ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS

M.TECH COMPUTER SCIENCE AND ENGINEERING

(Applicable for the batches admitted from 2015 -16)



VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS) Bollikunta, Warangal – 506 005. T.S.

VAAGDEVI COLLEGE OF ENGINEERING (AUTONOMOUS) Bollikunta, Warangal-506 005 (T.S)

R 15-ACADEMIC REGULATIONS (CBCS) FOR M.Tech. (REGULAR) DEGREE PROGRAMMES

Applicable for the students of **M. Tech. (Regular) programme from the Academic Year 2015-16 and onwards.** The M. Tech. Degree of the Jawaharalal Nehru Technological University Hyderabad shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

1. ELIGIBILITY FOR ADMISSIONS

Admission to the above programme 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. AWARD OF M. Tech. DEGREE

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, failing which he shall forfeit his seat in M. Tech. programme.

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

The minimum instruction days in each semester are 90.

3. DEPARTMENTS OFFERING M.TECH PROGRAMMES WITH SPECIALIZATIONS

Department	Specialization	Shift				
Civil Engg.	i. Structural Engineering	1 st Shift				
FFF	i. Power Electronics	$1^{st} \& 2^{nd}$ Shift				
	ii. Power Systems Control and Automation					
ME	i. Thermal Engineering.	1 st Shift				
ECE	i. VLSI System Design	1 st & 2 nd Shift				
ECE	ii. Wireless and Mobile Communications	1 st & 2 nd Shift				
	i. Computer Networks and Information Security	1 st & 2 nd Shift				
CSE	ii. Computer Science and Engineering	1 st & 2 nd Shift				
	iii. Software Engineering	1 st Shift				

4. COURSE REGISTRATION

A 'Faculty Advisor or Counselor' shall be assigned to each student, who will advise him on the Post Graduate Programme (PGP), its Course Structure and Curriculum, Choice/Option for Subjects/Courses, based on his competence, progress, pre-requisites and interest.

Academic Section of the College invites 'Registration Forms' from students within 15 days from the commencement of classwork, ensuring 'Date and Time of registration. The Registration requests for any 'Current Semester' shall be completed before the commencement of SEEs (Semester End Examinations) of the 'Preceding Semester'.

A Student can apply for Registration, only after obtaining the 'Written Approval' from his Faculty Advisor, which should be submitted to the College Academic Section through the Head of Department (a copy of it being retained with Head of Department, Faculty Advisor and the Student).

If the Student submits ambiguous choices or multiple options or erroneous entriesduring Registration for the Subject(s)/Course(s) under a given/ specified Course Group/Category as listed in the Course Structure, only the first mentioned Subject/Course in that Category will be taken into consideration.

Subject/Course Options exercised through Registration are final and cannot be changed, nor can they be inter-changed; further, alternate choices will also not be considered. However, if the Subject/ Course that has already been listed for Registration (by the Head of Department) in a Semester could not be offered due to any unforeseen or unexpected reasons, then the Student shall be allowed to have alternate choice - either for a new Subject (subject to offering of such a Subject), or for another existing Subject (subject to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the first week from the commencement of Class-work for that Semester.

5. ATTENDANCE

Attendance in all classes (Lectures/Laboratories etc.) is compulsory. The minimum required attendance in each theory / Laboratory etc. is 75% including the days of attendance in sports, games, NCC and NSS activities for appearing for the End Semester examination. A student shall not be permitted to appear for the Semester End Examinations (SEE) if his attendance is less than 75%.

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

Shortage of Attendance below 65% in each subject shall not be condoned.

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

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

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.

6. **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.

For the theory subjects 60 marks shall be awarded for the performance in the Semester End Examination and 40 marks shall be awarded for Continuous Internal Evaluation (CIE). The Continuous 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 Semester instructions. Each mid-term examination shall be conducted for a total duration of 120 minutes with Part A as compulsory question (16 marks) consisting of 4 sub-questions carrying 4 marks each, and Part B with 3 questions to be answered out of 5 questions, each question carrying 8 marks.

The details of the Question Paper pattern for End Examination (Theory) are given below:

- The Semester End Examination will be conducted for 60 marks. It consists of two parts, i).Part-A for 20 marks, ii). Part-B for 40 marks.
- Part-A is a compulsory question consisting of 5 sub questions, one from each unit and carries 4 marks each.
- Part-B to be answered 5 questions carrying 8 marks each. There will be 2 questions from each unit and only one should be answered.

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

For conducting laboratory end examinations of all PG Programmes, one internal examiner and one external examiner are to be appointed by the Head of the Department with the approval of the Principal. The external examiner should be selected from outside the College.

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. If he fails to fulfill minimum marks, he has to reappear during the supplementary examinations.

There shall be a Comprehensive Viva-Voce in II year I Semester. 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 Head of the Department shall be associated with the conduct of the Comprehensive Viva-Voce through a Committee. The Committee consisting of Head of the Department, one senior faculty member and an external examiner. The external examiner shall be appointed by the Principal. For this, the Head of the department shall submit a panel of 3 examiners. There are no internal marks for the Comprehensive Viva-Voce and evaluates for maximum of 100 marks. A candidate has to secure a minimum of 50% of marks to be declared

successful. If he fails to fulfill minimum marks, he has to reappear during the supplementary examinations.

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

In case the candidate does not secure the minimum academic requirement in any subject (as specified in 6.6) he has to reappear for the Semester End Examination in that subject.

A candidate shall be given one chance to re-register for the subjects if the internal marks secured by a candidate is less than 50% and failed in that subject for maximum of two subjects and should register within four weeks of commencement of the class work. In such a case, the candidate must re-register for the subjects and secure the required minimum attendance. The candidate's attendance in the reregistered subject(s) shall be calculated separately to decide upon his eligibility for writing the Semester End Examination in those subjects. In the event of the student taking another chance, his Continuous Internal Evaluation (internal) marks and Semester End Examination marks obtained in the previous attempt stands cancelled.

In case the candidate secures less than the required attendance in any subject, he shall not be permitted to write the Semester End Examination in that subject. He shall reregister for the subject when next offered.

7. Examinations and Assessment - The Grading System

Marks will be awarded to indicate the performance of each student in each Theory Subject, or Lab/Practicals, or Seminar, or Project, etc., based on the % marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in Item 6 above, and a corresponding Letter Grade shall be given.

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed:

% of Marks Secured (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points		
80% and above (\geq 80%, \leq 100%)	O (Outstanding)	10		
Below 80% but not less than 70% $(\ge 70\%, < 80\%)$	A ⁺ (<i>Excellent</i>)	9		
Below 70% but not less than $60\% \ (\ge 60\%, < 70\%)$	A (Very Good)	8		
Below 60% but not less than $55\% \ (\ge 55\%, < 60\% \)$	$B^+(Good)$	7		
Below 55% but not less than $50\% (\ge 50\%, < 55\%)$	B (above Average)	6		
Below 50% (< 50%)	F (FAIL)	0		
Absent	Ab	0		

A student obtaining F Grade in any Subject shall be considered 'failed' and is be required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Subjects will remain the same as those he obtained earlier.

A student not appeared for examination then 'Ab' Grade will be allocated in any Subject shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the Semester End Examination (SEE), as and when offered.

A Letter Grade does not imply any specific Marks percentage and it will be the range of marks percentage.

In general, a student shall not be permitted to repeat any Subject/ Course (s) only for the sake of 'Grade Improvement' or 'SGPA/ CGPA Improvement'.

A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/Course. The corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/Course.

Credit Points (CP) = Grade Point (GP) x Credits.... For a Course

The Student passes the Subject/Course only when he gets $GP \ge 6$ (B Grade or above).

The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ECP) secured from all Subjects/Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

$$SGPA = \left\{ \sum_{i=1}^{N} c_i G_i \right\} / \left\{ \sum_{i=1}^{N} c_i \right\} \quad \dots \text{ for each semester,}$$

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'Registered' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_j is the no. of Credits allotted to the ith Subject, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that ith Subject.

The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over all Semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in all registered Courses in all Semesters, and the Total Number of Credits registered in all the Semesters. CGPA is rounded off to two Decimal Places. CGPA is thus computed from the I Year Second Semester onwards, at the end of each Semester, as per the formula

$$CGPA = \left\{ \sum_{j=1}^{M} C_{j}G_{j} \right\} / \left\{ \sum_{j=1}^{M} C_{j} \right\} \dots \text{ for all semesters registered}$$

(ie., upto and inclusive of S Semesters, S \ge 2),

where 'M' is the total no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'Registered' from the 1st Semester onwards upto and inclusive of the Semester S (obviously M > N), 'j' is the Subject indicator index (takes into account all Subjects from 1 to S Semesters), C_j is the no. of Credits allotted to the jth Subject, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

For Calculations listed in Item 7.6 - 7.10, performance in failed Subjects/ Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/Courses will also be included in the multiplications and summations.

8. 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.

A Project Review Committee (PRC) shall be constituted with Head of the Department as Chairperson, Project Supervisor and one senior faculty member of the Departments offering the M. Tech. programme.

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

After satisfying 8.2, a candidate has to submit, in consultation with his Project

Supervisor, the title, objective and plan of action of hisproject work to the PRC for approval. Only after obtaining the approval of the PRC the student can initiate the Project work.

If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the PRC. However, the PRC 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.

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

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 all theory and practical courses 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 Head of the Department and make an oral presentation before the PRC.

Three copies of the Project Thesis certified by the supervisor shall be submitted to the College.

For Project work Review-I in II Year I Sem. there is an internal marks of 50, the evaluation should be done by the PRC for 25 marks and Supervisor will evaluate for 25 marks. The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain. A candidate has to secure a minimum of 50% of marks to be declared successful for Project Work Review-I. If he fails to fulfill minimum marks, he has to reappear during the supplementary examination.

For Project work Review-II in II Year II Sem. there is an internal marks of 50,

the evaluation should be done by the PRC for 25 marks and Supervisor will evaluate for 25 marks. The PRC will examine the overall progress of the Project Work and decide the Project is eligible for final submission or not. A candidate has to secure a minimum of 50% of marks to be declared successful for Project Work Review-II. If he fails to fulfill minimum marks, he has to reappear during the supplementary examination.

For Project Evaluation (Viva-Voce) in II Year II Sem. there is an external marks of 150 and the same evaluated by the External examiner appointed by the University. The candidate has to secure minimum of 50% marks in Project Evaluation (Viva-Voce) examination.

If he fails to fulfill as specified in 8.10, he will reappear for the Viva-Voce examination only after three months. In the reappeared examination also, fails to fulfill, he will not be eligible for the award of the degree.

The thesis shall be adjudicated by one examiner selected by the Principal. For this, the Head of the Department shall submit a panel of 3 examiners, eminent in that field, with the help of the guide concerned.

If the report of the examiner is not favourable, the candidate shall revise and resubmit the Thesis. If the report of the examiner is unfavourable again, the thesis shall be summarily rejected.

If the report of the examiner is favourable, Project Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis.

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

9. AWARD OF DEGREE AND CLASS

A Student who registers for all the specified Subjects/ Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes the examinations prescribed in the entire PG Programme (PGP), and secures the required number of 88 Credits (with CGPA > 6.0), shall be declared to have 'QUALIFIED' for the award of the M.Tech. Degree in the chosen Branch of Engineering and Technology with specialization as he admitted.

Award of Class

After a student has satisfied the requirements prescribed for the completion of the programme and is eligible for the award of M. Tech. Degree, he shall be placed in one of the following three classes based on the CGPA:

Class Awarded	CGPA
First Class with Distinction	≥7.75
First Class	$6.75 \le CGPA < 7.75$
Second Class	$6.00 \le \text{CGPA} < 6.75$

A student with final CGPA (at the end of the PGP) < 6.00 will not be eligible for the Award of Degree.

10. WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the College 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.

11. TRANSITORY REGULATIONS

If any candidate is detained due to shortage of attendance in one or more subjects, they are eligible for re-registration to maximum of two earlier or equivalent subjects at a time as and when offered.

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 R15 Academic Regulations.

12. GENERAL

Credit: A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.

Credit Point: It is the product of grade point and number of credits for a course.

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

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

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

The College 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 College.

MALPRACTICES RULES DISCIPLINARY ACTION FOR/IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper	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

	police and a case is registered against him.
in the Answer book or neet or takes out or arranges the question paper during the or answer book or additional 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.
onable, abusive or offensive the answer paper or in letters ners or writes to the examiner im to award pass marks.	Cancellation of the performance in that subject.
bey the orders of the Chief ent/Assistant - ent / any officer on duty or or creates disturbance of any around the examination hall s a walk out or instigates walk out, or threatens the arge or any person on duty in he examination hall of any is person or to any of his ether by words, either spoken or by signs or by visible on, assaults the officer-in- any person on duty in or examination hall or any of his indulges in any other act of or mischief which result in or destruction of property in tion hall or any part of the pus or engages in any other the opinion of the officer on ts to use of unfair means or or has the tendency to disrupt	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.
	in the Answer book or neet or takes out or arranges the question paper during the or answer book or additional or after the examination.

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.

M.Tech. (COMPUTER SCIENCE AND ENGINEERING)

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Code	Course Title	L	P	С
Core Course I	A958101	Data Structures and Algorithms	4	-	4
Core Course II	A958102	Database Internals	4	-	4
Core Course III	A958103	Distributed Systems	4	-	4
	A958104	Network Security	4	-	4
Coro Electivo I	A958105	Android Application Development	-	-	-
COLE Elective I	A958106	Cloud Computing	-	-	-
	A958107	Internet of Things	-	-	-
	A958108	Machine Learning	4	-	4
Coro Electivo II	A958109	Parallel and Distributed Algorithms	-	-	-
COLE Elective II	A958110	Software Architecture and Design Patterns	-	-	-
	A958111	Embedded Systems	-	-	-
	A958112	Big Data Analytics	4	-	4
	A958113	Bioinformatics	-	-	-
Open Elective I	A958114	Biometrics	-	-	-
	A958115	Computer Forensics	-	-	-
	A958116	Distributed Systems Security	-	-	-
Laboratory I	A958117	Data Structures and Algorithms Lab	-	4	2
Seminar I	A958118	Seminar		4	2
		Total Credits	24	8	28

I Year – II Semester

Category	Code	Course Title	L	P	С
Core Course IV	A958201	Network Programming	4	-	4
Core Course V	A958202	Information Retrieval Systems	4	-	4
Core Course VI	A958203	Internet Technologies and Services	4	-	4
	A958204	Data Mining	4	-	4
Coro Electivo III	A958205	Storage Area Networks	-	-	-
Core Elective III	A958206	Semantic Web and Social Networks	-	-	-
	A958207	Cyber Security	-	-	-
	A958208	Big Data Analytics	4	-	4
Com Elective IV	A958209	Soft Computing	-	-	-
Core Elective IV	A958210	Software Process and Project Management	-	-	-
	A958211	Distributed Computing	-	-	-
	A958212	E-Commerce	4	-	4
	A958213	Intellectual Property Rights	-	-	-
Open Elective II	A958214	Mobile Computing	-	-	-
	A958215	Mobile Application Security	-	-	-
	A958216	Principles of Information Security	-	-	-
Laboratory II	A958217	Internet Technologies and Services Lab		4	2
Seminar II	A958218	Seminar		4	2
		Total Credits	24	8	28

II Year - I Semester

Code	Course Title	L	Р	С
A958301	Comprehensive Viva-Voce			4
A958302	Project work Review I		24	12
	Total Credits		24	16

II Year - II Semester

Code	Course Title	L	Р	С
A958401	Project work Review II		8	4
A958402	Project Evaluation (Viva-Voce)		16	12
	Total Credits		24	16

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958101) DATA STRUCTURES AND ALGORITHMS

Course 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, Linked List, 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 methodsdfs 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, Tree Map Classes, Tries(examples only),Comparison of Search trees. Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Define knowledge basic on data structures to store and retrieve an ordered or unordered data. Such as, arrays, linked lists, trees, heaps, and hash tables.
- 2. Learn to analyze and to compare efficiency of an algorithm.
- 3. Understand the basic concepts of latest techniques. Have concepts on tree and graphs.
- 4. Implement various projects on these data structures.
- 5. Illustrate different pattern matching algorithms.

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.
- Data structures and Algorithms in Java, R.Lafore, Pearson education.
 Java: The Complete Reference, 8th editon, 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.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958102) DATABASE INTERNALS

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

Distributed databases management system concepts and impl

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

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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Differentiate the file systems in database by enumerating the features, function and its benefits in database systems.
- 2. Demonstrate a clear understanding on relational data model.
- 3. Transform an entity relation model on relational database schema and to use data definition language.
- 4. Demonstrate theory on normalization techniques and apply it effectively on a database.
- 5. Use SQL interface on a multi-user relational databases.Understand the concepts of distributed databases and various recovery method in Distributed DBMS.

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 & Franci 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.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958103) DISTRIBUTED SYSTEMS

Objectives:

- Understand the need for distributed systems and their applications.
- Understand the concepts of remote procedure calls, remote file systems, distributed agreement, clock synchronization, and security.

UNIT I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication.

Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT II

Operating System Support- Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study- SUN network file systems.

Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT III

Peer to Peer Systems–Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, Ocean Store, Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT IV

Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V

Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 Wi-Fi.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Mini case study, Other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Explain distributed system design and its properties. List the principles underlined along with its functionality.
- 2. Implement problems and challenges with these principles. Evaluate the effectiveness and shortcomings for solutions.
- 3. Identify the principles that are based on these contemporary distributed systems.
- 4. Explain its affect on software design to identify the features.
- 5. Design a distributed system with specific requirements. Develop a case study on CORBA, RMI services.

TEXT BOOKS:

- 1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
- 2. Distributed Systems, S.Ghosh, Chapman& Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

- 1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
- 2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
- 3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, TMH.
- 4. Reliable Distributed Systems, K.P.Birman, Springer.
- 5. Distributed Systems Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
- 6. Distributed Operating Systems and Algorithm Analysis, R.Chow, T.Johnson, Pearson.
- 7. Distributed Operating Systems, A.S.Tanenbaum, Pearson education.
- 8. Distributed Computing, Principles, Algorithms and Systems, Ajay D.Kshema kalyani and Mukesh Singhal, Cambridge, 2010.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958104) NETWORK SECURITY (CORE ELECTIVE-I)

Objectives:

- Understand the basic categories of threats to computers and networks Understand
- various cryptographic algorithms.
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec Understand Intrusions and
- intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

UNIT – I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II

Symmetric key Ciphers: Block Cipher principles & Algorithms(DES, AES,Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman,ECC), Key Distribution

UNIT – III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm **Authentication Applications:** Kerberos, X.509 Authentication Service, Public – Key Infrastructure, Biometric Authentication

UNIT – IV

Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, key management

$\mathbf{UNIT} - \mathbf{V}$

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders**, **Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Explain the model for Network Security.
- 2. Develop private and public key encryption techniques that can be used in modern cryptosystems.
- 3. Illustrate the concepts of digital signatures and different authentication protocols. Explain the concepts for web security and SET.
- 4. Adapt different Intrusion Detection Techniques.Classify different viruses, threats and their countermeasures for real time problems.
- 5. Explain the firewall and trusted systems with its importance. Solve case studies related cryptography and security.

TEXT BOOKS:

- 1. Cryptography and Network Security : William Stallings, Pearson Education,5th Edition
- 2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 2nd Edition.
- 3. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

REFERENCE BOOKS:

- 1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
- 2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
- 3. Information Security, Principles and Practice : Mark Stamp, Wiley India.
- 4. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White, TMH
- 5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
- 6. Principles of Information security by Michael E Whitman and Herbert J.Mattord.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958105) ANDROID APPLICATION DEVELOPMENT (CORE ELECTIVE-I)

Objectives:

To demonstrate their understanding of the fundamentals of Android operating systems To demonstrate their skills of using Android software development tools

To demonstrate their ability to develop software with reasonable complexity on mobile platform To demonstrate their ability to deploy software to mobile devices

To demonstrate their ability to debug programs running on mobile devices

UNIT I:

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT II:

Android User Interface: Measurements – Device and pixel density independent measuring units Layouts – Linear, Relative, Grid and Table Layouts

User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers

Event Handling – Handling clicks or changes of various UI components

Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity

Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT IV

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

UNIT V

Advanced Topics: Alarms – Creating and using alarms

Using Internet Resources – Connecting to internet resource, using download manager Location Based Services – Finding Current Location and showing location on the Map, updating location.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Configure and Install the tools used for Android application development. Design and develop various user Interfaces based on the Android platform.
- 2. Implement programs using Java to develop Android application.
- 3. Classify, create, display notification using Tools.
- 4. Adapt different persistent storage methods.
- 5. Discuss SQLite data base applications. Develop latest Location based services.

TEXT BOOKS:

- 1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
- 2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958106) CLOUD COMPUTING (CORE ELECTIVE-I)

Objectives:

- To learn the new computing model which enables shared resources on demand over the network. To learn about the pay-per-use scenarios.
- To learn about the new kind of service models and deployment models. To learn about the virtualization technology.
- To learn the python programming or various services and models. To develop cloud applications in Python

UNIT-I

Principles of Parallel and Distributed Computing, Introduction to cloud computing, Cloud computing Architecture, cloud concepts and technologies, cloud services and platforms, Cloud models, cloud as a service, cloud solutions, cloud offerings, introduction to Hadoop and Mapreduce.

UNIT –II

Cloud Platforms for Industry, Healthcare and education, Cloud Platforms in the Industry, cloud applications. Virtualization, cloud virtualization technology, deep dive: cloud virtualization,

Migrating in to cloud computing, Virtual Machines Provisioning and Virtual Machine Migration Services, On the Management of Virtual Machines for cloud Infrastructure, Comet cloud, T-Systems,

UNIT-III

Cloud computing Applications: Industry, Health, Education, Scientific Applications, Business and Consumer Applications, Understanding Scientific Applications for Cloud Environments, Impact of Cloud computing on the role of corporate IT.

Enterprise cloud computing Paradigm, Federated cloud computing Architecture, SLA Management in Cloud Computing, Developing the cloud: cloud application Design.

UNIT-IV

Python Basics, Python for cloud, cloud application development in python, Cloud Application Development in Python.

Programming Google App Engine with Python: A first real cloud Application, Managing Data in the cloud, Google app engine Services for Login Authentication, Optimizing UI and Logic, Making the UI Pretty: Templates and CSS, Getting Interactive. Map Reduce Programming Model and Implementations.

UNIT-V

Cloud management, Organizational Readiness and change management in the cloud age ,Cloud Security ,Data security in the cloud, Legal Issues in the Cloud , Achieving Production Readiness for the cloud Services

Course Outcome:

After the completion of this course the students should be able to :

- 1. Discuss main concepts, key strengths, and limitations for cloud computing.
- 2. Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
- 3. Explain the issues on cloud computing along with security, privacy, and interoperability.
- 4. Identify problems, and explain, analyze, and evaluate various cloud computing solutions. Provide the appropriate solutions on cloud computing based on the application.
- 5. Attempt to generate innovative ideas in cloud computing. Organize Data security in cloud computing.

TEXT BOOKS:

- 1. Cloud Computing: Raj Kumar Buyya, James Broberg, andrzej Goscinski, 2013 Wiley
- 2. Mastering Cloud Computing: Raj Kumar buyya, Christian Vecchiola, selvi-2013.
- 3. Cloud Computing: Arshdeep Bahga, Vijay Madisetti, 2014, University Press.
- 4. Cloud computing: Dr Kumar Saurab Wiley India 2011.

REFERENCES;

- 1. Code in the Cloud: Mark C.Chu-Carroll 2011, SPD.(Second part of IV UNIT)
- 2. Essentials of cloud computing : K Chandrasekharan CRC Press.
- 3. Cloud Computing: John W. Rittinghouse, James Ransome, CRC Press.
- 4. Virtualization Security: Dave shackleford 2013. SYBEX a wiley Brand.
- 5. Cloud computing and Software Services: Ahson, Ilyas.2011.
- 6. Cloud Computing Bible: Sosinsky 2012. Wiley India .
- 7. Cloud Computing: Dan C. Marinescu-2013, Morgan Kaufmann.
- 8. Distributed and Cloud Computing, Kai Hwang, Geoffery C.Fox, Jack J.Dongarra, Elsevier, 2012.
- 9. Fundamentals of Python Kenneth A.Lambert | B.L.Juneja

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958107) INTERNET OF THINGS (CORE ELECTIVE-I)

Objectives:

To introduce the terminology, technology and its applications

To introduce the concept of M2M (machine to machine) with necessary protocols To introduce the Python Scripting Language which is used in many IoT devices To introduce the Raspberry PI platform, that is widely used in IoT applications To introduce the implementation of web based services on IoT devices

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs

IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling

Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework

Designing a RESTful web API

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Describe the basic terminology, latest technology along with its applications. Discuss the protocols based on the concepts such as machine to machine.
- 2. Illustrate the IOT devices using Python Scripting Language.
- 3. Develop an application with Raspberry PI platform.

- 4. Implement these principles in many applications of IoT devices.
- 5. Design Real Time problems on web API. Implement frame work on python web applications.

TEXT BOOK

- 1. Internet of Things A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
- 2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS:

- 1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
- 2. Richardo. 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.
- 4. Machine Learning by Peter Flach, Cambridge.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958108) MACHINE LEARNING (CORE ELECTIVE-II)

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 Neighbour 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

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss different application on Machine Learning problems.
- 2. Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.
- 3. Illustrate the basic theory focused on Machine Learning. Improve the performance of Machine Learning algorithms with different parameters.
- 4. Analyze current research papers. Understand the latest issues raised by current researchers.
- 5. Develop different approaches to learn Inductive-Analytical. Adapt relationships 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
- 4. Machine Learning by Peter Flach , Cambridge.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958109) PARALLEL AND DISTRIBUTED ALGORITHMS (CORE ELECTIVE –II)

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 parallel list 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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Apply knowledge of parallel and distributed computing techniques with different methods.
- 2. Design, develop and analyze the performance of parallel and distributed applications.
- 3. Gain experience on applications of fundamentals of Computer Science methods.
- 4. Adapt algorithms on the development of different parallel applications. Elaborate design, testing, and performance of a software system.
- 5. Discuss different Distributed Shared memory concepts. Learn Memory related primitive, 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 Java from Pearson, 1992.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958110) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS (CORE ELECTIVE –II)

Objectives:

- 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 how to add functionality to designs while minimizing complexity To understand
- what design patterns really are, and are not
- To learn 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.

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

Behavioral 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,

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Design architecture for different structural patterns.
- 2. Analyze its architecture to build the system using its components. Develop creational and structural patterns.
- 3. Illustrate the patterns along with its importance and role. Learn and solve different patterns for behavioral.
- 4. Discuss Interpretor, mediator, iterator chain of responsibilities. Adapt a problems on Air Traffic Control.
- 5. Plan a case study on utilization of architectural structures.

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.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958111) EMBEDDED SYSTEMS (CORE ELECTIV-II)

Course 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.
Course Outcomes:

After the completion of this course the students should be able to :

- 1. Explain embedded systems design with different technologies along with metrics and challenges. Design a custom single purpose processor with combinational sequential logic.
- 2. Describe a optimizing of single purpose processors along with basic architecture, operation.
- 3. Define various types of timers, Universal Asynchronous Receiver/ Transmitter. Explain about the various controllers for LCD, Keypad and Stepper Motor.
- 4. Explain the different types of advanced RAM, Microprocessor interfacing and describe the arbitration methods.
- 5. Discuss the embedded software development process and 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.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958112) BIG DATA ANALYTICS (Open Elective-I)

Objectives:

- To understand about big data
- To learn the analytics of Big Data
- To Understand the Map Reduce fundamentals

UNIT I

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data; Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

UNIT- II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics; Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of Hbase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing Hbase, Architecture, Storing Big Data with Hbase , Interacting with the Hadoop Ecosystem; Hbase in Operations-Programming with HBase; Installation, Combining HBase and HDFS;

UNIT IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read, write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;

Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Illustrate a brief knowledge and a state of art on big data analytics.
- 2. Make decisions on Big Data analytics.
- 3. Understand fundamentals of Map Reduce and HBase.
- 4. Adapt latest big data technology such as NOSQL, Hadoop etc. Develop skills and models technically both in predictive and prescriptive that supports decision making in business.
- 5. Determine the effective communication skills, which includes details of data analysis results. Implement Mobile Analytics Tools.

TEXT BOOKS:

- 1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
- 2. BIG DATA, Black BookTM, DreamTech Press, 2015 Edition.

REFERENCE BOOKS:

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

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958113) BIOINFORMATICS (Open Elective-I)

UNIT-I

Introduction to Bioinformatics and Biological Databases, Sequence alignment, Pair wise Sequence alignment, multiple sequence alignment, database Similarities.

UNIT-II

Molecular phylogenetics: Basics, gene phylogene Vs Systems Phylogene, Tree construction methods and programs, advanced Statistical approaches, profiles and Hidden markow models.

UNIT-III

Gene and promoter prediction: Gene Prediction, promoter and regulatory element prediction, RNA structure prediction, protine motives and domain prediction

UNIT-IV

Structural Bioinformatics: Basics, Protine structure Visualization, comparison, classification, protein secondary structure prediction, protein tertiary structure prediction.

UNIT-V

Genomics and Proteomics: Genome Mapping, Assembly, comparison, functional genomics, proteomics.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss the basic knowledge, concepts of computer science and biology. Describe existing software information from large databases.
- 2. Develop new and latest methods on problem -solving skills.
- 3. Develop methods for element prediction.
- 4. Design and analyze the methods on information theory.
- 5. Adapt the depth concepts on protein tertiary structure prediction. Study new algorithms.

TEXT BOOKS:

1. Essential Bioinformatics: Jin Xiong 2006, Cambridge University Press.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958114) BIOMETRICS (Open Elective-I)

Objectives:

- To learn the biometric technologies
- To learn the computational methods involved in the biometric systems.
- To learn methods for evaluation of the reliability and quality of the biometric systems.

UNIT –I:

INTRODUCTION & HANDWRITTEN CHARACTER RECOGNITION

Introduction – history – type of Biometrics – General Architecture of Biometric Systems – Basic Working of biometric Matching – Biometric System Error and performance Measures – Design of Biometric Systems – Applications of Biometrics – Benefits of Biometrics Versus Traditional Authentication Methods – character Recognition – System Overview – Geature Extraction for character Recognition – Neura; Network for handwritten Charater Recognition – Multilayer Neural Network for Handwritten Character Recognition – Devanagari Numeral Recognition – Isolated Handwritten Devanagari Charater Recognition suing Fourier Descriptor and Hidden markov Model.

UNIT –II:

FACE BIOMETRICS & RETINA AND IRIS BIOMETRICS

Introduction –Background of Face Recognition – Design of Face Recognition System – Neural Network for Face Recognition – Face Detection in Video Sequences – Challenges in Face Biometrics – Face Recognition Methods – Advantages and Disadvantages – Performance of Biometrics – Design of Retina Biometrics – Iris Segmentation Method – Determination of Iris Region – Experimental Results of Iris Localization – Applications of Iris Biometrics – Advantages and Disadvantages. VEIN AND FINGERPRINT BIOMETRICS & BIOMETRIC HAND GESTURE RECOGNITION FOR INDIAN SIGN LANGUAGE. Biometrics Using Vein Pattern of Palm – Fingerprint Biometrics – Fingerprint Recognition System – Minutiae Extraction – Fingerprint Indexing – Experimental Results – Advantages and Disadvantages – Basics of Hand Geometry – Sign Language – Indian Sign Language – SIFT Algorithms-Practical Approach Advantages and Disadvantages.

UNIT-III

PRIVACY ENHANCEMENT USING BIOMETRICS & BIOMETRIC CRYPTOGRAPHY AND MULTIMODAL BIOMETRICS

Introduction – Privacy Concerns Associated with Biometric Developments – Identity and Privacy – Privacy Concerns – Biometrics with Privacy Enhancement – Comparison of Various Biometrics in Terms of Privacy – Soft Biometrics - Introduction to Biometric Cryptography – General Purpose Cryptosystem – Modern Cryptography and Attacks – Symmetric Key Ciphers – Cryptographic Algorithms – Introduction to Multimodal Biometrics – Basic Architecture of Multimodal Biometrics – Multimodal Biometrics Using Face and Ear – Characteristics and Advantages of Multimodal Biometrics Characters – AADHAAR : An Application of Multimodal Biometrics.

UNIT –IV

WATERMARKING TECHNIQUES & BIOMETRICS : SCOPE AND FUTURE

Introduction – Data Hiding Methods – Basic Framework of Watermarking – Classification of Watermarking – Applications of Watermarking – Attacks on Watermarks – Performance Evaluation – Characteristics of Watermarks – General Watermarking Process – Image Watermarking Techniques – Watermarking Algorithm – Experimental Results

 Effect of Attacks on Watermarking Techniques – Scope and Future Market of Biometrics – Biometric Technologies – Applications of Biometrics -Biometrics – and Information Technology Infrastructure – Role of Biometrics in Enterprise Security – Role of Biometrics in Border Security – Smart Card Technology and Biometric – Radio Frequency Identification Biometrics – DNA Biometrics – Comparative Study of Various Biometrics Techniques.

UNIT –V

IMAGE ENHANCEMENT TECHNIQUES & BIOMETRICS STANDS

Introduction – current Research in image Enhancement Techniques – Image Enhancement – Frequency Domain Filters – Databases and Implementation – Standard Development Organizations – Application Programming Interface

- Information Security and Biometric Standards - Biometric Template Interoperability.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Describe the knowledge of behavioral and biological biometrics. Analyze different interpretations, theory and practical problems.
- 2. Discuss various professional problems. Capable to structure as well as formulate different scientific problems.
- 3. Develop advanced and independent research projects in biometrics.
- 4. Implement biometrics applications and standards.
- 5. Develop Image Enhancement Techniques. Understand real time and current research Application Programming Interfaces

TEXT BOOK:

- 1. BIOMETRICS: CONCEPTS AND APPLICATIONS by G R SINHA and SANDEEP B. PATIL, Wiely, 2013.
- 2. Biometrics for Network Security Paul Reid, Pearson Education.

REFERENCE BOOKS:

- 1. Biometrics Identity verification in a networked world Samir Nanavathi, Micheal Thieme, Raj Nanavathi, Wiley dream Tech.
- 2. Biometrics The Ultimate Reference John D. Woodward, Jr.Wiley Dreamtech.

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958115) COMPUTER FORENSICS (Open Elective-I)

Objectives:

- To understand the cyberspace
- To understand the forensics fundamentals
- To understand the evidence capturing process.
- To understand the preservation of digital evidence.

UNIT I:

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists, Who Can Use Computer Forensic Evidence?.Types of Computer Forensics Technology : Types of Military Computer Forensic Technology, Types of Law Enforcement Computer Forensic Technology, Types of Business Computer Forensics Technology.

UNIT II:

Computer Forensics Evidence and Capture: Data Recovery: Data Recovery Defined, Data Backup and Recovery, The Role of Backup in Data Recovery, The Data-Recovery Solution, Case Histories. **Evidence Collection and Data Seizure:** Why Collect Evidence?, Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collecting and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody.

UNIT III:

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting And Preserving Computer Forensic Evidence. **Computer Image Verification and Authentication :** Special Needs of Evidential Authentication, Practical Considerations, Practical Implementation.

UNIT IV:

Computer Forensics Analysis: Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool, **Identification of Data:** Timekeeping, Time Matters, Forensic Identification and Analysis of Technical Surveillance Devices. **Reconstructing Past Events:** How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. **Networks:** Network Forensics Scenario, A Technical Approach, Destruction of Email, Damaging Computer Evidence, International Principles Against Damaging of Computer Evidence, Tools Needed for Intrusion Response to the Destruction of Data, Incident Reporting and Contact Forms.

UNIT V:

Current Computer Forensics Tools: Evaluating Computer Forensics Tool Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Apply the appropriate laws to identify, acquire, present and examine digital evident.
- 2. Develop methods related to industry to practice digital forensics & Illustrate the fundamental computer theory and practices.
- 3. Discuss principles of digital forensics & Evaluate and optimize the effective digital forensics tools.
- 4. Understand the role and field of information in digital forensics.
- 5. Plan current and advanced Computer Forensics Tools & Discuss various Software and hardware based on Forensics .

TEXT BOOKS:

- 1. "Computer Forensics: Computer Crime Scene Investigation", JOHN R. VACCA, Firewall Media.
- 2. "Guide to Computer Forensics and Investigations"4e, Nelson, Phillips Enfinger, Steuart, Cengage Learning.

REFERENCES:

- 1. "Computer Forensics and Cyber Crime", Marjie T Britz, Pearson Education.
- 2. "Computer Forensics", David Cowen, Mc Graw Hill.
- 3. Brian Carrier, "File System Forensic Analysis", Addison Wesley, 2005
- 4. Dan Farmer & Wietse Venema, "Forensic Discovery", Addison Wesley, 2005
- 5. Eoghan Casey, —Digital Evidence and Computer Crime —, Edition 3, Academic Press, 2011
- 6. Chris Pogue, Cory Altheide, Todd Haverkos ,Unix and Linux Forensic Analysis DVD ToolKit, Syngress Inc. , 2008
- 7. Harlan Carvey ,Windows Forensic Analysis DVD Toolkit, Edition 2, Syngress Inc. , 2009
- 8. Harlan Carvey ,Windows Registry Forensics: Advanced Digital Forensic Analysis of the Windows Registry , Syngress Inc, Feb 2011
- 9. Eoghan Casey, Handbook of Digital Forensics and Investigation, Academic Press, 2009
- 10. Gonzales/ Woods/ Eddins, Digital Image Processing using MATLAB, 2nd edition, Gatesmark Publishing, ISBN 9780982085400
- 11. N.Efford, Digital Image Processing, Addison Wesley 2000, ISBN 0-201-59623-7
- 12. M Sonka, V Hlavac and R Boyle, Image Processing, Analysis and Machine Vision, PWS
- 13. 1999, ISBN 0-534-95393-
- 14. Pratt.W.K., Digital Image Processing, John Wiley and Sons, New York, 1978

M.Tech. I Year I Semester (CSE)

L/T/P C 4/0/- 4

(A958116) DISTRIBUTED SYSTEMS SECURITY (Open Elective-I)

Objectives:

- To explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- To list the principles underlying the functioning of distributed systems, describe the
- problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
- To recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- To design a distributed system that fulfills requirements with regards to key distributed
- systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why;
- To build distributed system software using basic OS mechanisms as well as higher
- -level middleware and languages.

UNIT I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models -Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication. Distributed objects and Remote Invocation -Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT II

Operating System Support -Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study-SUN network file systems. Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT III

Peer to Peer Systems -Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, Ocean Store. Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT IV

Transactions and Concurrency control-Introduction, Transactions, Nested ransactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency controls. Distributed Transactions -Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions,

Distributed deadlocks, Transaction recovery, Replication -Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT V

Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 WiFi. Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services.

Course Outcomes: After the completion of this course the students should be able to :

- 1. Discuss distributed models and RPC events and modification.
- 2. Describe principles and critical issues in distributed systems & Solve the problems, challenges that are relevant in Distributed transactions.
- 3. Develop a real time case study to explore computer system.
- 4. Classify and explore design of distributed security system & Implement a simple and secure distributed system.
- 5. Understand transaction recovery, Replication and system model & Plan a CORBA case study services.

TEXT BOOKS:

- 1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
- 2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS:

- 1. Distributed Computing, S.Mahajan and S.Shah, Oxford University Press.
- 2. Distributed Operating Systems Concepts and Design, Pradeep K.Sinha, PHI.
- 3. Advanced Concepts in Operating Systems, M Singhal, N G Shivarathri, Tata McGraw-Hill Edition.
- 4. Reliable Distributed Systems, K.P.Birman, Springer.
- 5. Distributed Systems Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education.
- 6. Distributed Operating Systems and Algorithm Analysis, R.Chow, T.Johnson, Pearson.
- 7. Distributed Operating Systems, A.S.Tanenbaum, Pearson education.
- 8. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani & Mukesh Singhal, Cambrigde, rp 2010

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year I Semester (CSE)

L/T/P C 0/0/4 2

(A958117) 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 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) Arrayb) 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.
 - b) 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 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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss the concepts of arrays, linked lists and hashing methods.
- 2. Understand the use of collision and resolution techniques.
- 3. Implement algorithms to solve problems like searching and sorting.
- 4. Develop problems including graphs, trees and heap.

REFERENCE BOOKS:

- 1
- 2
- Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education. 3
- Data Structures using Java, D.S.Malik and P.S. Nair, Cengage Learning. 4
- Data structures, Algorithms and Applications in java, 2nd Edition, S.Sahani, Universities 5 Press.
- Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, Pearson education. 6
- Data Structures and java collections frame work, W.J.Collins, Mc Graw Hill. 7
- Java: the complete reference, 7th editon, Herbert Schildt, TMH. 8
- 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. 9
- 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)

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958201) NETWORK PROGRAMMING

Course Objectives:

Computer network programming involves writing computer programs that enable processes to communicate with each other across a computer network

Network programming is client–server programming

Interprocess communication, even if it is bidirectional, cannot be implemented in a perfectly symmetric way: to establish a communication channel between two processes, one process must take the initiative, while the other is waiting for it. Therefore, network programming unavoidably assumes a client–server model: The process initiating the communication is a client, and the process waiting for the communication to be initiated is a server. The client and server processes together form a distributed system. In a peer-to-peer communication, the program can act both as a client and a server.

UNIT – I

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities. Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples. Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

UNIT - II

Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lockf and fcntl functions, file permissions- chmod, fchmod, file ownership-chown, lchown , fchown, links-soft links and hard links – symlink, link, unlink. File and Directory management – Directory contents, Scanning Directories- Directory file APIs. Process-Process concept, Kernel support for process, process attributes, process control – process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT - III

Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions. Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory. Message Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example. Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT – IV

Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, client/server example. Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model ,Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented - Communication, Socket system calls for Connectionless-Communication, Example-Client/Server Programs- Single Server-Client connection, Multiple simultaneous clients, Socket options – setsockopt, getsockopt, fcntl.

UNIT-V

Network Programming in Java-Network basics, 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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss the knowledge on networking.
- 2. Understand the concepts of protocols that support the internet & Classify the interfaces and programs for network communication.
- 3. Illustrate the detail concepts of TCP/ UDP sockets & Implement the RMI and client server application.
- 4. Develop advance programming concepts using different network communications.
- 5. Discuss Client/Server Programs with real time examples & Plan a Application based on Java RMI.

TEXT BOOKS:

- 1. Unix System Programming using C++, T.Chan, PHI.(Units II,III,IV)
- 2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.(Unit I)
- 3. An Introduction to Network Programming with Java, Jan Graba, Springer, rp 2010.(Unit V)
- 4. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)
- 5. Java Network Programming,3rd edition, E.R. Harold, SPD, O'Reilly.(Unit V)

REFERENCE BOOKS:

- 1. Linux System Programming, Robert Love, O'Reilly, SPD.
- 2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
- 3. UNIX for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson Education.
- 4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
- 5. Unix Network Programming The Sockets Networking API, Vol.-I,W.R.Stevens, Bill Fenner, A.M.Rudoff, Pearson Education.
- 6. Unix Internals, U.Vahalia, Pearson Education.
- 7. Unix shell Programming, S.G.Kochan and P.Wood, 3rd edition, Pearson Education.
- 8. C Programming Language, Kernighan and Ritchie, PHI

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958202) INFORMATION RETRIEVALSYSTEMS

Course 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

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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Define Vector space model & Understand various similarity coefficient and measures.
- 2. Develop an Understanding on Relevance feedback, Regression Analysis, Thesauri.
- 3. Understand the applications of clustering.
- 4. Apply various Retrieval Utilities for Information Retrieval & Develop an Understanding about Signature files, Duplicate document detection.
- 5. Apply IR principles to locate relevant information large collection of data & Analyze the model of distributed retrieval web search.

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 & Retieval, Robert Korfhage, John Wiley & Sons.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958203) INTERNET TECHNOLOGIES AND SERVICES

Course Objective:

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

- Client Side: HTML5, CSS3, 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, XHTML, capabilities of HTML5

Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS 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 Simplifying scripting with JQuery, JASON for Information exchange.

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 struts2 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)

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss the principles of communication system.
- 2. Understand protocol and architectures of telecommunication & Apply the basics of network theory, testing and monitoring system.
- 3. Ability to manage Structs Framework & Compare technical benefits of Service Oriented Architecture and Web Services.
- 4. Install and Configure web service Framework.
- 5. Develop Real Time Application son MYSQL database & Describe Web services and anatomy of WSDL.

TEXT BOOKS:

- 1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dream tech.
- 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 & others Apress (dreamtech).
- 7. Java Server Programming , Ivan Bayross and others, The X Team, SPD
- 8. Web Warrior Guide to Web Programming-Bai/Ekedaw-Cengage Learning.
- 9. Beginning Web Programming-Jon Duckett, WROX.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958204) DATA MINING (CORE ELECTIVE -III)

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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Describe the concepts of preprocessing and data quality & Able to design Data ware house.
- 2. Capable to apply knowledge on advanced Classification and Clustering Methods.
- 3. Apply deep concepts on clustering Techniques & Discover latest methods in Text Mining.
- 4. Develop Web Mining Methods for Real Time Problems.
- 5. Adapt Temporal Spatial Rules & Implement Tools used for current research problems on 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.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958205) STORAGE AREA NETWORKS (CORE ELECTIVE –III)

Objectives:

- To understand Storage Area Networks characteristics and components.
- To become familiar with the SAN vendors and their products.
- To learn Fiber Channel protocols and how SAN components use them to communicate with each other.
- To become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
- To understand the use of all SAN-OS commands. Practice variations of SANOS features

UNIT- I: Introduction to Storage Technology

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

UNIT- II: Storage Systems Architecture

Hardware and software components of the host environment, Key protocols and concepts used by each component ,Physical and logical components of a connectivity environment, Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications, Concept of RAID and its components , Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems ,High-level architecture and working of an intelligent storage system

UNIT- III: Introduction to Networked Storage

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

UNIT- IV: Information Availability & Monitoring & Managing Datacenter

List reasons for planned/unplanned outages and the impact of downtime, Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR) ,RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures , Architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities.

Identify key areas to monitor in a data center, Industry standards for data center monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data center

UNIT-V: Securing Storage and Storage Virtualization

Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain, Virtualization technologies, block-level and file-level virtualization technologies and processes

Case Studies

The technologies described in the course are reinforced with EMC examples of actual solutions. Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss the necessity of Performance evaluation and different metrics used.
- 2. Develop techniques for data maintenance & Understand evolution of network storage.
- 3. Identify key areas in storage infrastructure.
- 4. Illustrate information Availability & Monitoring & Managing Datacenter & Develop critical security attributes for information system.
- 5. Implement Virtual technology analyzing threats & Plan a case study for real Time problems.

TEXT BOOK:

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

REFERENCE BOOKS:

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

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958206) SEMANTIC WEB AND SOCIALNETWORKS (CORE 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.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Explain three generation of Web with knowledge & Ability to participate related to web projects.
- 2. Understand the concepts on web applications and web data & Develop search engines to analyze social networking sites.
- 3. Describe technical affects related to web based computing methods.
- 4. Implement Linked data using XML based web services.
- 5. Analyze social networks and its development & Build a semantic web application for Real time problems.

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.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958207) CYBER SECURITY (CORE ELECTIVE –III)

OBJECTIVES:

- To learn Web Intelligence.
- To learn Knowledge Representation for the cyber security
- To learn security level in networks
- To learn Web Applications, Services and Technology and their security.
- To learn Social Network Analysis.

UNIT-I

Introduction to information systems, Types of information Systems, Development of Information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

UNIT-II

Application security (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, public Key Cryptography.

UNIT-III

Developing Secure Information Systems, Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and intrusion Detection Systems, Backup Security Measures.

UNIT-IV

Security Policies, Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate policies-Sample Security Policies, Publishing and Notification Requirement of the Policies.

UNIT-V

Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Describe the concepts of Fundamentals of cyber security to control threat & Analyze the architecture and articulate the threats.
- 2. Evaluate the features of information security and computer network in an organization.
- 3. Illustrate the cyber security risk management to protect crucial information.
- 4. Maintain the methods for trouble shooting and levels in information security & Develop methods for network security policies, requirements needed.
- 5. Implement security standards and publish & Understand IT act, copyright Act and patent Law.

TEXT BOOKS:

- 1. Charles P. Pfleeger, Shari Lawerance Pfleeger, "Analysing Computer Security", Pearson Education India.
- 2. V.K. Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
- 3. Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen kumar Shukla,"Introduction to Information Security and Cyber Law" Willey Dreamtech Press.
- 4. Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill.
- 5. CHANDER, HARISH," Cyber Laws And It Protection", PHI Learning Private Limited, Delhi, India.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958208) BIG DATA ANALYTICS (CORE ELECTIVE – IV)

OBJECTIVES:

- To understand about big data
- To learn the analytics of Big Data
- To Understand the Map Reduce fundamentals

UNIT-I

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data; Elements of Big Data; Big Data Analytics; Distributed and Parallel Computing for Big Data;

Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

UNIT-II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT-III

Understanding MapReduce Fundamentals and HBase: The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS;

UNIT-IV

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read, write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

UNIT-V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;

Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Describe Big Data and its importance & Discuss the different file structures and formats of data.
- 2. Understand MapReduce and fundementals of it.
- 3. Learn HBase installation and Hadoop Ecosystem & Discover latest technology on Big Data Landscape ,RDBMS.
- 4. Able to manage resources and applications with HADOOP.
- 5. Analyze Mobile Analytics and its types & Implement various technologies related to mobile Analytics tools.

TEXT BOOKS:

- 1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
- 2. BIG DATA, Black BookTM, DreamTech Press, 2015 Edition.

REFERENCE BOOKS:

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

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958209) SOFT COMPUTING (CORE ELECTIVE – IV)

OBJECTIVES

- To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience
- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems.
- To provide the mathematical background for carrying out the optimization associated with neural network learning.
- To familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations.
- To introduce case studies utilizing the above and illustrate the intelligent behavior of programs based on soft computing.

UNIT-I: FUZZY SET THEORY

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.

UNIT-II: OPTIMIZATION

Derivative-based Optimization – Descent Methods – The Method of Steepest Descent – Classical Newton's Method – Step Size Determination – Derivative-free Optimization – Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT-III: NEURAL NETWORKS

Supervised Learning Neural Networks – Perceptrons - Adaline – Backpropagation Mutilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.

UNIT-IV: NEURO FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT-V:APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Learn Different soft computing techniques and its role.
- 2. Understand problem solving techniques and Fuzzy inference and Rules & Adapt different competitive Learning Networks.
- 3. Discuss Self Organizing Networks and Hebbian Learning.
- 4. Adapt Neuro- Fuzzy Inference Systems & Develop Neuro fuzzy Modeling and its framework.
- 5. Implement application based on Computational Intelligence & Integrate various soft computing techniques to solve problems.

TEXT BOOK:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.

REFERENCES:

- 1. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
- 2. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
- 3. S. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
- 4. R.Eberhart, P.Simpson and R.Dobbins, "Computational Intelligence PC Tools", AP Professional, Boston, 1996.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958210) SOFTWARE PROCESS AND PROJECT MANAGEMENT (CORE ELECTIVE-IV)

Objectives:

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures.
- 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, and metrics automation.

UNIT-V

CCPDS-R Case Study and Future Software Project Management Practices

Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Discuss and plan to execute projects based on required standards.
- 2. Understand the range of tools used on project management & analyze the concepts related on project governance and methodologies.
- 3. Apply critical analysis on solving problems and planning process.
- 4. Describe planning, Risk and issues management & Plan process, pragmatic planning service delivery and quality assurance.
- 5. Develop project on software management and communication skills & Illustrate deeper knowledge and frameworks on real world scenarios.

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.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958211) DISTRIBUTED COMPUTING (CORE ELECTIVE – IV)

OBJECTIVES

- To expose students to both the abstraction and details of file systems.
- To introduce concepts related to distributed computing systems.
- To focus on performance and flexibility issues related to systems design decisions.
- To expose students to current literature in distributed systems.
- To prepare students for an industrial programming environment.

UNIT- I

Introduction The different forms of computing – Monolithic, Distributed, Parallel and cooperative computing, the meaning of Distributed computing, Examples of Distributed systems, the strengths and weaknesses of Distributed computing, operating system concepts relevant to distributed computing, the architecture of distributed applications.

UNIT- II

Distributed Computing Paradigms Paradigms for Distributed Applications – Message Passing Paradigm, The Client-Server Paradigm (Java Socket API), The peer-to-peer Paradigm, Message system (or MOM) Paradigm – the point-to-point message model and the publish/subscribe message model, RPC model, The Distributed Objects Paradigms – RMI, ORB, the object space Paradigm, The Mobile Agent Paradigm, the Network Services Paradigm, The collaborative application (Groupware Paradigm), choosing a Paradigm for an application.

UNIT-III

Distributed Objects Paradigm (RMI): Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, Java RMI API, A sample RMI Application, steps for building an RMI application, testing and debugging, comparison of RMI and socket API - Distributed Object Paradigm(CORBA): The basic Architecture, The CORBA object interface, Inter-ORB protocols, object servers and object clients, CORBA object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, object Adapters, Java IDL, An example CORBA application.

UNIT- IV

Distributed Document-based Systems : WWW, Lotus Notes, comparison of WWW and Lotus Notes, Distributed Coordination-based systems – Introduction to coordination models, TIB, JINI, comparison of TIB and JINI - Software Agents, Agent Technology, Mobile Agents - Distributed Multimedia Systems : characteristics of multimedia data, QOS of service management, Resource Management, Stream Adaptation.

UNIT- V

Grid Computing: Definition of grid, grid types – computational grid, data grid, grid benefits and applications, drawbacks of grid computing, grid components, grid architecture and its relation to various Distributed Technologies - Cluster Computing : Parallel computing

overview, cluster computing – Introduction, Cluster Architecture, parallel programming models and Paradigms, Applications of Clusters.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Design to implement distributed systems.
- 2. Describe computational thinking for applications on client-server paradigm & Apply knowledge to core architectural aspects of distributed system.
- 3. Describe the components of distributed databases such as RPC.
- 4. Illustrate the important methods on distributed components & Develop distributed multimedia systems.
- 5. Adapt different characteristics on software agents and resource management & Define grid computation, benefits and applications.

TEXT BOOKS:

- 1. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education.
- 2. Distributed Systems, Principles and Paradigms, A.S.Tanenbaum and M.V.Steen, Pearson Education.
- 3. Client/Server Programming with Java and CORBA, second edition, R.Orfali & Dan Harkey, John Wiley & sons.
- 4. Grid Computing, J.Joseph & C.Fellenstein, Pearson education. 5. High Performance Cluster Computing, Rajkumar Buyya, Pearson education.

* * * *

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958212) E – COMMERCE (OPEN ELECTIVE-II)

Objectives:

- Identify the major categories and trends of e-commerce applications. Identify the essential processes of an ecommerce system.
- Identify several factors and web store requirements needed to succeed in ecommerce. Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact. Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

UNIT - I

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications. Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT - II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems. Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT - III

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management. Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses.

UNIT- IV

Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research. Consumer Search and Resource Discovery - Information search and Retrieval, Commerce Catalogues, Information Filtering.

UNIT - V

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing, Desktop video conferencing.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Understand the concepts of E-Commerce consumer application.
- 2. Demonstrate Electronic payment systems using smart cards & Analyze broad view of work flow and corporate Data warehouses.
- 3. Customize the supply chain management and digital documents & Adapt advertise and marketing based information.
- 4. Discover new methods and strategy for E-commerce infrastructure.
- 5. Discuss issues on privacy and legal E-commerce & Develop electronic and desktop video processing.
TEXT BOOK:

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

REFERENCES BOOKS:

- 1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang, John Wiley. 2. E-Commerce, S.Jaiswal – Galgotia.
- 3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
- E-Commerce, Effain Furbon, sac Lee, Sarte Lee, 9
 Electronic Commerce Gary P.Schneider Thomson.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958213) INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE-II)

UNIT-I

Introduction to Intellectual Property Law – The Evolutionary Past - The IPR Tool Kit- Para -Legal Tasks in Intellectual Property Law Ethical obligations in Para Legal Tasks in Intellectual Property Law - Introduction to Cyber Law – Innovations and Inventions Trade related Intellectual Property Right

UNIT-II

Introduction to Trade mark – Trade mark Registration Process – Post registration Procedures – Trade mark maintenance - Transfer of Rights - Inter partes Proceeding – Infringement -Dilution Ownership of Trade mark – Likelihood of confusion - Trademarks claims – Trademarks Litigations – International Trade mark Law

UNIT-III

Introduction to Copyrights – Principles of Copyright Principles -The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration – Right to prepare Derivative works – Rights of Distribution – Rights of Perform the work Publicity Copyright Formalities and Registrations - Limitations - Copyright disputes and International Copyright Law – Semiconductor Chip Protection Act

UNIT -IV

The law of patents-patent searches –Patent ownership and transfer-Patent infringement-International Patent Law

UNIT-V

Introduction to Trade Secret – Maintaining Trade Secret – Physical Security – Employee Limitation - Employee confidentiality agreement - Trade Secret Law - Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law

Course outcomes:

After the completion of this course the students should be able to :

- 1. Understand fundementals of confidential, copyrights, patents, designs, tradeoffs and competition.
- 2. Able to apply principles of law to issues related to intellectual rights & Adapt the legal, practical steps needed to valid and agreed.
- 3. Demonstrate to identify, apply, protect intellectual property on new products & Describe current and emerging trend on internet, biotechnology and other laws.
- 4. Analyze critical analysis arguments on intellectual property rights.
- 5. Capable to anticipate the development of trade secret Law & Apply Employee confidentiality agreement and breach of contact.

TEXT BOOKS:

1. Debirag E.Bouchoux: "Intellectual Property" 4. Cengage learning, New Delhi

2. M.Ashok Kumar and Mohd.Iqbal Ali: "Intellectual Property Right" Serials Pub.

- 3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
- 4. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw -Hill, New Delhi
- 5. J Martin and C Turner "Intellectual Property" CRC Press
- 6. Richard Stimm "Intellectual Property" Cengage Learning

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958214) MOBILE COMPUTING (OPEN ELECTIVE-II)

UNIT-I

Introduction, Mobile Computing Architecture, Mobile Computing through Telephony, Emerging Technologies

UNIT-II

Global System for Mobile Communications (GSM), Short Message Service (SMS), General Packet Radio Services (GPRS), Wireless Application Protocol (WAP), CDMA and 3G.

UNIT-III

Wireless LAN, Intelligent Network and Internetworking, Client Programming, Programming for PalmOS, Wireless Devices with Symbian OS.

UNIT-IV

J2ME Introduction, J2ME Architecture, MIDLET, MidLet Suite , J2ME Profiles, Wireless Devices with WindowsCE, Voice Over Internet Protocol and Convergence, Session Internet Protocol(SIP), other protocols.

UNIT-V

Multimedia, IP Multimedia Subsystems, Security Issues in Mobile Computing, Next Generation Networks.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Describe the methods, principles on systematic programming.
- 2. Develop applications on secure enterprise.
- 3. Design and develop Wireless networks & Introduce J2ME Architecture.
- 4. Plan a Wireless Devices on Symbian OS & Discuss IP Multimedia Subsystems.
- 5. Adapt the effectiveness of user interface and interaction principles & Implement and Synthesize appropriate research trends.

TEXTBOOKS:

- 1. Mobile Computing Technology, Applications and Service Creation by Ashok Talukder , Hasan Ahmed, Roopa R Yavagal.
- 2. Mobile Computing Principles by Raza B'Far, Cambridge.
- 3. Mobile Computing by Raj Kamal 2e.
- 4. Mobile Computing by Jochen schiller.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958215) MOBILE APPLICATION SECURITY (OPEN ELECTIVE-II)

OBJECTIVES:

To understand the mobile issues and development strategies To understand the WAP and mobile security issues To understand the Bluetooth security issues.

UNIT-I:

Top Mobile Issues and Development Strategies: Top Issues Facing Mobile Devices, Physical Security, Secure Data Storage (on Disk), Strong Authentication with Poor Keyboards, Multiple-User Support with Security, Safe Browsing Environment, Secure Operating Systems, Application Isolation, Information Disclosure, Virus, Worms, Trojans, Spyware, and Malware, Difficult Patching/Update Process, Strict Use and Enforcement of SSL, Phishing, Cross-Site Request Forgery (CSRF), Location Privacy/Security, Insecure Device Drivers, Multifactor Authentication, Tips for Secure Mobile Application Development.

UNIT-II:

WAP and Mobile HTML Security :WAP and Mobile HTML Basics, Authentication on WAP/Mobile HTML Sites, Encryption, Application Attacks on Mobile HTML Sites, Cross-Site Scripting, SQL Injection, Cross-Site Request Forgery, HTTP Redirects, Phishing, Session Fixation, Non-SSL Login, WAP and Mobile Browser Weaknesses, Lack of HTTP Only Flag Support, Lack of SECURE Flag Support, Handling Browser Cache, WAP Limitations.

UNIT-III:

Bluetooth Security: Overview of the Technology, History and Standards, Common Uses, Alternatives, Future, Bluetooth Technical Architecture, Radio Operation and Frequency, Bluetooth Network Topology, Device Identification, Modes of Operation, Bluetooth Stack, Bluetooth Profiles, Bluetooth Security Features, Pairing, Traditional Security Services in Bluetooth, Security "Non-Features", Threats to Bluetooth Devices and Networks, Bluetooth Vulnerabilities, Bluetooth Versions Prior to v1.2, Bluetooth Versions Prior to v2.1.

UNIT-IV:

SMS Security: Overview of Short Message Service, Overview of Multimedia Messaging Service, Wireless Application Protocol (WAP), Protocol Attacks, Abusing Legitimate Functionality, Attacking Protocol Implementations, Application Attacks, iPhone Safari, Windows Mobile MMS, Motorola RAZR JPG Overflow, Walkthroughs, Sending PDUs, Converting XML to WBXML.

UNIT-V

Enterprise Security on the Mobile OS: Device Security Options, PIN, Remote, 346 Secure Local Storage, Apple iPhone and Keychain, Security Policy Enforcement, Encryption, Full Disk Encryption, E-mail Encryption, File Encryption, Application Sandboxing, Signing, and Permissions, Application Sandboxing, Application Signing, Permissions, Buffer Overflow Protection, Windows Mobile, iPhone, Android, BlackBerry, Security Feature Summary.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Understand the mobile devices and its platforms.
- 2. Describe the knowledge on mobile operating system wireless communication wit and architecture & Be familiar with Wireless communications and data transmissions.
- 3. Discuss mobile application for distribution & Ability to setup tools to program mobile applications.
- 4. Categorize appropriate mythologies on PDUs, converting XML.
- 5. Implement Secure Local storage on Enterprise Security & Implement a Security Feature summary frame work.

TEXT BOOK:

- 1. "Mobile Application Security", Himanshu Dwivedi, Chris Clark, David Thiel, TATA Mc.GRAW-Hill. REFERENCES:
- 2. "Mobile and Wireless Network Security and Privacy", Kami S.Makki, et al, Springer.
- 3. "Android Security Attacks Defenses", Abhishek Dubey, CRC Press.

M.Tech. I Year II Semester (CSE)

L/T/P C 4/0/- 4

(A958216) PRINCIPLES OF INFORMATION SECURITY (OPEN ELECTIVE-II)

UNIT – I

Introduction to Information Security, Need For Security,

UNIT –II

Legal Ethical and Professional Issues in Information Security, Planning For Security.

$\mathbf{UNIT} - \mathbf{III}$

Risk Management, Security Technology: Firewalls and VPNs, Security Technology: Intrusion Detection and Prevention Systems, and Other Security Tools.

$\mathbf{UNIT} - \mathbf{IV}$

Cryptography, Physical Security, Implementing Information Security,

UNIT – V

Security and Personnel, Information Security Maintenance.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Understand the importance of Information Security.
- 2. Describe the need and role of network security & illustrate the Legal Ethics.
- 3. Deploy the security Technologies. & adapt various firewalls and Intrusion detection systems.
- 4. Implement the techniques used in cryptography.
- 5. Plan methods for information security & demonstrate it with Real Time problems.

TEXT BOOKS:

1. Principles of Information Security by Whitman, Thompson

M.Tech. I Year II Semester (CSE)

L/T/P C -/-/-4 2

(A958217) INTERNET TECHNOLOGIES AND SERVICES LAB

OBJECTICVES:

- Sending receiving e-mails
- Browsing the WWW
- Coding in HTML, Java Script, ASP, VB Script etc.
- Using search engines
- Processing Online information in a critical passion
- Using search internet applications as TELNET and FTP.
- Submitting forms in online

Syllabus:

- 1. Describe the stages of creating e-mail id on yahoo website, How will you send and receive e-mail.
- 2. Describe the chatting components on the Internet.
- 3. Describe the use and function of the following (A) TELNET (B) TCP/IP (C) HTTP
- 4. Create a First web page using notepad in HTML.
- 5. Create your Login web page for your college website or company web site.
- 6. Create the web page with the following constraints (a) An Image on web page (b) a Hyper link to college website (C)
 - (a) An Image on web page (b) a Hyper link to college website (C) A table of marks for CSE Students.
- 7. Show Blinking effect on the web page using Java Script.
- 8. Design a Digital Clock on your webpage using Java Script
- 9. Design a Digital Calculator using HTML and Java Script.
- 10. Design the web page of your college.

Course Outcomes:

After the completion of this course the students should be able to :

- 1. Demonstrate the methods for sending and receiving E-Mails.
- 2. Implement the Java HTML Scripting, JSP, VB Script.
- 3. Create a web page to process online information.
- 4. Design a Web page to submit online forms.