ACADEMIC REGULATIONS
COURSE STRUCTURE AND
DETAILED SYLLABUS

M.TECH
SOFTWARE 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**

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

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

   2.3 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	1st Shift
EEE	i. Power Electronics	1st & 2nd Shift
	ii. Power Systems Control and Automation	1st & 2nd Shift
ME	i. Thermal Engineering.	1st Shift
ECE	i. VLSI System Design	1st & 2nd Shift
	ii. Wireless and Mobile Communications	1st & 2nd Shift
CSE	i. Computer Networks and Information Security	1st & 2nd Shift
	ii. Computer Science and Engineering	1st & 2nd Shift
	iii. Software Engineering	1st Shift

4. **COURSE REGISTRATION**

   4.1 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.

4.2 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'.

4.3 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).

4.4 If the Student submits ambiguous choices or multiple options or erroneous entries-during 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.

4.5 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

5.1 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%.

5.2 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.

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

5.4 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.

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

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

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.

6.1 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.

6.2 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.

6.3 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.

6.4 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.

6.5 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.

6.6   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.

6.7   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.

6.8   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.

6.9   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

7.1 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.

7.2 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% ($\geq 70\%, < 80\%$)	A$^+$ *(Excellent)*	*9*
Below 70% but not less than 60% ($\geq 60\%, < 70\%$)	A *(Very Good)*	*8*
Below 60% but not less than 55% ($\geq 55\%, < 60\%$)	B$^+$ *(Good)*	*7*
Below 55% but not less than 50% ($\geq 50\%, < 55\%$)	B *(above Average)*	*6*
Below 50% ($< 50\%$)	F *(FAIL)*	*0*
Absent	**Ab**	*0*

7.3 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.

7.4 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.

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

7.6 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'.

7.7 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

7.8 The Student passes the Subject/Course only when he **gets GP ≥ 6 (B Grade or above).**

7.9 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

.... for each semester $SGPA = \left\{ \sum_{i=1}^{N} C_i G_i \right\} / \left\{ \sum_{i=1}^{N} C_i \right\}$

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 i^{th} Subject.

7.10 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

$CGPA = \left\{ \sum_{j=1}^{M} C_j G_j \right\} / \left\{ \sum_{j=1}^{M} C_j \right\}$ .... for all semesters registered

(ie., upto and inclusive of S Semesters, S ≥ 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 j^{th} 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.

7.11 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.

8.1 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.

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

8.3 After satisfying 8.2, a candidate has to submit, in consultation with his Project Supervisor, the title, objective and plan of action of his project work to the PRC for approval. Only after obtaining the approval of the PRC the student can initiate the Project work.

8.4 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.

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

8.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of 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.

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

8.8 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.

8.9 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.

8.10 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.

8.11 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.

8.12 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.

8.13 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.

8.14 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.

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

9. AWARD OF DEGREE AND CLASS

9.1 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.

9.2 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	$6.75 \leq CGPA < 7.75$
Second Class	$6.00 \leq CGPA < 6.75$

9.3 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

11.1 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.

11.2 The candidate who fails in any subject will be given two chances to pass the same subject; otherwise, he has to identify an equivalent subject as per R15 Academic Regulations.

12. GENERAL

12.1 **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.

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

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

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

12.5 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.

12.6 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.

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MALPRACTICES RULES
DISCIPLINARY ACTION FOR/IMPROPER CONDUCT IN EXAMINATIONS

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

		academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.

11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech. (SOFTWARE ENGINEERING)

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Code	Course Title	L	P	C
Core Course I	A925101	Data Structures and Algorithms	4	-	4
Core Course II	A925102	Software Development Methodologies	4	-	4
Core Course III	A925103	Software Requirements and Estimation	4	-	4
Core Elective I	A925104	Cloud Computing	4	-	4
	A925105	Database Internals	-	-	-
	A925106	Component Based Software Engineering	-	-	-
	A925107	Internet Technologies and Services	-	-	-
Core Elective II	A925108	Big Data Analytics	4	-	4
	A925109	Web Mining	-	-	-
	A925110	Object Oriented Modeling	-	-	-
	A925111	Information Theory and Coding	-	-	-
Open Elective I	A925108	Big Data Analytics	4	-	4
	A925112	Bioinformatics			
	A925113	Biometrics			
	A925114	Computer Forensics			
	A925115	Distributed Systems Security			
Laboratory I	A925116	Software Development Methodologies Lab	-	4	2
Seminar I	A925117	Seminar	-	4	2
		Total Credits	**24**	**8**	**28**

I Year – II Semester

Category	Code	Course Title	L	P	C
Core Course IV	A925201	Software Architecture and Design Patterns	4	-	4
Core Course V	A925202	Software Process and Project Management	4	-	4
Core Course VI	A925203	Software Quality Assurance and Testing	4	-	4
Core Elective III	A925204	Scripting Languages	4	-	4
	A925205	Information Retrieval Systems	-	-	-
	A925206	Semantic Web and Social Networks	-	-	-
	A925207	E-Commerce	-	-	-
Core Elective IV	A925208	Software Security Engineering	4	-	4
	A925209	Cyber Security	-	-	-
	A925210	Information Security And Audit	-	-	-
	A925211	Business Process Management	-	-	-
Open Elective II	A925212	E-Commerce	4	-	4
	A925213	Intellectual Property Rights			
	A925214	Mobile Computing			
	A925215	Mobile Application Security			
	A925216	Principles of Information Security			
Laboratory II	A925217	Software Testing Lab	-	4	2
Seminar II	A925218	Seminar	-	4	2
		Total Credits	**24**	**8**	**28**

II Year - I Semester

Code	Course Title	L	P	C
A925301	Comprehensive Viva-Voce	--	--	4
A925302	Project work Review I	--	24	12
	Total Credits	--	**24**	**16**

II Year - II Semester

Code	Course Title	L	P	C
A925401	Project work Review II	--	8	4
A925402	Project Evaluation (Viva-Voce)	--	16	12
	Total Credits	--	**24**	**16**

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
                                                                          4/0/-   4

(A925101) DATA STRUCTURES AND ALGORITHMS

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

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic, Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples. Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, 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, Hash table. Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV

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

UNIT V

Search trees- Binary search tree-Binary search tree ADT ,insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees – Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java. util-Tree Set, 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. Understand the basics of Algorithms and analyze the performance and complexity of Algorithms.
2. Gain knowledge about applications of data structures including creating, inserting, deleting, searching and sorting of data for each data structure.
3. Experiment with using linear data structures like stacks, queues and linked list for real time applications & Sorting –Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, and comparison of sorting methods.
4. Distinguish between Trees and Graphs and the areas where best applicable
5. Be able to decide an appropriate data structure for any specific problem.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage learning.
3   Data structures and Algorithm Analysis in Java, M. A. Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2   Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th edition, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M. T. Goodrich, R. Tomassia, 3rd edition, Wiley India Edition.
5.   Data structures and the Java Collection Frame work, W. J. Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Top, 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.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
                                                                4/0/-   4

(A925102) SOFTWARE DEVELOPMENT METHODOLOGIES

Objectives:
Your studies will enable you to develop:
* A broad and critical understanding of all the processes for engineering high quality software and the principles, concepts and techniques associated with software development
* An ability to analyze and evaluate problems and draw on the theoretical and technical knowledge to develop solutions and systems
* A range of skills focused on the analysis of requirements, design and implementation of reliable and maintainable software, with strong emphasis on engineering principles applied over the whole development lifecycle
* An awareness of current research in software development, the analytical skills and research techniques for their critical and independent evaluation and their application to new problems.

UNIT I

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

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

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

UNIT II

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

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

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

UNIT III

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

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

Software Design Approaches, Structured Analysis,

Structured Design.

UNIT IV

Object Oriented Concepts and Principles, Object Oriented Analysis, Object Oriented Design,

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

UNIT V

User Interface Design, Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation. **Coding and Documentation**.

Course Outcomes:
After the completion of this course, the students should be able to
1. Demonstrate in depth knowledge on: Software Paradigms, Agile Development, Software Reuse, and Testing & Perform requirements analysis and build requirements model.
2. Apply advanced software engineering models in software development life cycle.
3. Design and create the architectural design to map data flows.
4. Adapt Software design approaches & Understand object oriented concepts and principles.
5. Implement and develop interface analysis.

TEXT BOOKS:
1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGraw Hill International Edition, 2005 (Unit 1, 2, 3, 5)
2. Software Engineering by Jibitesh Mishra, Ashok Mohanty. Pearson.(Unit 4,5)

REFERENCE BOOKS:
1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall,PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering 3: Domains, Requirements and Software Design, D.Bjorner, Springer, International Edition.
9. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, Wiley India edition.
10. Introduction to Software Engineering, R.J.Leach,CRC Press.
11. Software Engineering Fundamentals, Ali Behforooz and Frederick J.Hudson, Oxford University Press, rp2009
12. Software Engineering Handbook, Jessica Keyes, Auerbach, 2003.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
                                                                4/0/- 4

(A925103) SOFTWARE REQUIREMENTS AND ESTIMATION
Objectives:
- Students will demonstrate knowledge of the distinction between critical and non-critical systems.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management. Students will author a software
- requirements document.
- Students will demonstrate an understanding of the proper contents of a software requirements document. Students will author a formal specification for a software
- system.
- Students will demonstrate an understanding of distributed system architectures and application architectures. Students will demonstrate an understanding of the differences between real-time and non-real time systems. Students will demonstrate
- proficiency in rapid software development techniques.
- Students will demonstrate proficiency in software development cost
- estimation Students will author a software testing plan.

UNIT I

Software Requirements: What and Why

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

Software Requirements Engineering

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

UNIT II

Software Requirements Management

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

Software Requirements Modeling

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

UNIT III

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

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

UNIT IV

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

UNIT V

Tools for Requirements Management and Estimation

Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation, **Software Estimation Tools:** Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools

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

1. Gain knowledge on: Requirements engineering and Management• Estimation of software - size, effort, schedule and cost & analyze the problems in estimation & factors influencing estimation and build traceability matrix, links in requirement chain.
2. Apply requirement management and estimation tools for software development.
3. Gain the understanding of the requirements engineering and management principles for effective software implementation & Develop Estimation tools for requirement management.
4. Solve size and cost estimation for software development using COCOMO II, Putnam Estimation and Algorithmic models.
5. Predict the components of Software and size estimations & analyze the models, object and define problem frames.

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

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
4/0/-   4

(A925104) 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 Outcomes:
After the completion of this course, the students should be able to
1. Demonstrate knowledge on Virtualization models, Cloud Architecture, Services and Programming concepts & analyze the problems in existing cloud architectures.
2. Apply concurrent programming, throughput computing and Data intensive computing in Cloud programming.
3. Develop research insights into emerging technologies and energy management.
4. Apply virtualization techniques to optimize resource sharing.
5. Learn basics of python and cloud application development & Implement data security in the cloud.

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. Cloud Security and Privacy: Mather, Kumaraswamy and Latif.2011. SPD, OREILLY.
5. Virtualization Security: Dave shackleford 2013. SYBEX a wiley Brand.
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

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VAAGDEVI COLLEGE OF ENGINEERING
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M.Tech- I Year – I Semester (Software Engineering)   **L/T/P C**
                                                                               4/0/- 4

(A925105) DATABASE INTERNALS (Core Elective-I)

UNIT I

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

UNIT II

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

UNIT III

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL.
   Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques – Concurrency Control without Locking.
Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery.

UNIT IV

  Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks. Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete. Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable Vs Linear Hashing.

UNIT V

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

Course Outcomes:
After the completion of this course, the students should be able to
1. Explain structure of databases and how to design a database & design the appropriate tables Handling Keys appropriately Enforcing Integrity Constraints.
2. Able to maintain the database consistent normalizing the tables to eliminate redundancies.
3. Discuss Storage Optimizing Strategies for easy retrieval of data through index Triggers, Procedures and Cursors, Transaction Management.
4. Explain distributed databases management system concepts and Implementation.
5. Understand the concepts of crash recovery & develop methods to store data in distributed databases.

TEXT BOOKS:
1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:
1. Introduction to Database Systems, C.J.Date, Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database-Principles, Programming and Performance, P.O'Neil & E.O'Neil, 2nd ed, ELSEVIER
6. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.
10. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez , Pearson Education, 2nd Edition.
11. Distributed Database Systems, Chhanda Ray, Pearson.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C

4/0/-   4

(A925106) COMPONENT BASED SOFTWARE ENGINEERING
(Core Elective-I)

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

UNIT I

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

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

UNIT II

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

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

UNIT III

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

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

UNIT IV

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

UNIT V

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

Course Outcomes:

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

1. Define a software component and its element & understand the concepts for the case of components.
2. Plan team roles for CBD.
3. Practice software engineering from subroutines & measure the metrics for software components.
4. Describe the trouble shooting with testing components.
5. Generate software components & implement COM+ and CCM software agents.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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VAAGDEVI COLLEGE OF ENGINEERING
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M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
4/0/- 4

(A925107)INTERNET TECHNOLOGIES AND SERVICES
(Core Elective-I)

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 Java Scripts, 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. Client Side: HTML5, CSS3, JavaScript, Ajax, JQuery and JSON Server Side: Servlets, JSP.
2. Database: MySQL with Hibernate and Connection Pooling.
3. Introduce MVC Architecture and validate framework.
4. SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS.
5. Understand the concepts SOAP in web services & Deploy and install web service framework

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

REFERENCE BOOKS:
1. Programming the world wide web,4th edition, R.W.Sebesta, Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE
3. TECHNOLOGIES , Marty Hall and Larry Brown Pearson
4. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson.
5. Jakarta Struts Cookbook, Bill Siggelkow, S P D O'Reilly.
6. Professional Java Server Programming, S.Allamaraju & others Apress (dreamtech).
7. Java Server Programming ,Ivan Bayross and others, The X Team,SPD

8. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
9. Beginning Web Programming-Jon Duckett, WROX.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
                                                              4/0/- 4

(A925108) BIG DATA ANALYTICS (Core Elective-II)

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. Gain knowledge on Big Data storage, processing, querying and reporting.
2. Analyze complex analytical problems to provide optimal solutions.
3. Initiate research using HDFS and Map Reduce programming model for the implementation of parallelism.
4. Apply various Big Data tools: Sqoop, HBase, Map Reduce and Mahout for data analytics & Plan a use case of Hadoop.
5. Develop applications with Hadoop YARN & Introduce Mobile Analytics Tools.

TEXT BOOKS

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book^{TM} , DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

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.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
                                                                4/0/-   4

(A925109) WEB MINING (Core Elective-II)

Objectives:
- To describe web mining and understand the need for web
- mining To differentiate between Web mining and data mining
- To understand the different application areas for web mining
- To understand the different methods to introduce structure to web-based
- data To describe Web mining, its objectives, and its benefits
- To understand the methods of Web usage mining

UNIT I
Introduction to Web Data Mining and Data Mining Foundations
Introduction – World Wide Web(WWW), A Brief History of the Web and the Internet, Web Data Mining-Data Mining, Web Mining.
Data Mining Foundations – Association Rules and Sequential Patterns – Basic Concepts of Association Rules, Apriori Algorithm- Frequent Itemset Generation, Association Rule Generation, Data Formats for Association Rule Mining, Mining with multiple minimum supports – Extended Model, Mining Algorithm, Rule Generation, Mining Class Association Rules, Basic Concepts of Sequential Patterns, Mining Sequential Patterns on GSP, Mining Sequential Patterns on PrefixSpan, Generating Rules from Sequential Patterns.

UNIT II
Supervised and Unsupervised Learning
Supervised Learning - Basic Concepts, Decision Tree Induction – Learning Algorithm, Impurity Function, Handling of Continuous Attributes, Classifier Evaluation, Rule Induction – Sequential Covering, Rule Learning, Classification Based on Associations, Naïve Bayesian Classification , Naïve Bayesian Text Classification - Probabilistic Framework, Naïve Bayesian Model .
Unsupervised Learning – Basic Concepts , K-means Clustering – K-means Algorithm, Representation of Clusters, Hierarchical Clustering – Single link method, Complete link Method, Average link method, Strength and Weakness.

UNIT III
Information Retrieval and Web Search
Basic Concepts of Information Retrieval, Information Retrieval Methods - Boolean Model, Vector Space Model and Statistical Language Model, Relevance Feedback, Evaluation Measures, Text and Web Page Preprocessing – Stopword Removal, Stemming, Web Page Preprocessing, Duplicate Detection, Inverted Index and Its Compression – Inverted Index, Search using Inverted Index, Index Construction, Index Compression, Latent Semantic Indexing – Singular Value Decomposition, Query and Retrieval, Web Search, Meta Search, Web Spamming.

UNIT IV

Link Analysis and Web Crawling

Link Analysis - Social Network Analysis, Co-Citation and Bibliographic Coupling, Page Rank Algorithm, HITS Algorithm, Community Discovery-Problem Definition, Bipartite Core Communities, Maximum Flow Communities, Email Communities.

Web Crawling – A Basic Crawler Algorithm- Breadth First Crawlers, Preferential Crawlers, Implementation Issues – Fetching, Parsing, Stopword Removal, Link Extraction, Spider Traps, Page Repository, Universal Crawlers, Focused Crawlers, Topical Crawlers, Crawler Ethics and Conflicts.

UNIT V

Opinion Mining and Web Usage Mining

Opinion Mining - Sentiment Classification – Classification based on Sentiment Phrases, Classification Using Text Classification Methods, Feature based Opinion Mining and Summarization – Problem Definition, Object feature extraction, Feature Extraction from Pros and Cons of Format1, Feature Extraction from Reviews of Format 2 and 3, Comparative Sentence and Relation Mining, Opinion Search and Opinion Spam.

Web Usage Mining - Data Collection and Preprocessing- Sources and Types of Data, Key Elements of Web usage Data Preprocessing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web usage Patterns -Session and Visitor Analysis, Cluster Analysis and Visitor Segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigation Patterns.

Course Outcomes:

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

1. Introduce students to the basic concepts and techniques of Information Retrieval, Web Search, Data Mining, and Machine Learning for extracting knowledge from the web.
2. Develop skills of using recent data mining software for solving practical problems of Web Mining.
3. Gain experience of doing independent study and research & Understand the concepts of information retrieval.
4. Analyze the link analysis and web crawling & Collect data and pre-process the types of data.
5. Discover and analyze web usage patterns & Develop cluster analysis of web usage patterns.

TEXT BOOK:

1. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by Bing Liu (Springer Publications)

REFERENCES BOOKS:

1. Data Mining: Concepts and Techniques, Second Edition Jiawei Han, Micheline Kamber (Elsevier Publications)
2. Web Mining:: Applications and Techniques by Anthony Scime
3. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)　　　　　　　L/T/P C
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(A925110) OBJECT ORIENTED MODELING (Core Elective-II)

Objectives:
- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.
- To describe the activities in the different phases of the object-oriented development
- life cycle.
- State the advantages of object-oriented modeling vis-à-vis structured approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
  Model a real-world application by using a UML class diagram.
  Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

UNIT I
Introduction to UML: The meaning of Object Orientation, object identity, Encapsulation, information hiding, polymorphism, generosity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.
Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.
Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, callback mechanism, broadcast messages.

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

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

UNIT IV

Iterative incremental process: iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.

The Generic Iteration workflow: phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed, assess the iteration and phases

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

UNIT V

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

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

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

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

Course Outcomes:

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

1. State the advantages of object-oriented modeling vis-à-vis structured approaches.
   Compare and contrast the object-oriented model with the E-R and EER models.
2. Model a real-world application by using a UML class diagram.
   Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
3. Recognize when to use generalization, aggregation, and composition relationships & Specify different types of business rules in a class diagram
4. Define use case, analyze, design and implementation & Develop iterative approach.
5. Construct the phase and execute transition phase & Plan a case study for Library.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech- I Year – I Semester (Software Engineering)   L/T/P C
                                                                4/0/-   4

(A925111) INFORMATION THEORY AND CODING (Core Elective-II)

Objectives:

- To learn various coding techniques of information
- To learn probability theories related to information

UNIT -I
RANDOM VARIABLES AND PROCESSES: Events - Random variables - Distribution and density functions Operations on random variables - Covariance - Correlation functions - Random process - Stationarity - Spectral decomposition - Response of linear system to random inputs, Relation between information and probability

UNIT- II
INFORMATION ENTROPY FUNDAMENTALS: Self information measure - mutual and self information - Entropy function - Characteristics of Entropy function - Conditional Entropies - Derivation of the noise characteristics of a channel - Redundancy - Efficiency and channel capacity - capacities of channels with symmetric noise structure. Huffman coding: Implementation of Huffman code, Shannon's theorem, Code design, Shannon - Fano coding

UNIT-III
ERROR CONTROL CODING : Backward error correction linear block codes, BCH codes, Golay codes, efficiency of LBC, forward correction codes-Convolution coding decoding algorithms, Viterbi decoding optimum decoding performance **measures**

UNIT- IV
DATA AND VOICE CODING: Context dependent coding, arithmetic codes, overall efficiency consideration. Voice coding, Delta Modulation and adaptive delta modulation, linear predictive coding, silence coding, sub-band coding

UNIT -V
COMPRESSION TECHNIQUES: Principles – Text compression –Static Huffman Coding - Dynamic Huffman coding. Arithmetic coding – Image Compression – Graphics Interchange format – Tagged Image File Format – Digitized documents – Introduction to JPEG standards.

Course Outcomes:
After the completion of this course, the students should be able to:
1. Understand random variables and density functions.
2. Demonstrate the information Entropy and fundamentals.
3. Discuss Shannon theory & Adapt data and voice coding
4. Illustrate Forward correction code & Practice the principles of Text compression.
5. Develop Graphic Interchange format& Introduce JPEG standards.

REFERENCES:
1. Reza F M, "An Introduction to Information Theory", McGraw Hill, 2000.
2. Viterbi A and Omura J K, "Principles of Digital Communication and Coding", McGraw Hill, 1979.
3. Cover T M and Thomas J A, "Elements of Information theory", 2nd edition, John Wiley & Sons, 2006.

4. Sheldon M Ross, "Introduction to Probability Models", Academic Press, 2003
5. Roth R, "Introduction to Coding theory", Cambridge University Press, 2006.
6. Peter Sweeney, "Error Control Coding: From Theory to Practice", John Wiley & Sons, 2002.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

I Year M.Tech. (SE) I-Semester   **L/T/P C**
                                                                     4/0/- 4
(A925112) BIOINFORMATICS (Open Elective-I)

UNIT-I

Introduction to Bioinformatics and Biological Databases, Sequence allignment, Pairwise Sequence allignment, multiple sequence allignment, 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 pridiction, RNA structure prediction, protine motives and domain prediction

UNIT-IV

Structural Bioinformatics: Basics,Protine structure Visualization, comparision,classofication, 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. Introduce Bioinformatics and databases.
2. Discuss molecular phylogenetics in detail & Demonstrate phylogene tree Construction.
3. Plan a Gene promoter.
4. Compare and classify protein secondary structure & Make a protein tertiary prediction.
5. Construct a comparison of genomics and proteomics & Map a genome and functional proteomics.

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
I Year M.Tech. (SE) I Semester   **L/T/P C**

                                                      4/0/- 4

(A925113) 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 Biometrices – 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. Understand the history, types, architecture and Applications of Biometric System and perform a comparative study on Benefits of Biometrics Versus Traditional Authentication Methods.
2. Acquire advanced knowledge in Biological Biometrics like Face Recognition, Retina and Iris Biometrics and Identify the advantages and disadvantages of Using Vein Pattern of Palm, Fingerprint biometrics and Hand Geometry.
3. Implement practically any one of the biometric authentication system.
4. Explore the different cryptography techniques which can improve the working of biometric systems.
5. Make a study on how Watermarking Techniques and Image Enhancement Techniques can be used in biometrics and identify the future scope.

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.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

I Year M.Tech. (SE) I-Semester   **L/T/P C**
                                                                             4/0/- 4

(A925114) 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. Understand the fundamental concepts of Computer Forensics and Describe the different Types of Computer Forensics Technologies.
2. Explain the role of backup in data recovery and how it can be used as an evidence and Classify the different types of evidences and identify the steps in collecting the evidences.
3. Explain the process of verification and Authentication of any computer image.
4. Understand the concepts like destruction of any Email or damaging any computer evidence under Network Forensics.
5. Interpret the performance of the current Computer Forensics Tools & Plan to validate software tools and test software.

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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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

I Year M.Tech. (SE) I-Semester

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

(A925115) 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. Compare the benefits of centralized system versus distributed systems and define the Architectural requirements for distributed environment and Formulate a case study on Inter Process Communication using Java RMI.
2. Analyze the concepts of Operating system architecture, File Service architecture, Name Services and the Domain Name System. Design case study on Global Name Service, X.500 Directory Service.
3. Understand the concepts of concurrency control and deadlocks in distributed system environment.
4. Classify the cryptographic algorithms and identify which suits best for securing the distributed system.
5. Plan CORBA case study-Introduction, CORBA RMI, CORBA 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, 2010

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

I Year M.Tech (Software Engineering) I Semester   **L/T/P C**
                                                                         -/ - /4 /2

(A925116) SOFTWARE DEVELOPMENT METHODOLOGIES
LAB

Objectives:

- To understand the software engineering methodologies involved in the phases for project development.
- To gain knowledge about open source tools used for implementing software engineering methods. To exercise developing product-startups implementing
- software engineering methods.

Open source Tools: StarUML / UMLGraph / Topcased

Prepare the following documents and develop the software project startup, prototype model, using software engineering methodology for at least two real time scenarios or for the sample experiments.

1. Problem Analysis and Project Planning -Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.
2. Software Requirement Analysis – Describe the individual Phases/modules of the project and Identify deliverables. Identify functional and non-functional requirements.
3. Data Modeling – Use work products – data dictionary.
4. Software Designing - Develop use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
5. Prototype model – Develop the prototype of the product.

The SRS and prototype model should be submitted for end semester examination.
List of Sample Experiments:

1. Student Enrolment System.

A University has contracted you to develop their new student records system. The normal tasks that the system performs are as follows:

Enroll a student at the university: A student provides his or her personal details (name, address, sex, date of birth), along with the code of the course (e.g. Bachelor of Computer Science) in which he or she wishes to enroll. A student record is created, and a unique student ID number is assigned to the student. The system automatically enrolls the student in any core first-year subjects for the course.

Enroll a student in a subject: A student provides his or her student ID number and the subject code of the subject in which he or she wish to enroll. The system checks that the subject requested by the student is allowed for the course in which the student is enrolled. If not, the enrolment request is rejected. The system checks what subjects (if any) are specified as prerequisites for the subject in which the student wishes to enroll. If the student has passed all the prerequisite subjects, he or she is enrolled in the desired subject. Otherwise, the enrolment request is rejected.

Record a mark for a student: A staff member accesses the system by giving a subject code and a password for that subject. If the password is correct, the system displays the list of students enrolled in the subject to the staff member. The staff member can then specify a mark for any student on the list.

Create a new subject: An administrator accesses the system using a password. The administrator then chooses a subject code for the new subject. The system checks that this code is not already in use in the system, and if not, creates a new subject record. The administrator then gives the subject name, the course to which it belongs, the year of the course in which it may first be taken, a flag indicating whether or not it is a core subject and the codes of any prerequisite subjects.

Print a transcript of a student's results: An administrator accesses the system using a password. The administrator then gives the student ID number of the student for whom the transcript is to be generated. The system contacts the finance system to check whether or not the student has paid all fees. If fees have been paid, the system creates a transcript showing all the subjects in which the student has been enrolled in each year, and the mark for that subject. The header of the transcript shows the student's personal details and the course in which he or she is enrolled.

Assign a staff member to a subject: An administrator accesses the system using a password. The administrator then gives the subject code for the subject to which the staff member is to be assigned, and the staff ID number of the staff member.

2. **Online Bookshop.**

A major book retailer is planning to develop a computer system to handle their new online bookshop: Booky.com. You have been chosen to do the analysis and design.
The following requirements have been identified:
Customers can search for books on the Booky.com website, either by author name, or words in the title. A list of all matching books is returned to the customer. A customer does not need to be logged-in in order to search. The system records all the customers of the Booky.com who have ever logged in. A customer may be an individual customer or a business customer. · Each customer has a username and password. Business customers may have several usernames and passwords, corresponding to different divisions within the business.

When a customer has selected a book to buy at the Booky.com website.

The system prompts for the customer's username and password. The customer enters these details. The system verifies the customer's identity and retrieves the customer's name and address, then prompts for credit card details. The customer enters these details. The system checks the credit card details. The system shows the customer the book and delivery price. The customer confirms the transaction.
The system records all books available at Booky.com. For each book, the author, title and ISBN number are recorded. The number of each book in stock is also stored, along with the number on order by customers and the number on order from publishers. Books may be temporarily unavailable.
All books are stored in the Booky.com warehouse. The warehouse can be contacted via a secure internet connection.
For each customer, a permanent record of books bought by that customer is maintained. Likewise, for each book, a record of customers who have bought that book is kept.
A customer order consists of one or more order lines, each corresponding to a particular book. A customer may choose to defer the shipment of an order until all the order lines have been filled.
When the warehouse fills all or part of customer order, an email is sent to the customer informing them of what has been shipped.
If a book ordered by a customer turns out to be unavailable, the corresponding order line is flagged and an email is sent to the customer informing them of the problem. At this stage the customer can cancel this order line.
When a book corresponding to a previously-unavailable order line becomes available, an

email is sent to the customer and a copy of the book is held for seven days, after which it is returned to normal stock if the customer has not confirmed the order.

The shop keeps track of which publishers produce particular book titles. Some books may be available from more than one publisher.

Although Booky.com will initially sell only books, it is envisaged that in future it will offer further products, such as CDs. The list of possible future products has not yet been finalized.

3. **Course management system** (CMS)

A course management system (CMS) is a collection of software tools providing an online environment for course interactions. A CMS typically includes a variety of online tools and environments, such as:

*   An area for faculty posting of class materials such as course syllabus and handouts
*   An area for student posting of papers and other assignments
*   A grade book where faculty can record grades and each student can view his or her
*   grades.
    An integrated email tool allowing participants to send announcement email messages to the entire class or to a subset of the entire class
*   A chat tool allowing synchronous communication among class participants
*   A threaded discussion board allowing asynchronous communication among participants

In addition, a CMS is typically integrated with other databases in the university so that students enrolled in a particular course are automatically registered in the CMS as participants in that course.

The Course Management System (CMS) is a web application for department personnel, Academic Senate, and Registrar staff to view, enter, and manage course information formerly submitted via paper. Departments can use CMS to create new course proposals, submit changes for existing courses, and track the progress of proposals as they move through the stages of online approval.

4. **Easy Leave**

This project is aimed at developing a web based Leave Management Tool, which is of importance to either an organization or a college.

The **Easy Leave** is an Intranet based application that can be accessed throughout the organization or a specified group/Dept. This system can be used to automate the workflow of leave applications and their approvals. The periodic crediting of leave is also automated. There are features like notifications, cancellation of leave, automatic approval of leave, report generators etc in this Tool.

Functional components of the project:

There are registered people in the system. Some are approvers. An approver can also be a requestor. In an organization, the hierarchy could be Engineers/Managers/Business Managers/Managing Director etc. In a college, it could be Lecturer/Professor/Head of the Department/Dean/Principal etc.

Following is a list of functionalities of the system:

1. A person should be able to

> login to the system through the first page of the application
> change the password after logging into the system
> see his/her eligibility details (like how many days of leave he/she is eligible for etc)

query the leave balance

see his/her leave history since the time he/she joined the company/college

> apply for leave, specifying the from and to dates, reason for taking leave, address for communication while on leave and his/her superior's email id
> see his/her current leave applications and the leave applications that are submitted to him/her for approval or cancellation

approve/reject the leave applications that are submitted to him/her

withdraw his/her leave application (which has not been approved yet)

> Cancel his/her leave (which has been already approved). This will need to be approved by his/her Superior

get help about the leave system on how to use the different features of the system

2. As soon as a leave application /cancellation request /withdrawal /approval /rejection /password-change is made by the person, an automatic email should be sent to the person and his superior giving details about the action
3. The number of days of leave (as per the assumed leave policy) should be automatically credited to everybody and a notification regarding the same be sent to them automatically

An automatic leave-approval facility for leave applications which are older than 2 weeks should be there. Notification about the automatic leave approval should be sent to the person as well as his superior

5. E-Bidding

Auctions are among the latest economic institutions in place. They have been used since antiquity to sell a wide variety of goods, and their basic form has remained unchanged. In this dissertation, we explore the efficiency of common auctions when values are interdependent- the value to a particular bidder may depend on information available only to others-and asymmetric. In this setting, it is well known that sealed-bid auctions do not achieve efficient allocations in general since they do not allow the information held by different bidders to be shared.

Typically, in an auction, say of the kind used to sell art, the auctioneer sets a relatively low initial price. This price is then increased until only one bidder is willing to buy the object, and the exact manner in which this is done varies. In my model a bidder who drops out at some price can "reenter" at a higher price.

With the invention of E-commerce technologies over the Internet the opportunity to bid from the comfort of ones own home has seen a change like never seen before. Within the span of a few short years, what may have began as an experimental idea has grown to an immensely popular hobby, and in some cases, a means of livelihood, the Auction Patrol gathers tremendous response everyday, all day. With the point and click of the mouse, one may bid on an item they may need or just want, and in moments they find that either they are the top bidder or someone else wants it more, and you're outbid! The excitement of an auction all from the comfort of home is a completely different experience.

Society cannot seem to escape the criminal element in the physical world, and so it is the same with Auction Patrols. This is one area wherein a question can be raised as to how safe Auction Patrols.

Proposed system

1. To generate the quick reports
2. To make accuracy and efficient calculations
3. To provide proper information briefly
4. To provide data security
5. To provide huge maintenance of records
6. Flexibility of transactions can be completed in time

6. Electronic Cash counter

This project is mainly developed for the Account Division of a Banking sector to provide better interface of the entire banking transactions. This system is aimed to give a better out look to the user interfaces and to implement all the banking transactions like:
- Supply of Account Information
- New Account Creations
- Deposits
- Withdraws
- Cheque book issues
- Stop payments
- Transfer of accounts
- Report Generations.

Proposed System:

The development of the new system contains the following activities, which try to automate the entire process keeping in view of the database integration approach.
User friendliness is provided in the application with various controls.
The system makes the overall project management much easier and flexible.
   Readily upload the latest updates, allows user to download the alerts by clicking the URL.
   There is no risk of data mismanagement at any level while the project development is under process.
It provides high level of security with different level of authentication

7. Enterprise Security Services

Verification and Validation is a part of S/W Quality Assurance. Verification refers to the set of activities that ensure correctly implements a specific function. Validation refers to a different set of activities that ensure that the software that has been built is traceable to customer requirements.

Verification:" Are we building the product right"

Validation: "Are we building the right product"
The project entitled Independent Project Metrics is an effort, to develop a tool to manage the Verification and Validation process.

The specific purpose of the Independent Verification and Validation Process o f Project
Metrics Tool is to bring out the various Verification and validation tasks to be performed.

The scope of the Project Metrics is to cover the developed for system.

The goals of the V&V effort is to ensure that the software and the documents are developed are of high quality as expected from any mission critical software. This project generates the plan for Verification and validation process. This project maintain the document names, source code module names, version number, released date, receiving date size of document and source code modules of receiving projects for Verification and validation.

Using this application we assign the tasks/activities to different persons and also calculate the expected efforts and actual efforts. The V&V co-coordinator does this work.

Proposed System:

The general description gives an "executive overview" and is very client-oriented. It expounds on the functional and data requirements of the application. It also lists the limitations, assumptions and dependencies of the application. It also touches on the performance and quality requirements of the application and provides a solid definition of the interface

The computerization of this system would avoid the wrong interpretation and bad calculation of data
.The system help the user to see any documents, source code, tasks, activities, team information with

details at the click of a button. The record data is maintained and backed up such a way that data is not loss. The speed of the system could also increased

8. ERP

ERP is a powerful human resource tool for maintaining employee and company information. More than a data storage program, ERP helps you manage your employees. ERP offers a wide variety of reports that give you exactly the information you need. View payroll information by department, or find everyone who is receiving company

Module Description:
1. Payroll
2. Employee
3. Employee payslip
4. Selection process
5. Reports
6. Mailing System
7. Training
8. Add Company Information

PROPOSED SYSTEM

The proposed system is designed to eliminate all the drawbacks of the existing system. The system is part of a large HRMS Application and shall be responsible for maintaining information about employees,

> positions,
> company benefits,
>> departments, new recruit checklists,
>> employee achievements,
> warnings,
> evaluation reports,
>> education & training,
>> administration,
> work changes and several ad hoc reports.

The major advantage of the proposed system is,

> It's online, so that information is available
> anytime. High integrity and security.
> Ability to incorporate newly available
> data. It is user friendly
> Speed and accuracy is
> increased Fully automated.
> Security is associated with user authentication
> Duplication of information is curbed

9. Examination Branch System

The project **"Examination Branch System** " is to reduce the overhead involved in the process of maintains the data and the transaction in the Examination branch**.** Examination branch is an intranet application for an organization. It is software which is used to perform all the examination activities like adding employees, search employees, delete employees and assign examination duties etc.

The basic framework of the project can be developed in .NET. Making use of this application the administrator can perform their activities through it.

Proposed System: can be extend to assign duties to faculty, can implement edit, update operations and develop a user friendly type.

10. Exam Experts

The system would be providing a number of services, automating the processes that are being done manually. The services include communication services such as mailing facility, chat service, electronic file transfer etc and office automation packages such as leave letter processing, admission management, teaching evaluation, counseling automation etc.

The aim of the project is to design a comprehensive web enabled application for management of the Examination Process. Examination system is categorized into various

sections. Among those sections, this system concentrates on the work being done in section (E-X).

The section (E-X) deals with the confidential work, i.e., Coding-Decoding of answer scripts, Processing of results, Computerization of certificates etc. This is an automated section and it plays a pivotal role in the Examination Process starting from the Application Processing to the final announcement of results

This project is aimed to solve many of the problems that are in the existing system and also provide a hassle free system that is efficient and easy to use. This project concentrates mainly on Application Processing, Marks Processing and Results Processing with an easy to use interface. The system also provides a means to generate and print various types of reports.

This project can include an **Application Processing System:**

This phase involves the storing of the application information and generating the required reports.
1. Entry of Application forms according to center ,course order and batch.
2. Generating Application Id for further transactions.
3. Capturing of photographs of students for hall ticket processing.
4. Reports involving the information about students who are appearing for supplementary exams.
5. Generating nominal roles reports describing the college, course, subjects and the students appearing.

Course Outcomes:
After the completion of this course, the students should be able to
1. Demonstrate in depth knowledge on: Software Paradigms, Agile Development, Software Reuse, and Testing **&** Perform requirements analysis and build requirements model.
2. Apply advanced software engineering methods in software development life cycle & analyze the techniques and requirements for different system models.
3. Design and create the architectural design to map data flows.
4. Adapt Software design approaches & Understand object oriented concepts and principles.
5. Implement and develop interface analysis.

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(A925201) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

Objectives:
After completing this course, the student should be able to:
- To understand the concept of patterns and the Catalog.
- To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.
- To understand the variety of implemented bad practices related to the Business and Integration tiers.
- To highlight the evolution of patterns.
- To 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. Discuss a Software Architecture, Architectural patterns and reference models.
2. Define architectural structures and views.
3. Design an Architecture Quality Attributes, Achieving qualities, Architectural styles and patterns & Understand Architecture design decision making.
4. Describe Chain of responsibility, command Interpreter and iterator & Plan case study in utilizing architectural structures.
5. Make a study in interoperability and Air Traffic Control & Develop Celsius Tech – a case study in product line development.

TEXT BOOKS:
1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995.

REFERENCE BOOKS:
1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.
8. Pattern Oriented Software Architecture, F.Buschmann & others, John Wiley & Sons.

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(A925202) SOFTWARE PROCESS AND PROJECTMANAGEMENT

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. Understand the critical problems and principles in software process management.
2. Define the roles in project management process & Discuss various frameworks in software project management.
3. Practice Life Cycle Phases and Process artifacts & Plan a report on the Software project management.
4. Analyze and write feasibility study on system implementations.
5. Make a report on pragmatic software metrics & Develop a case study on modern project profiles.

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.

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(A925203) SOFTWARE QUALITY ASSURANCE AND TESTING

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

UNIT- I
Software Quality Assurance and Standards
The Software Quality challenge, What is Software Quality, Software Quality factors, The components of Software Quality Assurance system, Software Quality Metrics, Costs of Software Quality, Quality Management Standards, Management and its role in Software Quality Assurance, SQA unit and other actors in SQA system.
Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom
Balridge, 3 Sigma, 6 Sigma and other latest quality standards.

UNIT- II
Software Testing Strategy and Environment: Minimizing Risks, Writing a Policy for Software Testing, Economics of Testing, Testing-an organizational issue, Management Support for Software Testing, Building a Structured Approach to Software Testing, Developing a Test Strategy.
Building Software Testing Process: Software Testing Guidelines, workbench concept, customizing the Software Testing Process, Process Preparation checklist.
Software Testing Techniques: Dynamic Testing – Black Box testing techniques, White Box testing techniques, Static testing, Validation Activities, Regression testing.

UNIT- III
Software Testing Tools Selecting and Installing Software Testing tools. Automation and Testing Tools **- (Chapter 15) of T2** Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus.

UNIT- IV
Testing Process Seven Step Testing Process – I: Overview of the Software Testing Process, Organizing of Testing, Developing the Test Plan, Verification Testing, Validation Testing.

UNIT- V
Seven Step Testing Process – II: Analyzing and Reporting Test results, Acceptance and

Operational Testing, Post-Implementation Analysis
Specialized Testing Responsibilities: Software Development Methodologies, Testing Client/Server Systems

Course Outcomes:
After the completion of this course, the students should be able to
1. Learn different resources to develop a software.
2. Discuss how to minimize Software Testing Strategy and Environment.
3. Demonstrate approaches in systematic way to maintain and retirement of software.
4. Develop methods to test, detect Life cycle of defect & Summarize SDLC and Testing on software testing process.Analyze the results created during testing process.
5. Plan various goals, techniques and requirements & Identify specialized testing responsibilities.

TEXT BOOKS:

1. Effective Methods for Software Testing, Third edition, *William E. Perry*, Wiley India, 2009.
2. Software Testing – Principles and Practices, *Naresh Chauhan,* Oxford University Press, 2010.
3. Software Quality Assurance – From Theory to Implementation, *Daniel Galin,* Pearson Education, 2009.

REFERENCE BOOKS:
1. Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India,rp2012.
2. Software Testing – Principles, Techniques and Tools, *M.G.Limaye*, Tata McGraw-Hill, 2009.
3. Software Testing - A Craftsman's approach, *Paul C. Jorgensen*, Third edition, Auerbach Publications, 2010.
4. Foundations of Software Testing, *Aditya P. Mathur*, Pearson Education, 2008.
5. Software Testing and Quality Assurance – Theory and Practice, *Kshirasagar Naik, Priyadash Tripathy*, Wiley India, 2010.
6. Software Testing, *Ron Patton*, Second edition, Pearson Education, 2006.
7. Software Testing and Analysis – Process, Principles and Techniques, *Mauro Pezze, Michal Young,* Wiley India, 2008.
7. Software Testing Techniques, Boris Beizer, Second edition, Wiley India, 2006
8. Foundations of Software Testing, Dorothy Graham, et al., Cengage learning, 2007, rp 2010.
9. Software Testing - Effective Methods, Tools and Techniques, *Renu Rajani, Pradeep Oak*, Tata McGraw-Hill, rp2011.
10. Software Automation Testing Tools for Beginners, *Rahul Shende*, Shroff Publishers and Distributors, 2012.
11. Software Testing Tools, *K.V.K.K. Prasad*, Dream Tech Press, 2008.
12. Software Testing Concepts and Tools, *Nageswara Rao Pusuluri*, Dream Tech press, 2007.
13. Software Quality Assurance, *Milind Limaye*, Tata McGraw-Hill, 2011.
14. Software Quality – Theory and Management, *Alan C. Gillies*, Second edition, Cengage Learning,2009.
15. Software Quality – A Practitioner's approach, *Kamna Malik, Praveen Choudhary,* Tata McGraw-Hill, 2008.
16. Software Quality Models and Project Management in a Nutshell, *Shailesh Mehta*, Shroff Publishers and Distributors, 2010.

17. Software Quality Engineering – Testing, Quality Assurance and Quantifiable Improvement, *Jeff Tian*, Wiley India, 2006.
18. Software Quality, *Mordechai Ben-Menachem/Garry S. Marliss,* Cengage Learning, 2010

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(A925204) SCRIPTING LANGUAGES
(CORE ELECTIVE-III)

Objectives:

The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data.

The instructor is advised to discuss examples in the context of Bio-data/ Bio-information

application development.

UNIT- I

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

UNIT- II

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

UNIT- III Advanced PHP Programming

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

UNIT- IV TCL – Tk

TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output,

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

UNIT- V Python

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

Course Outcomes:

After the completion of this course, the students should be able to
1. Understand basics of Pearl and scripting languages.
2. Define a problem on Advanced PHP Programming & Analyze PHP Authentication and Methodologies.
3. Apply different techniques on , Building Web sites for the World and Translating Websites.
4. Discuss problems related to TCL Structure & Illustrate and write event driven programs, making applications internet aware.
5. Implement and Build Small Efficient Python Web Systems & Develop Web Application Framework.

TEXT BOOKS:
1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3rd Edition, Jason Gilmore, Apress Publications (Dreamtech)

REFERENCE BOOKS:
1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Perl by Example, E.Quigley, Pearson Education.
8. Programming Perl, Larry Wall, T.Christiansen and J.Orwant, O'Reilly, SPD.

M. TECH. SOFTWARE ENGINEERING-R13 Regulations
1. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
2. PHP and MySQL by Example, E.Quigley, Prentice Hall(Pearson).
3. Perl Power, J.P.Flynt, Cengage Learning.
4. PHP Programming solutions, V.Vaswani, TMH.

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(A925205) INFORMATION RETRIEVAL SYSTEMS
(CORE ELECTIVE III)

OBJECTIVES

The main objective of this course is to present the basic concepts in information retrieval and more advance techniques of multimodal based information systems.

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 the problems underlined to IRS & demonstrate the basic concepts and objectives in Dictionaries and tolerant retrieval.
2. Understand Scoring, term weighting and the vector space model.
3. Plan a Probabilistic information retrieval.
4. Discuss Vector space classification & Implement Matrix decompositions and latent semantic indexing.
5. Able to understand Web search basics and indexes.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.
4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
5. Information Storage & Retrieval, Robert Korfhage , John Wiley & Sons.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

I Year M.Tech. (SE) II Semester   **L/T/P C**
                                                                        4/0/-   4

(A925206) 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. Understand all the basic concepts of today's WWW and its limitations and need for next generation web.
   2. Explain the new features supported by semantic web and the role of Artificial Intelligence and machine intelligence in semantic web.
   3. Define the term Ontology and interpret how data on semantic web is represented in the form of ontology & Classify the different languages on semantic web namely Resource Description Framework(RDF), RDFSchema and Ontology Web Language(OWL).

4. Explain how to make use of Logics, Rules and Inferences for ontology sharing, mapping and merging.
5. Differentiate between the method of searching in web 2.0 the existing web and web 3.0 (semantic web) the next generation web & Understand what is social network analysis and the role of semantic web.

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.

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   **L/T/P C**

4/0/- 4

(A925207) E – COMMERCE
(CORE ELECTIVE-III)

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 e-commerce. 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. Analyze E-commerce foundation and its importance.
2. Demonstrate a clear strategy on Electronic payment systems.
3. Understand the various Risks in Electronic Payment systems & Discuss the work flow in Intra Organizational Commerce.
4. Describe Supply chain Management. Corporate Digital Library & Illustrate the legal problem and Information based marketing.
5. Plan and discuss global E-commerce issues & Develop a Desktop video conferencing.

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.
4. Electronic Commerce – Gary P.Schneider – Thomson.

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester L/T/P C
  4/0/- 4

(A925208) SOFTWARE SECURITY ENGINEERING (ELECTIVE-IV)

Objectives:

Students will demonstrate knowledge of the distinction between critical and non-critical systems.

Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.

Students will author a software requirements document.

Students will demonstrate an understanding of the proper contents of a software requirements document.

Students will author a formal specification for a software system.

Students will demonstrate an understanding of distributed system architectures and application architectures.

UNIT – I

Security a software Issue: introduction, the problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security

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

UNIT – II

Requirements Engineering for secure software: Introduction, the SQUARE process Model, Requirements elicitation and prioritization

UNIT – III

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

Secure coding and Testing: Code analysis, Software Security testing, Security testing considerations throughput the SDLC

UNIT – IV

Security and Complexity: System Assembly Challenges: introduction, security failures, functional and attacker perspectives for security analysis, system complexity drivers and security

UNIT – V

Governance and Managing for More Secure Software: Governance and security,
Adopting an enterprise software security framework, How much security is enough?,
Security and project
management, Maturity of Practice.

Course Outcomes:
After the completion of this course, the students should be able to
1. Understand what are the sources and threats to software security.
2. Explain the properties of secure software and benefits of providing software security &
    Analyze the SQUARE process Model for gathering requirements to design a secure
    software.
3. Classify the different practices needed for architecture and design of secure software.
4. Summarize the different principles, guidelines and attack patterns of a secure software &
    Experiment with the secure coding and testing.

5. Understand the real time challenges in secure system Assembly & Analyze how much security is sufficient and plan for adopting an enterprise software security framework

TEXT BOOK:
 1. Software Security Engineering: Julia H. Allen, Pearson Education.
REFERNCE BOOKS:
 1. Developing Secure Software: Jason Grembi, Cengage Learning.
 2. Software Security: Richard Sinn, Cengage Learning.
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I Year M.Tech. (SE)-II Semester   **L/T/P C**
                                                                       4/0/- 4

(A925209) CYBER SECURITY (CORE ELECTIVE –IV)

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. Classify the different kinds of information system and identify the need for information security.
2. Understand the application security with respect to Database, E-mail and Internet & Determine the differences between the different kinds of security threats like virus, worms, Trojan, spoofs etc & Explain the different threats on Electronic Payment System.
3. Analyze the Architecture and Design of cyber security.
4. Summarize the security policy issues related to www and Email system.
5. Identify the different Information Security Standards & interpret the various concepts of Intrusion Detection System.

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

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I Year M.Tech. (SE)-II Semester   **L/T/P C**
                                                                          4/0/- 4

OBJECTIVES:

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

UNIT- I

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

UNIT- II

Approaches of Message Authentication, Secure Hash Functions (SHA-512, MD5) and HMAC, Digital Signatures, Kerberos, X.509 Directory Authentication Service, Email Security: Pretty Good Privacy (PGP) IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT- III

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
Firewalls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

UNIT- IV Auditing For Security:

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

UNIT- V Auditing For Security:

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

Course Outcomes:
After the completion of this course, the students should be able to
1. Identify the importance of Information Security and gain knowledge about the conventional encryption techniques to provide security.
2. Classify the different public key cryptography algorithms and develop code for their execution
3. Understand what is messageauthentication and how to make use of Digital Signatures.
4. Analyze the architecture of Kerberos for security & Differentiate between Pretty Good Privacy (PGP) and SMIME for Email security & Explain how Firewalls can provide network level security to information.

5. Identify the need for security audits in any organization & Perform a case study on different approaches to security audit.

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

REFERENCE BOOKS:

1. Information Security by Mark Stamp, Wiley – INDIA, 2006.
2. Fundamentals of Computer Security, Springer.
3. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
4. Computer Security Basics by Rick Lehtinen, Deborah Russell & G.T.Gangemi Sr., SPD O'REILLY 2006.
5. Modern Cryptography by Wenbo Mao, Pearson Education 2007.
6. Principles of Information Security, Whitman, Thomson.

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   **L/T/P C**
                                                                                   4/0/- 4

(A925211) BUSINESS PROCESS MANAGEMENT
(CORE ELECTIVE-IV)

OBJECTIVES:

To recognize the role of business processes within an Infinity based application

To understand the importance of parameter sets to a business process

To learn common patterns and best practices for formatting and restricting the output from a business process

To understand the difference between a business process and a business process instance

To learn how data processing occurs within a business process

To list the Infinity SDK software developer responsibilities for building and supporting the functionality required for a business process

UNIT- I
UNDERSTANDING BPM - I:

How can we demystify business process management? What is business process management? Why is it important to improve business process before automating them? When should you do BPM – what are the main drivers and triggers? Who should be involved in BPM?

UNIT- II
UNDERSTANDING BPM - II:

Why are organizational strategy and process architecture important in BPM implementation? How do you sell BPM technology to the organization? What are the critical success factors in a BPM project? What are the critical implementation aspects for a BPM solution?

UNIT- III
FRAMEWORK - I:

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

UNIT- IV
FRAMEWORK – II:

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

UNIT- V
BPM AND THE ORGANIZATION:

BPM maturity, Embedding BPM within the organization.

Course Outcomes:
After the completion of this course, the students should be able to
1. Understand the Parameter sets of Business Process Management.

2. Analyze the Business Process Frame Work.

3. Analyze the performance of existing processes and identify process improvement & create a BPM implementation strategy and implementation plan for an organization.

4. Explain the role of IT in Business Process Management.

5. Understand software developer responsibilities for building and supporting the functionality required for a business process

TEXT BOOKS:

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

REFERENCE BOOK:
1. Business Process Management Systems, Strategy and Implementation, James F. Chang, Auerbach

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   **L/T/P C**

                                                                  4/0/- 4

(A925212) 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 e-commerce. 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 fundamentals, foundations and importance of E-Commerce.
2. Analyze the effectiveness of market research and Implement the electronic payment systems.
3. Demonstrate the role and impact of E-Commerce in business models.
4. Discuss the internet trading relationship by advertising and marketing.
5. Assess the payment systems and determine and recognize multimedia concepts.

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.
4. Electronic Commerce – Gary P.Schneider – Thomson.

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   **L/T/P C**
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(A925213) 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 the legal rights related to design, trade and unfair competition.
2. Ability to apply and assess principles in intellectual property.
3. Discuss the real time areas related to semiconductor chip protection act.
4. Develop different law of patents.
5. Introduce trade secret and apply state law and trade secret law.

TEXT BOOKS:

1. Debirag E.Bouchoux: "Intellectual Property" 4e. 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

I Year M.Tech. (SE) II Semester   **L/T/P C**
                                                                              4/0/-   4

(A925214) MOBILE COMPUTING
(OPEN ELECTIVE-II)

Objective:

To impart fundamental concepts in the area of mobile computing, to provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software, and to introduce selected topics of current research interest in the field.

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 importance of design paradigms in mobile computing.
2. Discuss the GSM Architecture and understand various services like SMS,GPRS .
3. Manage software systems of various Operating systems.
4. Understand the J2ME Architecture, J2ME Profiles and other Protocols.
5. Evaluate the role of Multimedia in mobile applications.

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.

VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   **L/T/P C**
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(A925215) 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. Identify the top issues faced by mobile devices and their causes.
2. Analyze how can we create
   a. Secure data storage
   b. Strong authentication
   c. Safe browsing environment
   d. For mobile devices

3. Interpret the best ways of providing Bluetooth Security in mobile devices & identify the Bluetooth vulnerabilities and differences between the Bluetooth Versions Prior to v1.2 and v2.1
4. Understand the concepts of SMS-Short Message Service and the security threats related to SMS.
5. Demonstrate how Enterprise Security can be provided on the Mobile OS.

TEXT BOOK:
1. "Mobile Application Security", Himanshu Dwivedi, Chris Clark, David Thiel, TATA McGRAW-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.

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   **L/T/P C**
                                                                        4/0/- 4

(A925216) 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.

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

UNIT – 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. Analyze the different components of any Information System & understand the need for Information Security.
2. Differentiate between the Legal, Ethical and Professional Issues in Information Security.
3. Describe Risk Management and examine risk identification and risk assessment & understand the functionalities of Intrusion Detection and Prevention Systems.
4. Summarize how to make use of cryptography techniques to information security.
5. Demonstrate how to implement Information Security System

TEXT BOOKS:

1. Principles of Information Security by Whitman, Thompson

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VAAGDEVI COLLEGE OF ENGINEERING
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I Year M.Tech. (SE)-II Semester   L/T/P C
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(A925217) SOFTWARE TESTING LAB

OBJECTIVES:
The student should be able to:

To understand software testing and quality assurance as a fundamental component of software life cycle

To define the scope of SW T&QA projects

To efficiently perform T&QA activities using modern software tools To estimate cost of a T&QA project and manage budgets

To prepare test plans and schedules for a T&QA project

To develop T&QA project staffing requirements

To effectively manage a T&QA project

Software Testing Objectives:
To learn to use the following (or Similar) automated testing tools to automate testing:
a. Win Runner/QTP for functional testing.
b. Load Runner for Load/Stress testing.
c. Test Director for test management.
d. JUnit,HTMLUnit, CPPUnit.

Sample problems on testing:
1. Write programs in 'C' Language to demonstrate the working of the following constructs: i) do..while ii) while….do iii) if…else iv) switch v) for
2. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.

Additional problems on testing:
1. Test the following using JUnit and CPPUnit:
   i) Sorting problems ii) Searching problems
   iii) Finding gcd of two integers iv) Finding factorial of a number.
2. Test web based forms using HTMLUnit.
3. Test database stored procedures using SQLUnit.
   (Use sufficient number of test cases in solving above Problems)

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

Course outcomes:
After the completion of this course, the students should be able to
1. Define the scope of SW T&QA projects.
2. Implement the efficiency perform T&QA activities using modern software.
3. Develop **Sample problems on testing:**
4. Plan a mini projects

REFERENCE BOOKS:

1. Software Testing Concepts and Tools, P.Nageswara Rao, Dream Tech Press, 2007.
2. Software Testing Tools, *K.V.K.K. Prasad*, Dream Tech Press, 2008.
3. Software Testing with Visual Studio Team System 2008, S.Subashini, N.Satheesh kumar, Shroff Publishers Distributors.
4. Software Automation Testing Tools for Beginners, *Rahul Shende*, Shroff Publishers and Distributors, 2012.

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