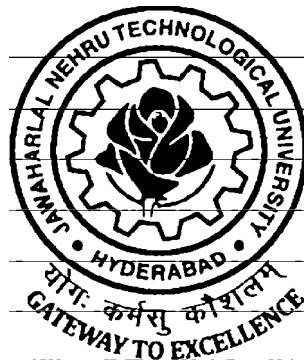# ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

M.TECH
INFORMATION TECHNOLOGY

(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 - INFORMATION TECHNOLOGY

COURSE STRUCTURE AND SYLLABUS

I Year I Semester

Code	Group	Subject	L	P	Credits
		Advanced Data Structures and Algorithms	3	-	3
		Database Engineering	3	-	3
		Information Retrieval Systems	3	-	3
		Advanced Computer Networks	3	-	3
	Elective -I	Machine Learning Software Architecture and Design Patterns Parallel and Distributed Algorithms	3	-	3
	Elective -II	Bio-Metrics Business Intelligence & Big Data Soft Computing	3	-	3
	Lab	Advanced Data Structures and Algorithms Lab	-	3	2
		Seminar	-	-	2
		Total Credits	18	3	22

I Year II Semester

Code	Group	Subject	L	P	Credits
		Information Security and Audit	3	-	3
		Web Services and Service Oriented Architecture	3	-	3
		Cloud Computing	3	-	3
		Mobile Application Development	3	-	3
	Elective -III	Embedded Systems Machine Learning Semantic Web and Social Networks	3	-	3
	Elective -IV	Mobile Commerce Software Testing & Quality Assurance Bio-Informatics	3	-	3
	Lab	Web Services 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	-	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. (IT)

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. (IT)

DATABASE ENGINEERING

Objectives:

To implementation of relational database management systems.

- To design, implementation, and testing of one or more database systems components, and integration of those components into the existing code-base.

UNIT- I

Relational Model

Constraints, update operations, transactions, and dealing with constraint violations, Relational database design algorithms, MVDs and 4NF, JD and 5NF, inclusion dependencies, other dependencies and normal forms.

UNIT- II

Query Processing & Optimization

Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions.

Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans, Materialized Views, Advanced Topics in Query Optimization.

UNIT- III

Object & Object-Relational Databases

Concepts of Object databases, Object database standards, languages and design, Object-relational and Extended-Relational Systems.

UNIT – IV

Security, Advanced Modeling

Database Security
Enhanced data models for advanced applications – active databases, temporal databases, spatial and multimedia databases, deductive databases.

UNIT- V

Advanced Transaction Processing - Transaction-Processing Monitors, Transactional Workflows, E-Commerce, Main-Memory Databases, Real-Time Transaction Systems, Long-Duration Transactions.

Case studies: PostgreSQL, IBM DB2, Oracle, Microsoft SQL server.

TEXT BOOKS:

1. Fundamentals of Database Systems, Elmasri Navrate Pearson Education, V edition.
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, VI edition.

REFERENCE BOOKS:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Introduction to Database Systems, C.J.Date Pearson Education.
3. Oracle for Professionals, The X Team, S.Shah and V.Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
5. Fundamentals of Database Management Systems, M.L.Gillenson, Wiley Student Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

INFORMATION RETRIEVAL SYSTEMS

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 analyze performance of retrieval systems when dealing with unmanaged data sources.
- To implement retrieval systems for web search tasks.

UNIT I

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

UNIT II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure - **Automatic Indexing:** Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

UNIT III

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters - **User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext - **Information Visualization**: Introduction, Cognition and perception, Information visualization technologies.

UNIT IV

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems. **Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT V

Multimedia Information Retrieval – Models and Languages – Data Modeling, Query Languages, Indexing and Searching - **Libraries and Bibliographical Systems –** Online IR Systems, OPACs, Digital Libraries.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

ADVANCED COMPUTER NETWORKS

Objectives:

- The objective of this course is to build a solid foundation in computer networks concepts and design

- To understand computer network architectures, protocols, and interfaces.

- The OSI reference model and the Internet architecture. Network applications.

- The course will expose students to the concepts of traditional as well as modern day computer networks - wireless and mobile, multimedia-based.

- Students completing this course will understand the key concepts and practices employed in modern computer networking.

Prerequisite: *Computer Networks*

Course description: This course will enable the student to refresh the fundamentals of Computer Networks in Unit I. Unit II describes the architecture, components, and operation of routers, and explains the principles of Routing and Routing protocols. Especially the Routing protocols need to be understood thoroughly with the help of any freely downloadable simulator tool. Through Unit III a student can learn the technologies and protocols needed to design and implement a converged switched network. This section explains how to configure a switch for basic functionality and how to implement Virtual LANs, VTP, and Inter-VLAN routing in a converged network. Students need to develop the necessary skills to implement a WLAN in a small-to-medium network. This course in Unit IV discusses the WAN technologies and network services required by converged applications in enterprise networks. Unit V makes the student to implement networking using Java programs.

Suggested Simulator tools: NS-2/*NS-3, OPNET, Packet Tracer, Boson, Wireshark.*

UNIT I: Review

Computer Networks and the Internet: History of Computer Networking and the Internet, Networking Devices, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones.

Networking Models: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM.

UNIT II: Network Routing

Routing and its concepts: Structure of a Router, Basic Router Configuration, Building a Routing Table, Static Routing, Dynamic Routing – Distance Vector Routing Protocol (RIPv1, RIPv2, EIGRP), Link State Routing Protocols (OSPF).

UNIT III: LAN Switching

Switching and its concepts: Structure of a Switch, Basic Switch Configuration, Virtual LANs (VLANs), VLAN Trunking Protocol (VTP), Spanning Tree Protocol (STP), Inter-VLAN Routing.

UNIT IV: Wide Area Networks (WANs)

Introduction to WANs, Point-to-Point Protocol (PPP) concepts, Frame Relay concepts, Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), IPv6.

UNIT V: Network Programming using Java

TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI) - Basic RMI

Process, Implementation details - Client-Server Application.

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W.Ross*, Fifth Edition, Pearson Education, 2012.

2. Network Fundamentals, Mark Dye, Pearson Education.

3. Routing Protocols & Concepts, Rick Graziani, Pearson Education.

4. LAN Switching & Wireless, Wayne Lewis, Pearson Education.

5. Accessing the WAN, Bob Vachon, Pearson Education.

6. An Introduction to Network Programming with Java, Jan Graba, Springer,rp 2010.

REFERENCE BOOKS:

1. Computer Networks: A Systems approach, *Larry L. Peterson & Bruce S. Davie,* Fifth edition, Elsevier, rp2012.

2. Computer Networks: A Top-Down Approach, *Behrouz A. Forouzan, Firoz Mosharaf*, Tata McGraw Hill, 2012.

3. Java Network Programming,3rd edition, *E.R. Harold*, SPD, O'Reilly.(Unit V).

4. An Engineering Approach to Computer Networking*, S.Keshav,* Pearson Education, 1997.

5. Computer Networks: Principles,Technologies And Protocols For Network Design, *Natalia Olifer, Victor Olifer*, Wiley India, 2006.

6. Computer Networks, *Andrew S. Tanenbaum*, Fifth Edition, Prentice Hall.

7. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007.

8. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill, 2007.

9. Computer Networks, *Bhushan Trivedi,* Oxford University Press, 2011.

10. Fundamentals of Business Data Communications, *Jerry FitzGerald and Alan Dennis*, Tenth Edition, Wiley, 2009.

11. Internetworking with TCP/IP: Principles, Protocols and Architecture, Volume 1, *Douglas E. Comer,* 4th edition, PHI, 2005.

12. Next-Generation Internet: Architectures and Protocols, Byrav Ramamurthy et al, Cambridge, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

MACHINE LEARNING
(ELECTIVE-I)

Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT I

INTRODUCTION - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning.

Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

UNIT II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition.

Advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm.

Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - **Instance-Based Learning**- Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

Genetic Algorithms – Motivation, Genetic Algorithms, An Illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms.

UNIT IV

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction,

Inverting Resolution.

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

UNIT V

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators.

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH.

2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC).

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.

2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc.,2001.

3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
(ELECTIVE-I)

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 overdesign.

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.

UNIT III

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

UNIT IV

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, Proxy.

UNIT V

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

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, 1995.

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 – I Sem. (IT)

PARALLEL AND DISTRIBUTED ALGORITHMS

(ELECTIVE-I)

Objectives:

- To learn parallel and distributed algorithms development techniques for shared memory and message passing models.
- To study the main classes of parallel algorithms.
- To study the complexity and correctness models for parallel algorithms.

UNIT-I

Basic Techniques, Parallel Computers for increase Computation speed, Parallel & Cluster Computing.

UNIT-II

Message Passing Technique- Evaluating Parallel programs and debugging, Portioning and Divide and Conquer strategies examples.

UNIT-III

Pipelining- Techniques computing platform, pipeline programs examples.

UNIT-IV

Synchronous Computations, load balancing, distributed termination examples, programming with shared memory, shared memory multiprocessor constructs for specifying parallelist sharing data parallel programming languages and constructs, open MP.

UNIT-V

Distributed shared memory systems and programming achieving constant memory distributed shared memory programming primitives, algorithms – sorting and numerical algorithms.

TEXT BOOK:

1. Parallel Programming, Barry Wilkinson, Michael Allen, Pearson Education, 2nd Edition.

REFERENCE BOOK:

1. Introduction to Parallel algorithms by Jaja from Pearson, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

BIO-METRICS
(ELECTIVE-II)

Objectives:

- To learn the actual biometric technologies (fingerprint, retina, iris, DNA etc.) and their application in the IT and in the security systems.
- To learn methods for evaluation of the reliability and quality of the biometric systems.

UNIT I

Introduction – Benefits of biometric security – Verification and identification – Basic working of biometric matching – Accuracy – False match rate – False non-match rate – Failure to enroll rate – Derived metrics – Layered biometric solutions.

UNIT II

Finger scan – Features – Components – Operation (Steps)– Competing finger Scan technologies – Strength and weakness. Types of algorithms used for interpretation, Facial Scan - Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness.

UNIT III

Iris Scan - Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness.

Voice Scan - Features – Components – Operation (Steps) – Competing voice Scan (facial) technologies – Strength and weakness.

UNIT IV

Other physiological biometrics – Hand scan – Retina scan– AFIS (Automatic Finger Print Identification Systems) – Behavioral Biometrics – Signature scan- keystroke scan.

UNIT V

Biometrics Application – Biometric Solution Matrix – Bio privacy – Comparison of privacy factor in different biometrics technologies – Designing privacy sympathetic biometric systems. Biometric standards – (BioAPI, BAPI) – Biometric middleware, Biometrics for Network Security, Statistical measures of Biometrics, Biometric transactions.

TEXT BOOKS:

1. Biometrics – Identity Verification in a Networked World – Samir Nanavati, Michael Thieme, Raj Nanavati, WILEY- Dream Tech.
2. Biometrics for Network Security- Paul Reid, Pearson Education.

REFERENCE BOOK:

1. Biometrics- The Ultimate Reference- John D. Woodward, Jr. Wiley Dreamtech.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

BUSINESS INTELLIGENCE AND BIG DATA

(ELECTIVE-II)

Objectives:

- To understand and explain some of the uses of big data and business intelligence in accounting, auditing and business.
- To learn about some cases those are useful for studying big data, business intelligence.
- To learn about some research issues in big data, business intelligence as they relate to accounting, auditing or business.

UNIT-I

Data Science – Introduction, working with data at scale, data scientist, the SMAQ stack for big data, scraping, cleaning & selling big data.

Data Hand Tools- free data tools for journalists.

Data Issues- Introduction, anonymization, risk of de-anonymization, Big data & semantic web, meta data.

UNIT-II

Applications of Data: - Product & Process – Twitter archive, data journalism & data tools, newsroom stack, bridging the data divide, data analysis path, Big data in education & academic disciplines, Discussion of Facebook.

UNIT-III

BI foundations - Understanding BI, Describing BI, Defining BI cycle, Enabling BI, Bridging the Analysis Gap- Multidimensional analysis, Operation Systems, BI Systems.

UNIT-IV

Defining BI Technologies- The High-level view, Reporting & Analysis, the data warehouse and Data warehousing Framework, Identifying BI opportunities.

UNIT-V

Implementing a BI solution- implementation strategy, Fundamental decisions, Case studies- Audi AG, The Frank Russell Company.

TEXT BOOKS:

1. Elizabeth Vitt, Michael Luckevich, StaciaMisner, "Business Intelligence", Microsoft Press, 2010.
2. Big Data Now, O'Reily Radar Team.

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez, "Business Intelligence-Practices, Technologies and Management", John Wiley 2011.
2. Larissa T. Moss, ShakuAtre, "Business Intelligence Roadmap", Addison –Wesley IT Series.
3. Yuli Vasiliev, "Oracle Business Intelligence: The Condensed Guide to Analysis and Reporting", SPD Shroff , 2012.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

SOFT COMPUTING
(ELECTIVE-II)

Objectives:

To give students knowledge of soft computing theories fundamentals, i.e. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

UNIT-I

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

UNIT-II

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network. Associative Memory Networks. Traing Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-III

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

UNIT-IV

Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT-V

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making

Fuzzy Logic Control Systems, Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique.

TEXT BOOKS:

1.   Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007.

2.   Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva,. Pearson Edition, 2004.

REFERENCE BOOKS:

1.   Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modeling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.

2.   Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.

3.   Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.

4.   A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – I Sem. (IT)

ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

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.

Sample Problems on Data structures:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:

   a) Linear search   b) Binary search

2. Write Java programs to implement the following using arrays and linked lists

   a) List ADT

3. Write Java programs to implement the following using an array.

   a) Stack ADT   b) Queue ADT

4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).

5. Write a Java program to implement circular queue ADT using an array.

6. Write a Java program that uses both a stack and a queue to test whether the given string is a palindrome or not.

7. Write Java programs to implement the following using a singly linked list.

   a) Stack ADT   b) Queue ADT

8. Write Java programs to implement the deque (double ended queue) ADT using

   a) Array   b) Singly linked list   c) Doubly linked list.

9. Write a Java program to implement priority queue ADT.

10. Write a Java program to perform the following operations:

    a) Construct a binary search tree of elements.

    b) Search for a key element in the above binary search tree.

    c) Delete an element from the above binary search tree.

11. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.

12. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.

13. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in

    a) Preorder   b) Inorder and   c) Postorder.

14. Write Java programs for the implementation of bfs and dfs for a given graph.

15. Write Java programs for implementing the following sorting methods:

    a) Bubble sort   d) Merge sort   g) Binary tree sort

    b) Insertion sort   e) Heap sort

    c) Quick sort   f) Radix sort

16. Write a Java program to perform the following operations:

    a) Insertion into a B-tree   b) Searching in a B-tree

17. Write a Java program that implements Kruskal's algorithm to generate minimum cost spanning tree.

18. Write a Java program that implements KMP algorithm for pattern matching.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.

2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.

3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.

4. Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning.

5. Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities Press.

6. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education.

7. Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill.

8. Java: the complete reference, 7th editon, Herbert Schildt, TMH.

9. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education / Java: How to Program P.J.Deitel and H.M.Deitel , 8th edition, PHI.

10. Java Programming, D.S.Malik,Cengage Learning.

11. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman, Chapman & Hall/CRC, Taylor & Francis Group.

    (Note: Use packages like java.io, java.util, etc)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

INFORMATION SECURITY AND AUDIT

Learning Objective:

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 – II Sem. (IT)

WEB SERVICES AND SERVICE ORIENTED ARCHITECTURE

Objectives:

- To Understand Web Services and implementation model for SOA.

- To Understand the SOA, its Principles and Benefits.

- To Understand XML concepts.

- To Understand paradigms needed for testing Web Services.

- To explore different Test Strategies for SOA-based applications.

- To implement functional testing, compliance testing and load testing of Web Services.

- To Identify bug-finding ideas in testing Web Services.

UNIT I

Evolution and Emergence of Web Services – Evolution of distributed computing. Core distributed computing technologies – client/server, CORBA, JAVA RMI, Micro Soft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA). Introduction to Web Services – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT II

Web Service Architecture – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services. Describing Web Services – WSDL introduction, non functional service description, WSDL1.1 Vs WSDL 2.0, WSDL document, WSDL elements, WSDL binding, WSDL tools, WSDL port type, limitations of WSDL.

UNIT III

Brief Over View of XML – XML Document structure, XML namespaces, Defining structure in XML documents, Reuse of XML schemes, Document navigation and transformation. SOAP : Simple Object Access Protocol, Inter-application communication and wire protocols, SOAP as a messaging protocol, Structure of a SOAP message, SOAP envelope, Encoding, Service Oriented Architectures, SOA revisited, Service roles in a SOA, Reliable messaging, The enterprise Service Bus, SOA Development Lifecycle, SOAP HTTP binding, SOAP communication model, Error handling in SOAP.

UNIT IV

Registering and Discovering Services : The role of service registries, Service discovery, Universal Description, Discovery, and Integration, UDDI Architecture, UDDI Data Model, Interfaces, UDDI Implementation, UDDI with WSDL, UDDI specification, Service Addressing and Notification, Referencing and addressing Web Services, Web Services Notification.

UNIT V

SOA and web services security considerations, Network-level security mechanisms, Application-level security topologies, XML security standards, Semantics and Web Services, The semantic interoperability problem, The role of metadata, Service metadata, Overview of .NET and J2EE, SOA and Web Service Management, Managing Distributed System, Enterprise management Framework, Standard distributed management frameworks, Web service management, Richer schema languages, WS-Metadata Exchange.

TEXT BOOKS:

1. Web Services & SOA Principles and Technology, Second Edition, Michael P. Papazoglou.

2. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

3. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education.

REFERENCE BOOKS:

1. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

2. Building web Services with Java, 2nd Edition, S. Graham and others, Pearson Education.

3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.

4. McGovern, et al., "Java web Services Architecture", Morgan Kaufmann Publishers, 2005.

5. J2EE Wer Services, Richard Monson-Haefel, Pearson Education.

M. Tech – I Year – II Sem. (IT)

CLOUD COMPUTING

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. (IT)

MOBILE APPLICATION DEVELOPMENT

Objectives:

- To understand how the characteristics of mobile devices and applications affect decisions about software design.
- To be able to select and use appropriate technologies, standards, APIs and toolkits to build mobile applications.
- To design and development of mobile applications using up-to-date software development tools and APIs.

UNIT-I

J2ME Overview: Inside J2ME, J2ME and Wireless Devices.

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

UNIT-II

J2ME Architecture and Development Environment: J2ME Architecture, Small Computing Device requirement, Run Time Environment, Midlet Programming, Java Language for J2ME, J2ME Software Development Kits, examples, multiple MIDlets in a MIDlet suite, J2ME Wireless Toolkit.

UNIT-III

Commands Items and Event Processing: J2ME User Interfaces, Display Class, the Palm OS Emulator, Command Class, Item Class, Exception Handling.

UNIT-IV

High- Level Display: Screens: Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.

Low Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation.

UNIT-V

Android

Introduction: Background, Android, An Open Platform for Mobile Development, Native Android applications, Android SDK features, Development Framework.

Developing for Android: Developing for Mobile and Embedded device Android Development Tools.

Creating Applications and Activities: Application Manifest File, Android Application Lifecycle, Android Application Class, Android Activities.

TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata Mc Graw Hill.
2. Professional Android™ 4 Application Development, Reto Meier, John Wiley.

REFERENCE BOOKS:

1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao Yuan, Pearson Education, 2004.
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009.
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005.
4. Kicking Butt with MIDP and MSA:Creating Great Mobile Applications,1st edition, J.Knudsen, Pearson.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

EMBEDDED SYSTEMS

(ELECTIVE-III)

Objectives:

- To explain various embedded system applications and design requirements.
- To construct embedded system hardware.
- To develop software programs to control embedded system.
- To generate product specification for embedded system.

UNIT I

Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices in a System, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems.

UNIT II

8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/ output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization - **Devices and Communication Buses for Devices Network:** Serial and parallel Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols.

UNIT III

Embedded Programming Concepts: Software programming in Assembly language and High Level Language, Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ & JAVA.

UNIT IV

Real – Time Operating Systems: OS Services, Process and Memory Management, Real – Time Operating Systems, Basic Design Using an RTOS, Task Scheduling Models, Interrupt Latency, Response of Task as Performance Metrics - **RTOS Programming:** Basic functions and Types of RTOSES, RTOS VxWorks, Windows CE.

UNIT V

Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co-Design - **Testing, Simulation and Debugging Techniques and Tools:** Testing on Host Machine, Simulators, Laboratory Tools.

TEXT BOOK:

1. Embedded Systems, Raj Kamal, Second Edition TMH.

REFERENCE BOOKS:

1. Embedded/Real-Time Systems, Dr.K.V.K.K.Prasad, dreamTech press.
2. The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Pearson.
3. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. Micro Controllers, Ajay V Deshmukhi, TMH.
6. Microcontrollers, Raj kamal, Pearson Education.
7. Introduction to Embedded Systems,Shibu K.V,TMH.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

MACHINE LEARNING
(ELECTIVE-III)

Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT I

INTRODUCTION - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning.

Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

UNIT II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition.

Advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm.

Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - **Instance-Based Learning**- Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

Genetic Algorithms – Motivation, Genetic Algorithms, An Illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms.

UNIT IV

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary,

Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

UNIT V

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators.

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming.

TEXT BOOKS:

1.   Machine Learning – Tom M. Mitchell, - MGH.

2.   Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC).

REFERENCES BOOKS:

1**.**   Cover, T. M. and J. A. Thomas: Elements of Information Theory. Wiley.

2.   Charniak, E.: Statistical Language Learning. The MIT Press.

3.   Jelinek, F.: Statistical Methods for Speech Recognition. The MIT Press.

4.   Lutz and Ascher - "Learning Python", O'Reilly.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

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 inter science, 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. (IT)

MOBILE COMMERCE

(ELECTIVE-IV)

Objectives:

- To discuss the characteristics and attributes of m-commerce.
- To describe the drivers of m-commerce.
- To understand the technologies that support m-commerce.
- To discuss m-commerce applications in finance, advertising, and provision of content.
- To describe the applications of m-commerce within organizations.
- To understand B2B and supply chain applications of m-commerce.
- To describe consumer and personal applications of m-commerce.

UNIT I:

Electronic Commerce: Traditional commerce and E-commerce – Internet and WWW – Role of WWW – Value Chains – Strategic Business And Industry Value Chains – Role of E-commerce. Packet Switched Networks – TCP/IP Protocol Script – Internet Utility Programmes – SGML, HTML And XML – Web Client And Servers – Web Client/Server Architecture – Intranet And Extranets – Web Based Tools For E-commerce – Security.

UNIT II:

Mobile Commerce: Introduction – Infrastructure of M–Commerce – Types Of Mobile Commerce Services – Technologies Of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications In M–Commerce – Wireless/Wired Commerce Comparisons.

UNIT III:

Mobile Commerce: Technology: A Framework For The Study Of Mobile Commerce – NTT Docomo's I-Mode – Wireless Devices For Mobile Commerce – Towards A Classification Framework For Mobile Location Based Services – Wireless Personal And Local Area Networks –The Impact Of Technology Advances On Strategy Formulation In Mobile Communications Networks.

UNIT IV:

Mobile Commerce: Theory and Applications: The Ecology Of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption of Mobile Gaming Services – Mobile Data Technologies And Small Business Adoption And Diffusion – E–commerce in The Automotive Industry – Location– Based Services: Criteria For Adoption And Solution Deployment – The Role of Mobile Advertising In Building A Brand – M–commerce Business Models.

UNIT V:

Business-to-Business Mobile E– Commerce: Enterprise Enablement – Email and Messaging – Field Force Automation (Insurance, Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking and Maintenance/Management – Remote IT Support – Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security.

TEXT BOOKS:

1. E.Brian Mennecke, J.Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.
2. Ravi Kalakota, B.Andrew Whinston, "Frontiers of Electronic Commerce", Pearson Education, 2003.

REFERENCE BOOKS:

1. P. J. Louis, "M-Commerce Crash Course", McGraw- Hill Companies February 2001.
2. Paul May, "Mobile Commerce: Opportunities, Applications and Technologies Of Wireless Business" Cambridge University Press March, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

SOFTWARE TESTING & QUALITY ASSURANCE

(ELECTIVE-IV)

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

UNIT II

Software Quality Assurance Metrics and Measurement Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs – **Software Quality metrics methodology:** Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics – **Software quality indicators** – **Fundamentals in Measurement theory.**

UNIT III

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

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

UNIT IV

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

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

UNIT V

Testing Process

Eleven Step Testing Process: Assess Project Management Development Estimate and Status, Develop

Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes, Evaluate Test Effectiveness.

Testing Specialized Systems and Applications: Testing Client/Server – Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse.

TEXT BOOKS:

1**.**   Effective Methods for Software Testing, 2nd Edition, William E. Perry , Second Edition, Wiley India, 2006.

2.   Software Quality, Mordechai Ben-Menachem/Garry S. Marliss,Thomson Learning publication,1997.

REFERENCE BOOKS:

1.   Software Testing Tools, K.V.K.K. Prasad, Dream tech press, 2008.

2.   Practical Software Testing, Ilene Burnstein, Springer, 2003.

3.   Software Testing, Srinivasan Desikan & Gopalaswamy Ramesh, Pearson Education,2006.

4.   Software testing techniques, Scott Loveland & Geoffrey Miller, Shroff Publishers, 2005.

5.   Software testing, Ron Patton, second edition, Pearson Education, 2004.

6.   Software Quality, Martin Wieczorek & Dirk Meyerhoff, Springer, 2001.

7.   Software Testing: A Craftsman's approach, Paul C. Jorgensen, Second edition, CRC press, 2002.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

BIO-INFORMATICS

(ELECTIVE-IV)

Learning Objective:

The objective of the program in Bioinformatics is to prepare students for careers in academia and industry, and in particular to deepen their knowledge in both the biosciences and computational sciences to apply this knowledge to manage and analyze data in the life sciences and to train them in research.

UNIT I

Introduction:- Definition – Overview- Major databases in Bio Informatics- Molecular biology – Central Dogma-Data retrieval tools – Data mining of Databases – Gene Analysis – Prokaryotic and Eukaryotic Genomes – Sequence Assembly – Gene mapping – Physical maps – cloning – ORF – amino acids – DNA, RNA sequences – Genetic code.

UNIT II

DNA and Protein Sequences:-DNA: working with single DNA sequence : removing vector sequences-verifying restriction maps – PCR design – GC content – counting words – internal repeats – protein coding regions – ORFing – Genomescan Protein: predicting properties – primary structure analysis – transmembrane segments – PROSITE patterns –interpreting scanprosite results- finding domains – CD server results – pfscan results.

UNIT III

Alignment of Pair of Sequences:- Terminology – Global and Local alignment – Dot matrix – dynamic programming – using scoring matrices –PAM matrices – BLOSUM.Working with FASTA – Algorithm – output – E-values – Histogram. Working with BLAST – algorithm – output – services – gapped BLAST-PSIBLAST – comparison of FASTA and BLAST.

UNIT IV

Multiple Sequence Alignment:- Criteria for Multiple sequence alignment – applications – choosing the right sequences; FASTA, ClustalW, TCoffee methods – interpreting multiple sequence alignment – getting in right format – converting formats –using Jalview – preparing for publication.

UNIT V

Protein Classification & Structure Prediction:- Structure of amino acids – primary structure – secondary structure – folds and motifs – alpha and beta helix –structure based protein classification – protein structure Data bases – folding problem – PROPSEARCH –primary structure analysis and prediction – secondary structure analysis and prediction – motifs – profiles –patterns and fingerprints.

TEXT BOOKS:

1.   S.C Rostogi , Mendiratta, P.Rasogi, " *BioInformatics: methods and applications*",second edition, PHI 2006.

2.   Jean Mickel Clavere & Cadrienotredom "*Bio Informatics– A beginners guide*" Wiley DreamTech, 2003.

REFERENCE BOOKS

1.   T.K. Attwood and D.J Perry Smith, *" Introduction to Bio Informatics*", Pearson Education, 1st Edition, 2001.

2.   Dan E.Krane, Michael L.Raymer, "*fundamental concepts of BioInformatics* ", Pearson Education, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech – I Year – II Sem. (IT)

WEB SERVICES LAB

Objectives:

- To implement the technologies like WSDL, UDDI.
- To learn how to implement and deploy web service client and server.

List of Programs:

1. Write a program to implement WSDL Service (Hello Service. WSDL File).
2. Write a program the service provider can be implement a single get price (), static bind () and get product operation.
3. Write a program to implement the operation can receive request and will return a response in two ways.

   a) One-Way operation

   b) Request - Response
4. Write a program to implement to create a simple web service that converts the temperature from Fahrenheit to Celsius (using HTTP Post Protocol).
5. Write a program to implement business UDDI Registry entry.
6. Write a program to implement

   a) Web based service consumer

   b) Windows application based web service consumer.