, security failures, functional and attacker perspectives for security

analysis, system complexity drivers and security

UNIT – V

Governance and Managing for More Secure Software:

Governance and security, Adopting an enterprise software security framework, How much security is enough?, Security and project management, Maturity of Practice

TEXT BOOK:

1.   Software Security Engineering: Julia H. Allen, Pearson Education

REFERNCE BOOKS:

1.   Developing Secure Software: Jason Grembi, Cengage Learning

2.   Software Security : Richard Sinn, Cengage Learning

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

CYBER SECURITY AND CYBER LAWS

(ELECTIVE-I)

Objectives:

- To learn Internet, E-commerce and E-governance with reference to Free Market Economy
- To learn International Efforts relating to Cyberspace laws and Cyber crimes
- To learn Law relating to electronic records and intellectual property rights in India
- To learn Penalties, Compensation and Offences under the Cyberspace and Internet in India
- To learn Miscellaneous provisions of IT Act and Conclusions

UNIT-I

Internet, E-commerce and E-governance with reference to Free Market Economy

Understanding Computers, Internet and Cyber laws, Conceptual Framework of E-commerce: E-governance, the role of Electronic Signatures in E-commerce with Reference to Free Market Economy in India.

UNIT-II

Law relating to electronic records and intellectual property rights in India

Legal aspects of Electronic records / Digital signatures, The roles and regulations of Certifying Authorities in India, Protection of Intellectual Property Rights in Cyberspace in India.

UNIT-III

International Efforts relating to Cyberspace laws and Cyber crimes

International efforts related to Cyber laws, Council of Europe (COE) convention on Cyber Crimes.

UNIT-IV

Penalties, Compensation and Offences under the Cyberspace and Internet in India

Penalties, Compensation and Adjunction of violations of provisions of IT Act and Judicial review, Some important offences under the Cyberspace law and the Internet in India, Other offences under the Information Technology Act in India.

UNIT-V: Miscellaneous provisions of IT Act and Conclusions

The role of Electronic Evidence and miscellaneous provisions of the IT Act.

TEXT BOOK:

1. Cyber Laws and IT Protection, Harish Chander, PHI, 2012

REFERENCE BOOKS:

1. Cyberspace and Cybersecurity, George Kostopoulos, Auerbach Publications, 2012.
2. Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes, Second Edition, Albert Marcella, Jr., Doug Menendez, Auerbach Publications, 2007.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

INFORMATION SECURITY AND AUDIT

(ELECTIVE- I)

Objectives:

To introduce the fundamental concepts and techniques in computer and network security, giving students an overview of information security and auditing, and to expose students to the latest trend of computer attack and defense. Other advanced topics on information security such as mobile computing security, security and privacy of cloud computing, as well as secure information system development will also be discussed.

UNIT I

A model for Internetwork security, Conventional Encryption Principles & Algorithms (DES, AES, RC4, Blowfish), Block Cipher Modes of Operation, Location of Encryption Devices, Key Distribution.

Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellman, ECC),public Key Distribution.

UNIT II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service,

Email Security: Pretty Good Privacy (PGP)

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT IV

Auditing For Security:

Introduction, Basic Terms Related to Audits, Security audits, The Need for Security Audits in Organization, Organizational Roles and Responsibilities for Security Audit, Auditors Responsibility In Security Audits, Types Of Security Audits.

UNIT V

Auditing For Security:

Approaches to Audits, Technology Based Audits Vulnerability Scanning And Penetration Testing, Resistance to Security Audits, Phase in security audit, Security audit Engagement Costs and other aspects, Budgeting for security audits, Selecting external Security Consultants, Key Success factors for security audits.

TEXT BOOKS:

1. Cryptography and Network Security by William Stallings, Fourth Edition, Pearson Education 2007.
2. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education, 2008.
3. Cryptography & Network Security by Behrouz A. Forouzan, TMH 2007.
4. Information Systems Security by Nina Godbole, WILEY 2008.

REFERENCE BOOKS:

1.   Information Security by Mark Stamp, Wiley – INDIA, 2006.

2.   Fundamentals of Computer Security, Springer.

3.   Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH

4.   Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.

5.   Modern Cryptography by Wenbo Mao, Pearson Education 2007.

6.   Principles of Information Security, Whitman, Thomson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

PARALLEL ALGORITHMS

(ELECTIVE-II)

Objectives:

- To understand the role of computation models in parallel computation;
- To understand the circuit and comparison network models;
- To design Parallel Matrix Transportation and Multiplication Algorithm
- To understand the PRAM and BSP models and their theoretical foundations;

UNIT-I:

Sequential model, need of alternative model, parallel computational models such as PRAM, LMCC, Hypercube, Cube Connected Cycle, Butterfly, Perfect Shuffle Computers, Tree model, Pyramid model, Fully Connected model, PRAM-CREW, EREW models, simulation of one model from another one.

UNIT-II:

Performance Measures of Parallel Algorithms, speed-up and efficiency of PA, Cost optimality, Example to illustrate Cost-optimal algorithms- such as summation, Min/Max on various models.

UNIT-III:

Parallel Sorting Networks, Parallel Merging Algorithms on CREW/EREW/MCC/, Parallel Sorting Networks on CREW/EREW/MCC/, linear array

UNIT-IV:

Parallel Searching Algorithm, Kth element, Kth element in X+Y on PRAM, Parallel Matrix Transportation and Multiplication Algorithm on PRAM, MCC, Vector-Matrix Multiplication, Solution of Linear Equation, Root finding.

UNIT-V:

Graph Algorithms - Connected Graphs, search and traversal, Combinatorial Algorithms- Permutation, Combinations, Derangements.

TEXT BOOK:

1. M.J. Quinn, "Designing Efficient Algorithms for Parallel Computer" by Mc Graw Hill.

REFERENCE BOOKS:

1. Algorithms, K.A.Berman and J.L.Paul, Cengage Learning.
2. Distributed Algorithms, N.A.Lynch, Morgan Kaufmann Publishers, Elsevier.
3. Parallel Algorithms, Henri Casanova, A.Legrand, Y.Robert, Chapman &Hall/CRC, Taylor and Francis Group.
4. Handbook of Parallel Computing, S.Rajasekaran, John Reif, Chapman & Hall/CRC,Taylor and Francis Group.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

ADVANCED DATA MINING

(ELECTIVE-II)

Objectives:

- To develop the abilities of critical analysis to data mining systems and applications.
- To implement practical and theoretical understanding of the technologies for data mining
- To understand the strengths and limitations of various data mining models**;**

UNIT-I

Data mining Overview and Advanced Pattern Mining

Data mining tasks – mining frequent patterns, associations and correlations, classification and regression for predictive analysis, cluster analysis , outlier analysis; advanced pattern mining in multilevel, multidimensional space – mining multilevel associations, mining multidimensional associations, mining quantitative association rules, mining rare patterns and negative patterns.

UNIT-II

Advance Classification

Classification by back propagation, support vector machines, classification using frequent patterns, other classification methods – genetic algorithms, roughest approach, fuzz>set approach;

UNIT-III

Advance Clustering

Density - based methods –DBSCAN, OPTICS, DENCLUE; Grid-Based methods – STING, CLIQUE; Exception – maximization algorithm; clustering High- Dimensional Data; Clustering Graph and Network Data.

UNIT-IV

Web and Text Mining

Introduction, web mining, web content mining, web structure mining, we usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

UNIT-V

Temporal and Spatial Data Mining

Introduction; Temporal Data Mining – Temporal Association Rules, Sequence Mining, GSP algorithm, SPADE, SPIRIT Episode Discovery, Time Series Analysis, Spatial Mining – Spatial Mining Tasks, Spatial Clustering. Data Mining Applications.

TEXT BOOKS:

1. Data Mining Concepts and Techniques, Jiawei Hang Micheline Kamber, Jian pei, Morgan Kaufmannn.
2. Data Mining Techniques – Arun K pujari, Universities Press.

REFERENCE BOOKS:

1. Introduction to Data Mining – Pang-Ning Tan, Vipin kumar, Michael Steinbach, Pearson.
2. Data Mining Principles & Applications – T.V Sveresh Kumar, B.Esware Reddy, Jagadish S Kalimani, Elsevier.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

OBJECT ORIENTED MODELING

(ELECTIVE-II)

Objectives:

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.

- To describe the activities in the different phases of the object-oriented development life cycle.

- State the advantages of object-oriented modeling vis-à-vis structured approaches.

- Compare and contrast the object-oriented model with the E-R and EER models.

- Model a real-world application by using a UML class diagram.

- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.

- Recognize when to use generalization, aggregation, and composition relationships.

- Specify different types of business rules in a class diagram.

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.

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

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

Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, callback mechanism, broadcast messages.

UNIT II

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 III

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 IV

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

Inception phase: early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, requirements to test.

UNIT V

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

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.   The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson 2nd Edition, Pearson Education.

2.   UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado WILEY-Dreamtech India Pvt. Ltd.

3.   The Unified Software Development Process by Ivar Jacobson, Grady Booch, James Rumbaugh, Pearson Education

REFERENCE BOOKS:

1.   Fundamentals of Object Oriented Design in UML By Meilir Page-Jones, Pearson Education

2.   Object Oriented Analysis & Design By Atul Kahate, The McGraw-Hill.

3.   Practical Object-Oriented Design with UML By Mark Priestley, TATA Mc Graw Hill

4.   Object Oriented Analysis & Design By Brett D McLaughlin, Gary Pollice and David West, O'REILY.

5.   Object-Oriented Analysis and Design using UML by Simon Bennet, Steve McRobb and Ray Farmer, 2nd Edition, TATA Mc Graw Hill.

6.   Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.

7.   UML and C++,R.C.Lee, and W.M.Tepfenhart, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (Software Engg.)

WEB TECHNOLOGIES AND SERVICES LAB

Objectives:

- Write syntactically correct HTTP messages and describe the semantics of common HTTP methods and header fields

- Discuss differences between URIs, URNs, and URLs, and demonstrate a detailed understanding of http-scheme URLs, both relative and absolute

- Describe the actions, including those related to the cache, performed by a browser in the process of visiting a Web address

- Install a web server and perform basic administrative procedures, such as tuning communication parameters, denying access to certain domains, and interpreting an access log

- Write a valid standards-conformant HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms

- Use CSS to implement a variety of presentation effects in HTML and XML documents, including explicit positioning of elements

- Demonstrate techniques for improving the accessibility of an HTML document

List of Sample Problems:

i)   Web Technologies

1.   Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com the website should consist the following pages.

Home page, Registration and user Login

User Profile Page, Books catalog

Shopping Cart, Payment By credit card

Order Conformation

2.   Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3.   Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4.   Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using Servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

5.   Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

6.   Implement the "Hello World!" program using JSP Struts Framework.

ii)   Additional Assignment Problems

Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.

Write a java swing application that takes a text file name as input and counts the characters, words and lines in the file. Words are separated with white space characters and lines are separated with new line character.

Write a simple calculator servlet that takes two numbers and an operator (+, -, /, * and %) from an HTML page and returns the result page with the operation performed on the operands. It should check in a database if the same expression is already computed and if so, just return the value from database. Use MySQL or PostgreSQL.

Write an HTML page that contains a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

Write a servlet that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site" message.

Write a calculator program in HTML that performs basic arithmetic operations (+, -, /, * and %). Use CSS to change the foreground and background color of the values, buttons and result display area separately. Validate the input strings using JavaScript regular expressions. Handle any special cases like division with zero reasonably. The screen may look similar to the following:
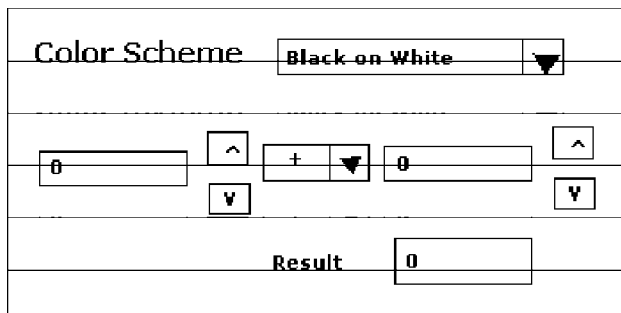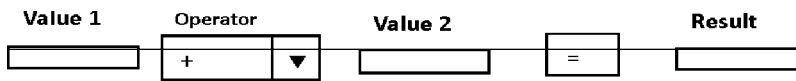
Write a Java program that creates a calculator GUI, as shown in figure. Extra components may be added for convenience:

The Color Scheme may be Black on White or Blue on Yellow (selectable) and accordingly all components colors must be changed. The values can be either entered or increased or decreased by a step of 10. The operators are +, -, / and * (selectable). Once any change takes place, the result must be automatically computed by the program.

Write a Java Application that will read an XML file that contains personal information (Name, Mobile Number, age and place. It reads the information using SAX parser. After reading the information, it shows two input Text Fields in a window, one for tag name and the other for value. Once these two values are given, it should list all the records in the XML file that match the value of the given field in a text area (result box). For example, if the two text boxes are entered with "name" and "ABCD" then it should show all the records for which name is "ABCD"? An Illustration is given below that takes a mobile number and lists all the records that have the same mobile number.

Consider the following web application for implementation:

The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.

If name and password matches, serves a welcome page with user's full name.

If name matches and password doesn't match, then serves "password mismatch" page

If name is not found in the database, serves a registration page, where users full name, present user name (used to login) and password are collected. Implement this application in:

1.   Pure JSP

2.   Pure Servlets

3.   Struts Framework

Implement a simple arithmetic calculator with +, -, /, *, % and = operations using Struts Framework The number of times the calculator is used should be displayed at the bottom (use session variable).

iii)   Web Technologies and Services Lab - Additional Problems

Create a web Service in Java that takes two city names from the user and returns the distance between these two from data available from a table in MySql.

Write a java and a C# client which use the above service

Write a Java program that takes a file as input and encrypts it using DES encryption. The program should check if the file exists and its size is not zero.

Write a Java program that generates a key pair and encrypts a given file using RSA algorithm.

Write a Java program that finds digest value of a given string.

Consider the following xml file for encryption

<?xml version="1.0"> <transaction> <from>12345</from> <to>54321</to> <amount>10000</amount>

<secretcode>abc123</secretcode> <checksum></checksum> </transaction>

Replace <from> and <to> values with the RSA encrypted values represented with base64 encoding assuming that the public key is available in a file in local directory "pubkey.dat". Encrypt <secretcode> with AES algorithm with a password 'secret'. The checksum of all the field values concatenated with a delimiter character '+' will be inserted in the checksum and the xml file is written to encrypted.xml file.

Assume that a file 'config.xml', which has the following information:

<users>

<user> <name>abc</name> <pwd>pwd123</pwd> <role>admin</role> <md5>xxx</md5> </user>

<user> <name>def</name> <pwd>pwd123</pwd> <role>guest</role> <md5>xxx</md5> </user>

</users>

Replace name and role with DES encrypted values and pwd with RSA encrypted values (represent the values with base64 encoding). The public key is available in "public.key" file in current directory. Replace xxx with respective MD5 values of all the fields for each user. Write the resulting file back to config.xml.

Write an HTML page that gives 3 multiple choice (a,b,c and d) questions from a set of 5 preloaded questions randomly. After each question is answered change the color of the question to either green or blue using CSS. Finally on clicking OK button that is provided, the score should be displayed as a pop-up window. Use Java Script for dynamic content.

Write an HTML page that has 3 countries on the left side ("USA", "UK" and "INDIA") and on the right side of each country, there is a pull-down menu that contains the following entries: ("Select Answer", "New Delhi",

"Washington" and "London"). The user will match the Countries with their respective capitals by selecting an item from the menu. The user chooses all the three answers (whether right or wrong). Then colors of the countries should be changed either to green or to red depending on the answer. Use CSS for changing color.

Write an HTML Page that can be used for registering the candidates for an entrance test. The fields are: name, age, qualifying examination (diploma or 10+2), stream in qualifying examination. If qualifying examination is "diploma", the stream can be "Electrical", "Mechanical" or "Civil". If the qualifying examination is 10+2, the stream can be "MPC" or "BPC". Validate the name to accept only characters and spaces.

Write an HTML page that has two selection menus. The first menu contains the states ("AP", "TN" and "KN") and depending on the selection the second menu should show the following items: "Hyderabad", "Vijayawada", "Kurnool" for AP, "Chennai", "Salem", "Madurai" for TN and "Bangalore", "Bellary", "Mysore" for KN.

Write an HTML page that has phone buttons 0 to 9 and a text box that shows the dialed number. If 00 is pressed at the beginning, it should be replaced with a + symbol in the text box. If the number is not a valid international number (+ followed by country code and 10 digit phone number) the color of the display should be red and it should turn to green when the number is valid. Consider only "+91, +1 and +44 as valid country codes. Use CSS for defining colors.

Write an HTML page that has a text box for phone number or Name. If a number is entered in the box the name should be displayed next to the number. If 00 is pressed at the beginning, it should be replaced with a + symbol in the text box. If a name is entered in the text box, it should show the number next to the name. If the corresponding value is not found, show it in red and show it in green otherwise. Use CSS for colors. Store at least 5 names and numbers in the script for testing.

A library consists of 10 titles and each title has a given number of books initially. A student can take or return a book by entering his/her HTNo as user ID and a given password. If there are at least two books, the book is issued and the balance is modified accordingly.

  (a) Use RDBMS and implement it with JSP.

  (b) Use XML File for data and Implement it with JSP

  (c) Use RDBMS and implement it with Servlets

  (d) Use XML File for data and Implement it with Servlets

A Bus Reservation System contains the details of a bus seat plan for 40 seats in 2x2 per row arrangement, where the seats are numbered from 1 to 40 from first row to last row. The customer can visit the website and can reserve a ticket of his choice if available by entering his details (Name, Address, Gender and Age). The customer can cancel the ticket by entering the seat number and his name as entered for reservation.

  (a) Use RDBMS and implement it with JSP.

  (b) Use XML File for data and Implement it with JSP

  (c) Use RDBMS and implement it with Servlets

  (d) Use XML File for data and Implement it with Servlets.

Implement a simple messaging system with the following details:

When a student logs in with his/her HTNO and a given password, they should get all the messages posted to him/her giving the ID of sender and the actual message. Each message may be separated with a ruler. There should be a provision for the user to send a message to any number of users by giving the IDs separated with commas in the "To" text box.

  (a) Use RDBMS and implement it with JSP.

(b) Use XML File for data and Implement it with JSP

(c) Use RDBMS and implement it with Servlets

(d) Use XML File for data and Implement it with Servlets.

There is an image of 600x100 size which can be logically divided into 12 button areas with labels (0-9, +, =). Write a javascript calculator program that uses this image as input virtual keyboard and three text areas for two input numbers and result of sum of these numbers. Add a CSS that can be used to change the colors of text and background of text areas and the page. The input numbers can be up to 4 digits each.

Develop a web application that takes user name and password as input and compares them with those available in an xml user database. If they match, it should display the welcome page that contains the user's full name and last used date and time retrieved from a client cookie. On logout it stores new time to the cookie and displays a goodbye page. If authentication fails, it should store the attempt number to the client cookie and displays an error page. Add necessary CSS that takes care of the font, color of foreground and background.

A web application has the following specifications:

The first page (Login page) should have a login screen where the user gives the login name and password. Both fields must be validated on client side for a minimum length of 4 characters, name should be lower case a-z characters only and password should contain at least one digit. On submitting these values, the server should validate them with a MySQL database and if failed, show the login page along with a message saying "Login Name or Password Mismatch" in Red color below the main heading and above the form. If successful, show a welcome page with the user's full name (taken from database) and and a link to Logout. On logout, a good bye page is displayed with the total time of usage (Logout time – login time). Specify the Schema details of table and web.xml file contents.

Implement it using (a) JSP Pages (b) Servlets   (c) Struts

Design a struts based web portal for an international conference with following specifications:

The welcome page should give the details of the conference and a link to login. If login fails, direct them back for re-login and also provide a link for registration. On successful registration/login, the user will be directed to a page where s/he can see the status (accepted/rejected) of their already submitted papers followed by a form for submitting a doc file to the conference. Provide a logout button on all pages including the home page, once the user logs in. Implement validation framework to check that the user name is in the form of CCDDCC and password is in the form of (CCSDDD) (C for character, S for special character (one of @ , #, $, %, ^, & and !) and D for digit)., Database should be accessed through Connection Pool for MySql for user information. Provide scope for internationalization in future. Assume any missing information and mention it first.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

Objectives:

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

- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.
- To highlight the evolution of patterns.
- To learn how to add functionality to designs while minimizing complexity
- To learn what design patterns really are, and are not
- To know about specific design patterns.
- To learn how to use design patterns to keep code quality high without over design.

UNIT I

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT II

Analyzing Architectures: Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

Moving from one system to many: Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT III

Patterns: Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage.

Creational and Structural patterns: Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight.

UNIT IV

Behavioural patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy. template method, visitor.

UNIT V

Case Studies: A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development,

TEXT BOOKS:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.

2.   Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001

3.   Software Design, David Budgen, second edition, Pearson education, 2003

4.   Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.

5.   Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006

6.   J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.

7.   Design Patterns in C#, Steven John metsker, Pearson education, 2004.

8.   Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

SOFTWARE PROCESS AND PROJECT MANAGEMENT

Objectives:

At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

UNIT I

Software Process Maturity : Software maturity Framework**,** Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

Process Reference Models Capability Maturity Model (CMM)**,** CMMi, PCMM, PSP, TSP.

UNIT II

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT III

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments.

Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT IV

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation.

Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT V

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process, *Watts S. Humphrey*, Pearson Education.
2. Software Project Management, *Walker Royce,* Pearson Education.

REFERENCE BOOKS:

1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000

3. Process Improvement essentials, James R. Persse, O'Reilly, 2006

4. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006

5. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.

6. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007

7. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.

8. The Art of Project Management, Scott Berkun, SPD, O'Reilly, 2011.

9. Applied Software Project Management, Andrew Stellman & Jennifer Greene, SPD, O'Reilly, rp2011.

10. Agile Project Management, Jim Highsmith, Pearson education, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

SOFTWARE QUALITY ASSURANCE AND TESTING

Objectives:

The student should be able to:

- To understand software testing and quality assurance as a fundamental component of software life cycle
- To define the scope of SW T&QA projects
- To efficiently perform T&QA activities using modern software tools
- To estimate cost of a T&QA project and manage budgets
- To prepare test plans and schedules for a T&QA project
- To develop T&QA project staffing requirements
- To effectively manage a T&QA project

UNIT I

Software Quality Assurance and Standards: The Software Quality challenge, What is Software Quality, Software Quality factors, The components of Software Quality Assurance system, Software Quality Metrics, Costs of Software Quality, Quality Management Standards, Management and its role in Software Quality Assurance, SQA unit and other actors in SQA system. - **(Chapters: 1-4, 21-23, 25, 26) of T3**

Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma and other latest quality standards **(Refer Internet and R11, R12, R13).**

UNIT II

Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy

Building Software Testing Process: Software Testing Guidelines, workbench concept, Customizing the Software Testing Process, Process Preparation checklist - **(Chapters: 2,3) of T1**

Software Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing -**(Chapters: 4, 5, 6, 7, 8) of T2**

UNIT III

Software Testing Tools: Selecting and Installing Software Testing tools – **(Chapter 4) of T1.**

Automation and Testing Tools **- (Chapter 15) of T2**

Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus. **(Refer Internet and R9, R10)**

UNIT IV

Testing Process

Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing. **(Chapters 6, 7, 8, 9, 10) of T1**

UNIT V

Seven Step Testing Process – II: Analyzing and Reporting Test results, Acceptance and Operational Testing, Post-Implementation Analysis.

Specialized Testing Responsibilities: Software Development Methodologies, Testing Client/Server Systems **(Chapters 12, 13, 14, 15) of T1.**

TEXT BOOKS:

1. Effective Methods for Software Testing, Third edition, *William E. Perry*, Wiley India, 2009

2. Software Testing – Principles and Practices, *Naresh Chauhan,* Oxford University Press, 2010.

3. Software Quality Assurance – From Theory to Implementation, *Daniel Galin,* Pearson Education, 2009.

REFERENCE BOOKS:

1. Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India, rp2012.

2. Software Testing – Principles, Techniques and Tools, *M.G.Limaye*, Tata McGraw-Hill, 2009.

3. Software Testing - A Craftsman's approach, *Paul C. Jorgensen*, Third edition, Auerbach Publications, 2010.

4. Foundations of Software Testing, *Aditya P. Mathur*, Pearson Education, 2008.

5. Software Testing and Quality Assurance – Theory and Practice, *Kshirasagar Naik, Priyadashi Tripathy*, Wiley India, 2010.

6. Software Testing, *Ron Patton*, Second edition, Pearson Education, 2006.

7. Software Testing and Analysis – Process, Principles and Techniques, *Mauro Pezze, Michal Young,* Wiley India, 2008.

7. Software Testing Techniques, Boris Beizer, Second edition, Wiley India, 2006

8. Foundations of Software Testing, Dorothy Graham, et al., Cengage learning, 2007, rp 2010.

9. Software Testing - Effective Methods, Tools and Techniques, *Renu Rajani, Pradeep Oak*, Tata McGraw-Hill, rp2011.

10. Software Automation Testing Tools for Beginners, *Rahul Shende*, Shroff Publishers and Distributors, 2012.

11. Software Testing Tools, *K.V.K.K. Prasad*, Dream Tech Press, 2008.

12. Software Testing Concepts and Tools, *Nageswara Rao Pusuluri*, Dream Tech press, 2007.

13. Software Quality Assurance, *Milind Limaye*, Tata McGraw-Hill, 2011.

14. Software Quality – Theory and Management, *Alan C. Gillies*, Second edition, Cengage Learning, 2009.

15. Software Quality – A Practitioner's approach, *Kamna Malik, Praveen Choudhary,* Tata McGraw-Hill, 2008.

16. Software Quality Models and Project Management in a Nutshell, *Shailesh Mehta*, Shroff Publishers and Distributors, 2010.

17. Software Quality Engineering – Testing, Quality Assurance and Quantifiable Improvement, *Jeff Tian*, Wiley India, 2006.

18. Software Quality, *Mordechai Ben-Menachem/Garry S. Marliss,* Cengage Learning, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

COMPONENT BASED SOFTWARE ENGINEERING

Objectives:

- To understand the essentials of component-based software engineering
- To know the main characteristics of components and component models
- To be aware of software development processes for component-based systems
- To be aware of the mutual relations between software architecture and component models

UNIT I

Component definition - Definition of a Software Component and its elements, The Component Industry Metaphor, Component Models and Component Services, An example specification for implementing a temperature regulator Software Component.

The Case for Components- The Business Case for components, COTS Myths and Other Lessons Learned in Component-Based Software Development.

UNIT II

Planning Team Roles for CBD, Common High-Risk Mistakes, CBSE Success Factors: Integrating Architecture, Process, and Organization.

Software Engineering Practices - Practices of Software Engineering, From Subroutines to Subsystems: Component-Based Software Development, Status of CBSE in Europe.

UNIT III

The Design of Software Component Infrastructures - Software Components and the UML, Component Infrastructures, Business Components, Components and Connectors, An OPEN process for CBD, Designing Models of Modularity and Integration.

Software Architecture, Software Architecture Design Principles, Product-Line Architectures.

UNIT IV

The Management of Component-Based Software Systems - Measurement and Metrics for Software Components, Implementing a Practical Reuse Program for Software Components, Selecting the Right COTS Software, Building instead of Buying, Software Component Project Management, The Trouble with Testing Components, Configuration Management and Component Libraries, The Evolution, Maintenance, and Management of CBS.

UNIT V

Component Technologies - Overview of the CORBA Component Model, Overview of COM+, Overview of the EJB Component Model, Bonobo and Free Software GNOME Components, Choosing between COM+, EJB, and CCM, Software Agents as Next Generation Software Components.

TEXT BOOK:

1. Component - Based Software Engineering, G.T. Heineman and W.T. Councill, Addison- Wesley, Pearson Education.

REFERENCE BOOKS:

1. Component Software, C.Szyperski, D.Gruntz and S.Murer, Pearson Education.
2. Software Engineering, Roger S. Pressman, 6th edition, Tata McGraw-Hill.
3. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.
4. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, Wiley India edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

SCRIPTING LANGUAGES

(ELECTIVE-III)

Objectives:

- The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

UNIT I

Introduction to PERL and Scripting

Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines, advance perl - finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT II

PHP Basics

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III

Advanced PHP Programming

Php and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World – Translating Websites- Updating Web sites Scripts, Creating the Localization Repository, Translating Files, text, Generate Binary Files, Set the desired language within your scripts, Localizing Dates, Numbers and Times.

UNIT IV

TCL – Tk

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface. Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

UNIT V

Python

Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling, Integrated Web Applications in Python – Building Small, Efficient Python Web Systems ,Web Application Framework.

TEXT BOOKS:

1.   The World of Scripting Languages, David Barron, Wiley Publications.

2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.

3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.

2. Programming Python, M.Lutz, SPD.

3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.

4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.

5. Core Python Programming, Chun, Pearson Education.

6. Guide to Programming with Python, M.Dawson, Cengage Learning.

7. Perl by Example, E.Quigley, Pearson Education.

8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.

10. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).

11. Perl Power, J.P.Flynt, Cengage Learning.

12. PHP Programming solutions, V.Vaswani, TMH.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

INFORMATION RETRIEVAL SYSTEMS

(ELECTIVE III)

Objectives:

On completion of this course you should have gained a good understanding of the foundation concepts of information retrieval techniques and be able to apply these concepts into practice. Specifically, you should be able to:

- To use different information retrieval techniques in various application areas
- To apply IR principles to locate relevant information large collections of data
- To analyse performance of retrieval systems when dealing with unmanaged data sources
- To implement retrieval systems for web search tasks.

UNIT I

Boolean retrieval. The term vocabulary and postings lists. Dictionaries and tolerant retrieval. Index construction. Index compression.

UNIT II

Scoring, term weighting and the vector space model. Computing scores in a complete search system. Evaluation in information retrieval. Relevance feedback and query expansion.

UNIT III

XML retrieval. Probabilistic information retrieval. Language models for information retrieval. Text classification. Vector space classification.

UNIT IV

Support vector machines and machine learning on documents, flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic indexing.

UNIT V

Web search basics, Web crawling and indexes, Link analysis.

TEXT BOOK:

1. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press, 2008.

REFERENCE BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.

2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.

3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.

4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.

5. Information Storage & Retrieval, Robert Korfhage , John Wiley & Sons.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

SEMANTIC WEB AND SOCIAL NETWORKS

(ELECTIVE-III)

Objectives:

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

Unit –I:

Web Intelligence

Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Unit -II:

Knowledge Representation for the Semantic Web

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML,XML/XML Schema.

Unit-III:

Ontology Engineering

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

Unit-IV:

Semantic Web Applications, Services and Technology

Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

Unit-V:.

Social Network Analysis and semantic web

What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience,2008.
2. Social Networks and the Semantic Web, Peter Mika,Springer,2007.

REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies, R.Studer, P.Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web,T.Segaran,C.Evans,J.Taylor,O'Reilly,SPD.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

CLOUD COMPUTING

(ELECTIVE-IV)

Objectives:

Prerequisite: Computer Networks and Operating Systems

Course Description:

Cloud computing has evolved as a very important computing model, which enables information, software, and shared resources to be provisioned over the network as services in an on-demand manner. This course provides an insight into what is cloud computing and the various services cloud is capable.

UNIT I

Systems Modeling, Clustering and Virtualization

Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

UNIT II

Foundations

Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS)

Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems, Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT IV

Monitoring, Management and Applications

An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT V

Governance and Case Studies

Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS:

1.   Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.

2.   Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

1.   Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata

McGraw Hill, rp2011.

2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.

3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.

4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.

5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

ADVANCED DATABASES

(ELECTIVE-IV)

Objectives:

By the end of the course, you will know:

- History and Structure of databases

- How to design a database

- How to convert the design into the appropriate tables

- Handling Keys appropriately

- Enforcing Integrity Constraints to keep the database consistent

- Normalizing the tables to eliminate redundancies

- Querying relational data

- and processing the queries

- Storage Optimizing Strategies for easy retrieval of data through index

- Triggers, Procedures and Cursors ,Transaction Management

- Distributed databases management system concepts and Implementation

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL,DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER diagrams,. Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers

UNIT II

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT III

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL.

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

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT IV

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM)

B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable Vs Linear Hashing.

UNIT V

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery

TEXT BOOKS:

1.   Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.

2.   Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.

3.   Fundamentals of Database Systems 5th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:

1.   Introduction to Database Systems, C.J.Date, Pearson Education.

2.   Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.

3.   Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.

4.   Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.

5.   Database-Principles, Programming, and Performance, P.O'Neil & E.O'Neil, 2nd ed, ELSEVIER

6.   Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.

7.   Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.

8.   Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.

9.   Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.

10.   Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez, Pearson Education, 2nd Edition.

11.   Distributed Database Systems, Chhanda Ray, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

BUSINESS PROCESS MANAGEMENT

(ELECTIVE-IV)

Objectives:

- To recognize the role of business processes within an Infinity based application
- To understand the importance of parameter sets to a business process
- To learn common patterns and best practices for formatting and restricting the output from a business process
- To understand the difference between a business process and a business process instance
- To learn how data processing occurs within a business process
- To list the Infinity SDK software developer responsibilities for building and supporting the functionality required for a business process
- To describe the database tables used by Blackbaud Enterprise CRM to manage business processes
- To describe how a QueryViewSpec can be used to define the output format for a business process
- To describe how a selection can be used to limit the rows processed by a business process

UNIT I

UNDERSTANDING BPM - I:

How can we demystify business process management?

What is business process management?

Why is it important to improve business process before automating them?

When should you do BPM – what are the main drivers and triggers?

Who should be involved in BPM?

UNIT II

UNDERSTANDING BPM - II:

Why are organizational strategy and process architecture important in BPM implementation?

How do you sell BPM technology to the organization?

What are the critical success factors in a BPM project?

What are the critical implementation aspects for a BPM solution?

UNIT III

FRAMEWORK - I:

Framework overview, Guidelines on how to use the framework, Organization strategy phase, Process architecture phase, Launch pad phase, Understand phase, Innovate phase.

UNIT IV

FRAMEWORK – II:

People phase, Develop phase, Implement phase, Realize value phase, Sustainable performance phase, Essentials introduction, Project management, People change management, Leadership.

UNIT V

BPM AND THE ORGANIZATION:

BPM maturity, Embedding BPM within the organization.

TEXT BOOKS:

1. Business Process Management, Practical guidelines to successful implementations, John Jeston and Johan Nelis, Second edition, Elsevier, 2009.

2. Management by Process, A roadmap to sustainable Business Process Management, John Jeston and Johan Nelis, Elsevier, 2009.

REFERENCE BOOK:

1. Business Process Management Systems, Strategy and Implementation, James F. Chang, Auerbach Publications, Taylor and Francis group, 2005.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (Software Engg.)

SOFTWARE TESTING LAB

Objectives:

The student should be able to:

- To understand software testing and quality assurance as a fundamental component of software life cycle
- To define the scope of SW T&QA projects
- To efficiently perform T&QA activities using modern software tools
- To estimate cost of a T&QA project and manage budgets
- To prepare test plans and schedules for a T&QA project
- To develop T&QA project staffing requirements
- To effectively manage a T&QA project

Software Testing Objectives:

To learn to use the following (or Similar) automated testing tools to automate testing:

a. Win Runner/QTP for functional testing.

b. LoadRunner for Load/Stress testing.

c. Test Director for test management.

d. JUnit,HTMLUnit,CPPUnit.

Sample problems on testing:

1. Write programs in 'C' Language to demonstrate the working of the following constructs:

    i) do...while ii) while….do iii) if…else iv) switch v) for

2. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.

4. Write the test cases for any known application (e.g. Banking application)

5. Create a test plan document for any application (e.g. Library Management System)

6. Study of any testing tool (e.g. Win runner)

7. Study of any web testing tool (e.g. Selenium)

8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)

9. Study of any test management tool (e.g. Test Director)

10. Study of any open source-testing tool (e.g. Test Link)

11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

Additional problems on testing:

1. Test the following using JUnit and CPPUnit:

    i) Sorting problems   ii) Searching problems

    iii) Finding gcd of two integers   iv) Finding factorial of a number.

2.   Test web based forms using HTMLUnit.

3.   Test database stored procedures using SQLUnit.

    (Use sufficient number of test cases in solving above Problems)

*Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry"

REFERENCE BOOKS:

1.   Software Testing Concepts and Tools, P.Nageswara Rao, Dream Tech Press, 2007.

2.   Software Testing Tools, *K.V.K.K. Prasad*, Dream Tech Press, 2008.

3.   Software Testing with Visual Studio Team System 2008, S.Subashini,   N.Satheesh kumar, Shroff Publishers Distributors.

4.   Software Automation Testing Tools for Beginners, *Rahul Shende*, Shroff Publishers and Distributors, 2012.