

**ACADEMIC REGULATIONS
COURSE STRUCTURE AND
DETAILED SYLLABUS**

**M.TECH
COMPUTER NETWORKS AND INFORMATION SECURITY**

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

4. COURSE REGISTRATION

4.1A '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:

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

- 7.3 A student obtaining F Grade in any Subject shall be considered 'failed' and is 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

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

where 'i' is the Subject indicator index (takes into account all Subjects in a Semester), 'N' is the no. of Subjects 'Registered' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_j is the no. of Credits allotted to the i^{th} 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

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

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

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 j^{th} 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.

8.1A 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

9.1A 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	$6.75 \leq \text{CGPA} < 7.75$
Second Class	$6.00 \leq \text{CGPA} < 6.75$

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.

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.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. (COMPUTER NETWORKS AND INFORMATION SECURITY)

COURSE STRUCTURE AND SYLLABUS

I Year – I Semester

Category	Code	Course Title	L	P	C
Core Course I	A978101	Data Structures and Algorithms	4	-	4
Core Course II	A978102	Computer Networking	4	-	4
Core Course III	A978103	Network Programming	4	-	4
Core Elective I	A978104	Database Internals	4	-	4
	A978105	Software Defined Networks	-	-	-
	A978106	TCP/IP Protocol Suite	-	-	-
	A978107	Cloud Computing	-	-	-
Core Elective II	A978108	Internet of Things	4	-	4
	A978109	Embedded Systems	-	-	-
	A978110	Distributed Systems	-	-	-
	A978111	Distributed Computing	-	-	-
Open Elective I	A978112	Big Data Analytics	4	-	4
	A978113	Bioinformatics	-	-	-
	A978114	Biometrics	-	-	-
	A978115	Computer Forensics	-	-	-
	A978116	Distributed Systems Security	-	-	-
Laboratory I	A978117	Network Programming Lab	-	4	2
Seminar I	A978118	Seminar	-	4	2
Total Credits			24	8	28

I Year – II Semester

Category	Code	Course Title	L	P	C
Core Course IV	A978201	Network Security	4	-	4
Core Course V	A978202	Wireless Networks	4	-	4
Core Course VI	A978203	Network Security Standards and Applications	4	-	4
Core Elective III	A978204	Internet Technologies and Services	4	-	4
	A978205	Digital Water Marking and Steganography	-	-	-
	A978206	Security Threats	-	-	-
	A978207	Network Management and Performance Evaluation	-	-	-
Core Elective IV	A978208	Storage Area Networks	4	-	4
	A978209	Distributed Systems Security	-	-	-
	A978210	Cyber Security	-	-	-
	A978211	Information Systems control and Audit	-	-	-
Open Elective II	A978212	E-Commerce	4	-	4
	A978213	Intellectual Property Rights	-	-	-
	A978214	Mobile Computing	-	-	-
	A978215	Mobile Application Security	-	-	-
	A978216	Principles of Information Security	-	-	-
Laboratory II	A978217	Network Security Lab	-	4	2
Seminar II	A978218	Seminar	-	4	2
Total Credits			24	8	28

II Year - I Semester

Code	Course Title	L	P	C
A978301	Comprehensive Viva-Voce	--	--	4
A978302	Project work Review I	--	24	12
	Total Credits	--	24	16

II Year - II Semester

Code	Course Title	L	P	C
A978401	Project work Review II	--	8	4
A978402	Project Evaluation (Viva-Voce)	--	16	12
	Total Credits	--	24	16

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

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

(A978101) 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, Hashtable. Sorting -Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT IV

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

UNIT V

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees -Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, 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 student should be able to

1. Understand the basics of Algorithms and Analyze the performance and complexity of Algorithms and explain the concepts of basic data structures: Linear and Non Linear and compare how the storage and retrieval of data is done on these data structures.
2. Gain knowledge about applications of data structures including creating, inserting, deleting, searching and sorting of data for each data structure.
3. Analyze Various Sorting Techniques for real time applications and Comparison of Sorting methods.

4. Understand the various Concepts of Graphs representations and Applications of Graphs.
5. Understand Operations on Binary Search Trees and Pattern Matching Algorithm .

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th edition, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work,W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978102) COMPUTER NETWORKING

Objectives:

- To introduce the high speed networks that has spurred the development of new applications.
- To identify the design issues related to the Internet protocol (IP), entire TCP/IP protocol suite and network technologies dominating the high-speed scene.

UNIT –I

What Is the Internet? The Network Edge , The Network Core , Delay, Loss, and Throughput in Packet-Switched Networks , Protocol Layers and Their Service Models, Networks Under Attack, History of Computer Networking and the Internet.

Application Layer: Principles of Network Applications, The Web and HTTP , File Transfer: FTP, Electronic Mail in the Internet, DNS–The Internet’s Directory Service, Peer-to-Peer Applications, Socket Programming: Creating Network Applications.

UNIT – II

Transport Layer: Introduction and Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control.

UNIT-III

The Network Layer: Introduction, Virtual Circuit and Datagram Networks, What’s Inside a Router?, The

Internet Protocol (IP): Forwarding and Addressing in the Internet , Routing Algorithms, Routing in the Internet, Broadcast and Multicast Routing.

UNIT – IV

The Link Layer: Links, Access Networks, and LANs, Introduction to the Link Layer, Error-Detection and - Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks, Link Virtualization: A Network as a Link Layer, Data Center Networking, Retrospective: A Day in the Life of a Web Page Request.

UNIT – V

Wireless and Mobile Networks: Introduction, Wireless Links and Network Characteristics, WiFi: 802.11 Wireless LANs, Cellular Internet Access, Mobility Management: Principles, Mobile IP, Managing Mobility in Cellular Networks, Wireless and Mobility: Impact on Higher-Layer Protocols.

Course Outcomes:

After the completion of this course the student should be able to

1. Describe the concepts of computer networks their types and Network Applications and Understand the architecture of Packet-Switched Networks , Protocol Layers and their Service Models.
2. Compare the principles of reliable data transfer for UDP and TCP transport layer protocols.
3. Explain about Routers and Routing algorithms and the process of broadcasting.
4. Understand how error detection and correction techniques can be applied to data in link layer.

5. Differentiate between Wired network, Wireless network and mobile network.

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach, 5/e, James F. Kurose and Keith W. Ross, Pearson Education, 2012.
3. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill. High Speed Networks and Internets – Performance and Quality of Service, *William Stallings*, Second Edition, Pearson Education.
4. Top-Down Network Design, *Priscilla Oppenheimer*, Second Edition, Pearson Education (CISCO Press)

REFERENCE BOOKS:

1. Computer Networks by Mayank Dave, Cengage.
2. Guide to Networking Essentials, *Greg Tomsho, Ed Tittel, David Johnson*, Fifth Edition, Thomson.
3. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
4. An Engineering Approach to Computer Networking, *S.Keshav*, Pearson Education.
5. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet*, Pearson Education (CISCO Press)
6. Computer Communications Networks, Mir, Pearson Education.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978103) NETWORK PROGRAMMING

Objectives:

- To understand to Linux utilities
- To understand file handling, signals
- To understand IPC, network programming in Java
- To understand processes to communicate with each other across a Computer Network.

UNIT-I

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Sockets : Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-II

TCP client server: Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host.

Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

I/O Multiplexing: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server,

UNIT-III

socket options: getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

Advanced I/O Functions: Introduction, Socket Timeouts, recv and send Functions, readv and writev Functions, recvmsg and sendmsg Functions, Ancillary Data, How Much Data Is Queued? Sockets and Standard I/O, T/TCP: TCP for Transactions

UNIT-IV

Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

Daemon Processes and inetd Superserver – Introduction, syslogd Daemon, syslog Function, daemon_init Function, inetd Daemon, daemon_inetd Function

Broadcasting- Introduction, Broadcast Addresses, Unicast versus Broadcast, dg_cli Function Using Broadcasting, Race Conditions

Multicasting- Introduction, Multicast Addresses, Multicasting versus Broadcasting on A LAN, Multicasting on a WAN, Multicast Socket Options, mcast_join and Related Functions, dg_cli Function Using Multicasting, Receiving Mbone Session Announcements, Sending and Receiving, SNTP: Simple Network Time Protocol, SNTP (Continued)

UNIT-V

Raw Sockets-Introduction, Raw Socket Creation, Raw Socket Output, Raw Socket Input, Ping Program, Traceroute Program, An ICMP Message Daemon,

Datalink Access- Introduction, BPF: BSD Packet Filter, DLPI: Data Link Provider Interface,
Linux: SOCK_PACKET, libpcap: Packet Capture Library, Examining the UDP Checksum Field
Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

Course Outcomes:

After the completion of this course the student should be able to

1. Understand the basic concepts of OSI model, Unix standards, TCP and UDP.
2. Explain the TCP and UDP socket address structure and its related functions and Classify the TCP Echo server functions for server process termination, Crashing and Rebooting.
3. Compare the different socket options for IPV6 and ICMPV6.
4. Analyze the working of advanced input output functions like Timeouts, recv, send, ready, writev, recvmsg and sendmsg and Understand the difference between broadcasting and multicasting.
5. Demonstrate RPC and concepts related to it.

Text Books:

1. UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Pearson Education
2. UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

**(A978104) DATABASE INTERNALS
(Core Elective-I)**

Objectives:

By the end of the course, you will know:

- History and Structure of databases How to design a database
- How to convert the design into the appropriate tables.
Handling Keys appropriately Enforcing Integrity Constraints to keep the database consistent Normalizing the tables to eliminate redundancies.
- Querying relational data and processing the queries.
- Storage Optimizing Strategies for easy retrieval of data through index.
- Triggers, Procedures and Cursors
,Transaction Management
- Distributed databases management system concepts and Implementation

UNIT I

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

UNIT II

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

UNIT III

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

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

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

UNIT IV

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

Tree based Indexing.

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks. Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete operations. 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 student should be able to

1. Understand the Purpose of a Database Systems and different models available to build a database and Perform a case study on designing a data model for any small organization using ER data model and relational data model.
2. Explain the problem of anomalies caused due to data redundancy and data decomposition considering functional dependencies.
3. Analyze how concurrency control can be achieved in transaction management.
4. Understand the concepts of different data structures used for storing and indexing large database.
5. Gain complete knowledge on distributed databases, distributed transactions and distributed recovery.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date, Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database- Principles, Programming and Performance, P.O.'Neil & E.O' Neil, 2nd edition, EL SEVIER.
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 Ozsü, Patrick Valduriez ,
Pearson Education, 2nd Edition.
11. Distributed Database Systems, Chanda Ray, Pearson.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

(A978105) SOFTWARE DEFINED NETWORKS

4/0/- 4

(Core Elective-I)

Objectives:

This course provides a comprehensive introduction to Software Defined Networking (SDN) and presents SDN in context with more familiar network services and challenges. It also offers a unique perspective of the business case and technology motivations for considering SDN solutions. It identifies the impact of SDN on traffic management and the potential for network service growth. It instills the knowledge needed to manage current and future demand and provisioning for SDN. It provides students with the basic concepts and explains the importance of virtualization, particularly the impact of virtualization on servers and networks. It also introduces students with the impact on service providers, legacy networks, and network vendors.

UNIT I

Introduction to Software Defined Networking: Virtualization, Virtual Memory, Virtual Memory Operation, Virtual and Physical Memory Mapping, Server Virtualization, Storage Virtualization, Software Defined Networking, Network Limitations, Network Control Plane.

UNIT II

SDN Implementation: Introduction, SDN Implementation, SDN Design, Separation of the Control and Data Planes, Edge-Oriented Networking, SDN Operation, Service Providers and SDN

UNIT III

Open flow Introduction, Overview of the Open Flow Switch Specification, Open Flow Ports, Open Flow Packet-Processing Pipeline, Open Flow Channel, Message Handling, Open Flow Channel Connections, Controller Modes, Auxiliary Connection Use for Performance and Reliability, Flow Table Synchronization, Bundle Messages, Open Flow Configuration-and-Management Protocol, Remote Configuration and The Open Flow Conformance Testing Program

UNIT IV

SDN Controllers, Network Programmability, The Management Interface, The Application-Network Divide, Modern Programmatic Interfaces, Virtualization and Data Plane I/O, Services Engineered Path, Service Locations and Chaining.

UNIT V

SDN Evolution Introduction, SDN and Enterprise Networks, SDN and Transport Networks, SDN and Optical Transport Networks, Increasing WAN Utilization with SDN, SDN Scalability Issues, Controller Designs for Scalability, Potential SDN Scalability Issues, Network Types, SDN Management, Load Adaptation, Google and SDN, Google's G-Scale Network, Google's G-Scale Network Hardware, Google SDN Deployment, Implementation Challenges

Course Outcomes:

After the completion of this course the student should be able to

1. Explain the basic concepts and architecture of Software Defined Networks(SDN).
2. Understand all the issues related to SDN- Design, Implementation, Operations and Service Providers.
3. Interpret the process of Open Flow Packet-Processing and use of Auxiliary Connection for Performance and Reliability.
4. Classify the different SDN controllers.
5. Compare the functioning of SDN with Enterprise, Transport and Optical Transport Networks and Summarize Google's G-Scale Network Hardware, and challenges in Google SDN Deployment and Implementation.

TEXT BOOKS:

1. Software Defined Networking: Design and Deployment, 1st Edition Patricia A. Morreale and James M. Anderson, CRC press.
2. SDN: Software Defined Networks, Thomas D. Nadeau and Ken Gray, Orielly media.

REFERENCE BOOKS:

1. Software Defined Networking with Open Flow by Siamak Azodolmolky wiley Publications
2. Software Defined Networks: A Comprehensive Approach by Paul Goransson , Chuck Black Publisher Morgan Kaufmann

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

**(A978106) TCP/IP PROTOCOL SUITE
(Core Elective-I)**

Objectives:

- To Describe how the TCP/IP protocol suite works
- To Describe the functions of static and dynamic IP addresses
- To explain the major functions of networks with the OSI seven-layer model.
- To Describe the major functions of networks with the TCP/IP model

UNIT - I

Introduction to TCP/IP, The OSI Model and TCP/IP Protocol Suites, Underlying Technologies; IP Addressing, Sub netting and Super netting, CIDR, Delivery and Routing of IP Packets

UNIT - II

Internet Protocol (IP), ARP and RARP, Internet Control Message Protocol (ICMP), Internet Group Management Protocol (IGMP)

UNIT - III

User Datagram Protocol (UDP), Transmission Control Protocol (TCP) ; Routing Protocols (RIP, OSPF, HELLO and BGP)

UNIT - IV

Application Layer and Client-Server Model, BOOTP and DHCP; Domain Name System (DNS), Telnet and Rlogin

UNIT - V

File Transfer Protocol (FTP), Trivial File Transfer Protocol (SMTP), Simple Network Management Protocol (SNMP), Hyper Text Transfer Protocol (HTTP)

Course Outcomes:

After the completion of this course the student should be able to

1. Identify and differentiate the various TCP/IP protocol suites and explore the OSI Model and Understand the major technologies like IP Addressing, Sub netting , Super netting and Routing of IP Packets.
2. Analyze the functionalities of various protocols like
 - a. Internet Protocol (IP), Internet Control Message Protocol (ICMP), Internet Group Management Protocol (IGMP)
 - b. User Datagram Protocol (UDP), Transmission Control Protocol (TCP) ; Routing Protocols (RIP)
3. Explain the differences between the Routing Protocols - RIP, OSPF, HELLO and BGP.
4. Understand the importance of Domain Name System-DNS for Internet and Differentiate between Rlogin and Telnet protocols for remote connections and execution of commands.
5. Summarize the different File Transfer Protocols.

TEXT BOOKS:

1. “Internetworking with TCP/IP, Principles, Protocols and Architectures”, Vol. I, Douglas E.Comer, Fourth Edition, PHI.
2. “TCP/IP Protocol Suite”, Forouzan BA, TMH (2000)

REFERENCE BOOK:

1. TCP/IP Unleashed, Pearson Education.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978107) CLOUD COMPUTING

(Core Elective-I)

Objectives:

- To learn the new computing model this 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.

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 Map Reduce.

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 student should be able to

1. Understand the basic Principles of Parallel, Distributed Computing and the importance of cloud computing.
2. Classify the requirement for migrating into cloud computing platform from the existing one.
3. Explain how cloud computing works in application areas like Industry, Health, Education, Business etc.
4. Introduce the concept of Python and how cloud applications can be developed using Python and Experiment on Programming Google App Engine with Python.
5. Summarize the cloud management issues related to cloud age, cloud security and legal issues of a 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 Madiseti, 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

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

**(A978108) INTERNET OF THINGS
(Core Elective-II)**

Objectives:

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

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

UNIT II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT
Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib.

UNIT IV

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

UNIT V

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

Course Outcomes:

After the completion of this course the student should be able to

1. Understand the basic Characteristics, Physical Design, Protocols and Communication Models of IoT.
2. Acquire Knowledge on M2M: Machine to Machine and IoT System Management
3. Develop techniques using Python Scripting Language to solve problems of IoT.
4. Analyze IoT Physical Devices and Raspberry PI-Interfaces (serial, SPI, I2C).
5. Experiment with Python programming on Raspberry PI and illustrate IoT Physical Server and Web Server designing frameworks.

Text Book:

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

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978109) EMBEDDED SYSTEMS

(Core Elective-II)

Objectives:

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

UNIT I

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

UNIT II

8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization -

Devices and Communication Buses for Devices Network: Serial and parallel Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols.

UNIT III

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

UNIT IV

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

UNIT V

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

Course Outcomes:

After the completion of this course the student should be able to

1. Explain the different embedded system design techniques and the metrics or challenges in designing them.
2. Understand the complete architecture of 8051 and Advanced Processor.
3. Demonstrate Software programming in Assembly language and High Level Language.
4. Classify the different Real Time Operating System (RTOS), RTOS Vx Works, Windows CE.
5. Understand the Embedded Software Development Process and Tools and Perform testing on Testing on Host Machine, Simulators, Laboratory Tools.

TEXT BOOK:

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

REFERENCE BOOKS:

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

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978110) DISTRIBUTED SYSTEMS

(Core Elective-II)

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. Design Issues, User Requirement, Network Technologies and Protocols, IPC, Client-Server Communication, Group Communication, IPC in UNIX. Remote Procedure Calling, Design issues, Implementation, Asynchronous RPC

UNIT-II

Distributed OS, Its kernel, Processes and Threads, Naming and Protection, Communication and Invocation, Virtual Memory, File Service components, Design issues, Interfaces, implementation techniques, SUN network file systems

UNIT-III

SNS – a name service model, its design issues, Synchronizing physical clocks, Logical time and logical clocks, Distributed coordination. Replication and its architectural model, Consistency and request ordering, Conversation between a client and a server, Transactions, Nested Transactions.

UNIT-IV

Concurrency control Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions and Nested Transactions, Atomic commit protocols, Concurrency control in distributed transactions, distributed Deadlocks, Transactions with replicated data, Transaction recovery, Fault tolerance, Hierarchical and group masking of faults.

UNIT-V

Cryptography, Authentication and key distribution, Logics of Authentication, Digital signatures.

Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy, Release consistency and Munin, Overview of Distributed Operating systems Mach, Chorus.

Course Outcomes:

After the completion of this course the student should be able to

1. Understand all the protocols which support client/server communication, group communication and IPC in Unix.
2. Analyze the Distributed OS with respect to its kernel, Processes and Threads.
3. Define Replication and its architectural model.
4. Explain what are Distributed Transactions and Nested Transactions and Understand the problem of Deadlock and how can they be handled in distributed systems.
5. Explain the Design and Implementation issues of shared memory in distributed systems.

TEXT BOOK:

1. G Coulouris, J Dollimore and T Kindberg - Distributed Systems Concepts and Design, Third Edition, Pearson Education.

REFERENCE BOOKS:

1. M. Singhal N G Shivrathri- Advanced Concepts in Operating Systems, Tata Mc GrawHill Edition.
2. A.S. Tanenbaum and M.V. Steen- Distributed Systems- Principles and Paradigms, Pearson education.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

**(A978111) DISTRIBUTED COMPUTING
(Core Elective-II)**

4/0/- 4

Objectives:

- Foundation of cooperative distributed systems engineering.
- Supporting technologies with a special attention to agent-oriented paradigm Service-oriented computing and grid computing.
- The implementation component includes a term-project.

UNIT I Introduction

The different forms of computing, The strengths and weaknesses of Distributed computing, Operating system concepts relevant to distributed computing, the architecture of distributed applications. Paradigms for Distributed Applications, choosing a Paradigm for an application (trade-offs).

UNIT II

Cluster Computing

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

UNIT III

Grid Computing

Introduction, Grid Computing Anatomy – Architecture, Architecture and relationship to other Distributed Technologies, Grid computing road map. Merging the Grid services Architecture with the Web Services Architecture.

UNIT IV

Open Grid Service Architecture – Introduction, Architecture and Goal, Sample Use cases: Commercial Data Center, National Fusion Collaboratory, Online Media and Entertainment. OGSA platform Components, Open Grid Services Infrastructure.

UNIT V

Globus GT 3 Toolkit – Architecture, Programming Model, A sample implementation, High Level services, OGSI.NET Middleware Solutions.

Course Outcomes:

After the completion of this course the student should be able to

1. Analyze the different forms of computing and the strength & weakness of distributed computing.
2. Compare the parallel computing and cluster computing architecture and programming models.
3. Understand how Grid services Architecture can be merged with Web Services Architecture and analyze the open grid service architecture.
4. Experiment on sample use cases of Commercial Data Center, Online Media and Entertainment.
5. Demonstrate the Globus GT 3 Toolkit.

TEXT BOOKS:

1. Grid Computing, Joshy Joseph & Craig Fellenstein, Pearson education, 2004

2. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education, 2004
3. High Performance Cluster Computing, Rajkumar Buyya, Pearson education.

REFERENCE BOOKS:

1. Grid Computing – Making the global infrastructure a reality, Fran Berman, Geoffrey C Fox, Anthony J G Hey, Wiley India, 2010.
2. A Networking Approach to Grid Computing, D.Minoli, Wiley & sons, 2006.
3. Grid Computing: A Practical Guide to Technology and Applications, A.Abbas, Firewall Media, 2008.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978112) BIG DATA ANALYTICS
(Open Elective-I)

Objectives:

- To understand about big data
- To learn the analytics of Big Data
- To Understand the MapReduce 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, HDFS Files, File system types, commands, org.apache.hadoop.io package, 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; HDFS (Hadoop Distributed File System), HDFS 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 student should be able to

1. Understand the cause and sources for evolution of Big Data and Explain the process of Big Data Analytics and its importance in different fields of data science.
2. Compare the different Reporting and Analysis tools of Big Data Analytics.
3. Analyze the different techniques needed to Optimize MapReduce problems and demonstrate the installation of Hadoop and the process of storing data in Hadoop.
4. Explain the programming concepts with HBase and combining HBase with Hadoop Distributed File System (HDFS).
5. Understand the concepts of Mobile Analytics and Web Analytics.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

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

(A978113) BIOINFORMATICS (Open Elective-I)

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

Course Outcomes:

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

1. Discuss the basic knowledge, concepts of computer science and biology.
2. Describe molecular phylogenetics and advanced statistical approaches.
3. Understand the concepts, functions of RNA Structure Prediction..
4. Adapt the depth concepts on protein tertiary structure prediction.
5. Understand concepts of Genomics and Proteomics and its comparison.

TEXT BOOKS:

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

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978114) BIOMETRICS (Open Elective-I)

Objectives:

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

UNIT –I

INTRODUCTION & HANDWRITTEN CHARACTER RECOGNITION

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

UNIT –II

FACE BIOMETRICS & RETINA AND IRIS BIOMETRICS

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

UNIT –III

PRIVACY ENHANCEMENT USING BIOMETRICS & BIOMETRIC CRYPTOGRAPHY AND MULTIMODAL BIOMETRICS

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

UNIT –IV

WATERMARKING TECHNIQUES & BIOMETRICS : SCOPE AND FUTURE

Introduction – Data Hiding Methods – Basic Framework of Watermarking – Classification of Watermarking – Applications of Watermarking – Attacks on Watermarks – Performance Evaluation – Characteristics of Watermarks – General Watermarking Process – Image Watermarking Techniques – Watermarking Algorithm – Experimental Results– Effect of Attacks on Watermarking Techniques – Scope and Future Market of Biometrics – Biometric

Technologies – Applications of Biometrics -Biometrics – and Information Technology Infrastructure – Role of Biometrics in Enterprise Security – Role of Biometrics in Border Security – Smart Card Technology and Biometric – Radio Frequency Identification Biometrics – DNA Biometrics – Comparative Study of Various Biometrics Techniques.

UNIT –V

IMAGE ENHANCEMENT TECHNIQUES & BIOMETRICS STANDS

Introduction – current Research in image Enhancement Techniques – Image Enhancement – Frequency Domain Filters – Databases and Implementation – Standard Development Organizations – Application Programming Interface – Information Security and Biometric Standards – Biometric Template Interoperability.

Course Outcomes:

After the completion of this course the student 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, Wiley, 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.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

(A978115) 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 student 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.

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, Stuart, 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

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P C

4/0/- 4

**(A978116) 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 transactions, 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 student 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.
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. Design case study on Global Name Service, X.500 Directory Service and 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, Cambridge, rp 2010

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year I Semester (CNIS)

L/T/P/ C

-/- / 4/ 2

(A978117) NETWORK PROGRAMMING LAB

Objectives:

- To gain hands-on experiences in installing and administering computer systems and networks, in particular, the UNIX version.
- To implement networking and Internet protocols via programming and TCP/IP protocol architecture; user datagram protocol.
- To implement shell script that accepts a list of files.

LIST OF SAMPLE PROBLEMS/EXPERIMENTS:

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6. Write a shell script that accepts any number of arguments and prints them in the reverse order.
7. Write a shell script that determines the period for which a specified user is working on the system.
8. Write a shell script to list all of directory files in a directory.
9. Write an interactive file-handling shell program- Let it offer the user the choice of copying, removing or linking files. Once the user has made a choice, have the program ask him for the necessary information such as the file name, new name and so on.
10. Write a shell script to find factorial of a given integer.
11. Write a shell script to find the G.C.D. of two integers
12. Write a shell script to generate a multiplication table
13. Write a shell script that copies multiple files to a directory.
14. Write a shell script that counts the number of lines and words present in a given file.
15. Write a shell script that displays the list of all files in the given directory.
16. Write a shell script (small calculator) that adds, subtracts, multiplies and divides the given two integers. There are two division options: one returns the quotient and the other returns remainder. The script requires 3 arguments: The operation to be used and two integer numbers. The options are add (-a), subtract (-s), multiply (-m), quotient (-c) and remainder (-r).
17. Write a shell script to reverse the rows and columns of a matrix.
18. Write a sed command that deletes the first character in each line in a file.
19. Write sed command that deletes the character before the last character in each line file.

20. Write a sed command that swaps the first and second words in each line of a file.
21. Write an awk script that reads a file of which each line has 5 fields – ID, NAME, MARKS1, MARKS2, MARKS3 and finds out the average for each student. Print out the average marks with appropriate messages.
22. Write an awk script to find the factorial of a user supplied number.
23. ls -l command produces long listing of files.
24. Write an awk script 1) to print the selected fields (Ex: size and name of the files) from the file listing.
25. To print the size of all files and number of files.
26. Write an awk script to count the number of lines in a file that do not contain vowels.
27. Write an awk script to find the number of characters, words and lines in a file.
28. Write a c program that makes a copy of a file using
 - a. Standard I/O
 - b. System calls.
29. Write a C program that counts the number of blanks in a text file
 - a. Using standard I/O
 - b. Using system calls
30. Implement in C the following UNIX commands using system calls a. cat b. ls c. mv
31. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.
32. File type.
33. Number of links.
34. Time of last access.
35. Read, Write and Execute permissions.
 - 2) Write a c program to emulate the UNIX ls -l command.
 - 3) Write a c program that creates a directory, puts a file into it, and then removes it.
 - 4) Write a c program that searches for a file in a directory and reports whether the file is present in the directory or not.
36. Write a c program to list for every file in a directory, its inode number and file name.
37. Write a c program that creates a file containing hole which is occupying some space but having nothing.
38. Write a c program that demonstrates redirection of standard output to a file. Ex: ls > fl.
39. Write a c program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen.
40. Write a c program to create a Zombie process.
41. Write a c program that illustrates how an orphan is created.
42. Write a c program that creates a child process to execute a command. The command to be executed is passed on the command line.
43. Write a c program that accepts two small numbers as arguments and then sums the two numbers in a child process. The sum should be returned by child to the parent as its exit status and the parent should print the sum.
44. Write a c program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls -l | sort.
45. Write c programs that illustrate communication between two unrelated processes using named pipe.
46. Write a c program in which a parent writes a message to a pipe and the child reads the message.
47. Write a c program that illustrates suspending and resuming processes using signals.
48. Write a c program that displays the real time of a day every 60 seconds, 10 times.
49. Write a c program that runs a command that is input by the user and prints the exit status if the command completes in 5 seconds. If it doesn't, then the parent uses kill to

- send a SIGTERM signal to kill the child process.
50. Write a C program that illustrates file-locking using semaphores.
 51. Write a C program that implements a producer-consumer system with two processes. (Using semaphores).
 52. Write client and server programs (using C) for
Interaction between server and client processes using Unix Domain Sockets.
Interaction between server and client processes using Internet Domain Sockets.
 53. Write a C program (sender.c)
 54. To create a message queue with read and write permissions.
 55. To write 3 messages to it with different priority numbers.
 - a. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in 63.a) and displays them.
 - b. Write C program that illustrates two processes communicating via shared memory.
 - c. Design TCP iterative Client and server application to reverse the given input sentence
 - d. Design TCP client and server application to transfer file

Course Outcomes:

After the completion of this course the student should be able to

1. Understand using shell scripts and apply for interactive file-handling shell program
2. Make use of shell scripts for writing code for all basic programs like finding GCD, Factorial, generate multiplication table and design simple calculator.
3. Practice Implementing UNIX commands using system calls in C .
4. Develop client server programming in C using Unix Domain Sockets.

TEXT BOOKS:

1. Advance Unix Programming Richard Stevens, Second Edition Pearson Education
2. Advance UNIX Programming, N.B. Venkateswarlu, BS Publication.
3. UNIX and Shell programming, B.A.Forouzan and R.F.Gilberg, Thomson.
4. UNIX and Shell Programming, M.G. Venkatesh Murthy, Pearson Education.
5. UNIX Shells by Example, 4th Edition, Ellie Quigley, Pearson Education.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
M.Tech. I Year II Semester (CNIS)

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

(A978201) NETWORK SECURITY

Objectives:

- To enable students to learn the various security standards set by the global industry.
- The various security applications that are used by industry.

UNIT-I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT-II

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT-III

Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

UNIT-IV

Email privacy: Pretty Good Privacy (PGP) and S/MIME. IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT-V

Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats. Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

Course Outcomes:

After the completion of this course the student should be able to

1. Gain a complete knowledge on types of security attacks, services and mechanisms.
2. Understand the implementation of Internetwork security model and its standards and vulnerabilities.
3. Demonstrate the Conventional Encryption Principles and the Public key cryptography principles
4. Take up projects on Email privacy system and compare Pretty Good Privacy (PGP) and S/MIME.
5. Build a model of Firewall and test the security issues

TEXT BOOKS:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.

2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W. Manzuik and Ryan Permech, Wiley Dreamtech

REFERENCE BOOKS:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Cengage Learning.

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year II Semester (CNIS)

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

(A978202) WIRELESS NETWORKS

UNIT I:

MULTIPLE RADIO ACCESS

Medium Access Alternatives: Fixed-Assignment for Voice Oriented Networks Random Access for Data Oriented Networks, Handoff and Roaming Support, Security and Privacy.

UNIT II:

WIRELESS WANS

First Generation Analog, Second Generation TDMA – GSM, Short Messaging Service in GSM, Second Generation CDMA – IS-95, GPRS - Third Generation Systems (WCDMA/CDMA 2000)

UNIT III:

WIRELESS LANS

Introduction to wireless LANs - IEEE 802.11 WLAN – Architecture and Services, Physical Layer- MAC sublayer- MAC Management Sublayer, Other IEEE 802.11 standards, HIPERLAN, WiMax standard.

UNIT IV:

ADHOC AND SENSOR NETWORKS

Characteristics of MANETs, Table-driven and Source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT V:

WIRELESS MANS AND PANS

Wireless MANs – Physical and MAC layer details, Wireless PANs – Architecture of Bluetooth Systems, Physical and MAC layer details, Standards.

Course Outcomes:

After the completion of this course the student should be able to

1. Identify the importance and advantage of a wireless network over the wired network
2. Understand the architecture and different layers of wireless Local Area Network(LAN), PAN's and MAN's.
3. Acquire knowledge in physical, data link ,network and transport layer of wireless internet networking models.
4. Classify the network and routing protocols for AD-HOC Wireless Network
5. Compare the applications of wireless sensor networks with MANET with respect to design challenges.

TEXT BOOKS:

1. William Stallings, "Wireless Communications and networks" Pearson / Prentice Hall of India, 2nd Ed., 2007.
2. Dharma Prakash Agrawal & Qing-An Zeng, "Introduction to Wireless and Mobile Systems", Thomson India Edition, 2nd Ed., 2007.

REFERENCES:

1. Vijay. K. Garg, "Wireless Communication and Networking", Morgan Kaufmann Publishers, 2007.

2. Kaveth Pahlavan, Prashant Krishnamurthy, "Principles of Wireless Networks", Pearson Education Asia, 2002.
3. Gary. S. Rogers & John Edwards, "An Introduction to Wireless Technology", Pearson Education, 2007.
4. Clint Smith, P.E. & Daniel Collins, "3G Wireless Networks", Tata McGraw Hill, 2nd Ed,.

* * *

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech I Year II Semester (CNIS)

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

(A978203) NETWORK SECURITY STANDARDS AND APPLICATIONS

OBJECTIVES:

- To understand the network issues and development strategies.
- To understand the WAP and security issues
- To understand basic cryptographic techniques and security of information.
- To understand intruders, e-transactions over internet.

UNIT-I

Introduction, Cyber Attacks, Defense Strategies and Techniques, Guiding Principles, Computer Networking Primer, Local Area Networks, Network Layer Protocols, The Transport Layer, Application Layer Protocols, Basics of Cryptography, Preliminaries, Elementary Substitution Ciphers, Elementary Transposition Ciphers, Other Cipher Properties

UNIT-II

IEEE 802.11 Wireless LAN Security, Back Ground, Authentication, Confidentiality and Integrity, Cell phone Security, Preliminaries, GSM (2G) Security, Security in UMTS (3G).

UNIT-III

Non – Cryptographic Protocol Vulnerabilities, DoS and DDoS, Session Hijacking and Spoofing, Pharming Attacks, Wireless LAN Vulnerabilities , Software Vulnerabilities, Phishing, Buffer Overflow, Format String Attacks, Cross-site Scripting (XSS), SQL Injection.

UNIT-IV

Access Control in the Operating System, Preliminaries, Discretionary Access Control – Case Studies, Mandatory Access Control, Role-based Access Control, SELinux and Recent Trends Intrusion Prevention and Detection, Intrusion, Prevention Versus Detection, Types of Intrusion Detection Systems, DDoS Attack Prevention/Detection, Malware Detection, RFIDs and E-Passport, RFID Basics, Applications, Security Issues, Addressing RFID Privacy Concerns, Electronic Passports.

UNIT-V

Electronic Payment, Intrusion, Enabling Technologies, Cardholder Present E-transactions, Payment Over the Internet, Mobile Payment, Electronic Cash, Web Services Security, Motivation, Technologies for Web Services, WS-Security, SAML, other standards.

Course Outcomes:

After the completion of this course the student should be able to

1. Understand the network issues and development strategies.
2. Understand the IEEE 802.11 standard and GSM -2G,3G Technology.
3. Adapt and illustrate cryptographic issues and security of information.
4. Discuss intruders, e-transactions over internet.
5. Ability to implement Mobile payment applications and Develop real time problems meeting the requirement of network standards.

TEXT BOOK

1. Network security and cryptography – Bernard Menezes.- Cengage Learning

REFERENCE BOOKS

1. Network Security essentials by William Stallings Pearson Education.
2. Cryptography and Network Security by Behrouz A. Forouzan, TMH-2007.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

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

**(A978204) INTERNET TECHNOLOGIES AND SERVICES
(CORE ELECTIVE-III)**

OBJECTIVE:

- The student who has knowledge of programming with java should be able to develop web based solutions.
- Client Side: HTML5, CSS3, Javascript, Ajax, JQuery and JSON Server Side: Servlets, JSP
- Database: MySQL with Hibernate and Connection Pooling
- Framework: Struts with validation framework, Internationalization (I18N)
- SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT I

Client Side Technologies:

Overview of HTML - Common tags, XHTML, capabilities of HTML5
Cascading Style sheets, CSS3 enhancements, linking to HTML Pages, Classes in CSS
Introduction to JavaScripts, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript
Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events Simplifying scripting with JQuery, JASON for Information exchange.

UNIT II

Introduction to Java Servlets:

Introduction to Servlets: Lifecycle of a Servlet, Reading request and initialization parameters, Writing output to response, MIME types in response, Session Tracking: Using Cookies and Sessions Steps involved in Deploying an application Database Access with JDBC and Connection Pooling Introduction to XML, XML Parsing with DOM and SAX Parsers in Java Ajax - Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, Sending request, Processing response data and displaying it. Introduction to Hibernate

UNIT III Introduction to JSP:

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

UNIT IV

Introduction to Struts Framework:

Introduction to MVC architecture, Anatomy of a simple struts2 application, struts configuration file, Presentation layer with JSP, JSP bean, html and logic tag libraries, Struts Controller class, Using form data in Actions, Page Forwarding, validation frame work, Internationalization

UNIT V

Service Oriented Architecture and Web Services

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

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

Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, Describing Web Services –Web Services life cycle, anatomy of WSDL

Introduction to Axis– Installing axis web service framework, deploying a java web service on axis. Web Services Interoperability – Creating java and .Net client applications for an Axis Web Service.

Course Outcomes:

After the completion of this course the student should be able to

1. Develop web based solutions using multi -tier architecture for client and server side components.
2. Illustrate dynamic content with Hibernate and Connection Pooling.
3. Understand the JSP constructs and apply it to develop for Web applications.
4. Analyze and validate Strut framework and Describe MVC architecture.
5. Adapt framework such as SOA: Service Oriented Architecture, Web services
 - fundamentals.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

**VAAGDEVI COLLEGE OF ENGINEERING
(UGC AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

**(A978205) DIGITAL WATERMARKING AND STEGANOGRAPHY
(CORE ELECTIVE-III)**

UNIT I

INTRODUCTION: Information Hiding, Steganography and Watermarking – History of watermarking –Importance of digital watermarking – Applications – Properties – Evaluating watermarking systems

WATERMARKING MODELS & MESSAGE CODING: Notation – Communications – Communication based models – Geometric models – Mapping messages into message vectors – Error correction coding– Detecting multi-symbol watermarks.

UNIT II

WATERMARKING WITH SIDE INFORMATION & ANALYZING ERRORS: Informed Embedding –Informed Coding – Structured dirty-paper codes - Message errors – False positive errors – False negativeerrors – ROC curves – Effect of whitening on error rates.

UNIT III

PERCEPTUAL MODELS: Evaluating perceptual impact – General form of a perceptual model –Examples of perceptual models – Robust watermarking approaches - Redundant Embedding, Spread Spectrum Coding, Embedding in Perceptually significant coefficients

UNIT IV

WATERMARK SECURITY & AUTHENTICATION: Security requirements – Watermark security and cryptography – Attacks – Exact authentication – Selective authentication – Localization – Restoration.

UNIT V

STEGANOGRAPHY: Steganography communication– Notation and terminology – Information-theoretic foundations of steganography – Practical steganographic methods – Minimizing the embedding impact –Steganalysis.

Course Outcomes:

After the completion of this course the student should be able to

1. Define Steganography and importance of water marking.
2. Model different along with error correction codes.
3. Evaluate perceptual and robust water marking approaches.
4. Analyze watermark security, attacks and authentication.
5. Implement practical steganography methods and Develop Steganalysis and Steganography methods.

REFERENCES:

1. Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, Jessica Fridrich, Ton Kalker, “Digital Watermarking and Steganography”, Morgan Kaufmann Publishers, New York, 2008.
2. Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, “Digital Watermarking”, Morgan Kaufmann Publishers, New York, 2003.
3. Michael Arnold, Martin Schmucker, Stephen D. Wolthusen, “Techniques and Applications of Digital Watermarking and Content Protection”, Artech House, London, 2003.

4. Juergen Seits, “Digital Watermarking for Digital Media”, IDEA Group Publisher, New York, 2005.
5. Peter Wayner, “Disappearing Cryptography – Information Hiding: Steganography & Watermarking”,Morgan Kaufmann Publishers, New York, 2002.

**VAAGDEVI COLLEGE OF ENGINEERING
(UGC AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

**(A978206) SECURITY THREATS
(CORE ELECTIVE-III)**

UNIT-I

Introduction: Security threats - Sources of security threats- Motives - Target Assets and vulnerabilities –Consequences of threats- E-mail threats - Web-threats - Intruders and Hackers, Insider threats, Cyber Crimes.

UNIT-II

Network Threats: Active/ Passive – Interference – Interception – Impersonation – Worms – Virus –Spam’s – Ad ware - Spy ware – Trojans and covert channels – Backdoors – Bots - IP Spoofing – ARP spoofing - Session Hijacking - Sabotage-Internal treats- Environmental threats - Threats to Server security.

UNIT-III

Security Threat Management: Risk Assessment - Forensic Analysis - Security threat correlation – Threat awareness - Vulnerability sources and assessment- Vulnerability assessment tools -Threat identification - Threat Analysis - Threat Modeling - Model for Information Security Planning.

UNIT-IV

Security Elements: Authorization and Authentication - types, policies and techniques - Security certification - Security monitoring and Auditing - Security Requirements Specifications - Security Polices and Procedures, Firewalls, IDS, Log Files, Honey Pots

UNIT-V

Access control, Trusted Computing and multilevel security - Security models, Trusted Systems, Software security issues, Physical and infrastructure security, Human factors – Security awareness, training , Email and Internet use policies.

Course Outcomes:

After the completion of this course the student should be able to

1. Gain a complete knowledge on Sources of security threats, vulnerabilities and consequences of threats.
2. Understand the threats on internet like Email threats, Web threats and how they lead to cyber crime.
3. Perform analysis on Vulnerability sources and assessment tools under Security Threat Management.
4. Implement types of policies, access control, Trusted systems.
5. Compare and understand Email and Internet use policies.

REFERENCES

1. Joseph M Kizza, “Computer Network Security”, Springer Verlag, 2005
2. Swiderski, Frank and Syndex, “Threat Modeling”, Microsoft Press, 2004.
3. William Stallings and Lawrie Brown, “Computer Security: Principles and Practice”, Prentice Hall, 2008.

4. Thomas Calabres and Tom Calabrese, "Information Security Intelligence: Cryptographic Principles & Application", Thomson Delmar Learning, 2004.

VAAGDEVI COLLEGE OF ENGINEERING
(UGC AUTONOMOUS)

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

(A978207) NETWORK MANAGEMENT AND PERFORMANCE
EVALUATION (CORE ELECTIVE-III)

UNIT-I

Introduction to Network Management: Analogy of Telephone Network Management, Communication,* protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management. Network Management System Platform, Current Status and future of Network Management

UNIT-II

SNMP v1 Network Management: Organization and Information Models: The History of SNMF Management Tue SNMP Mode, The Organization Model, System Overview, The Information Model. The SNMP Communication Model . Functional model – SNMP Management: SNMP v2: Major Changes in SNMPv2, SN[Mpv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base. SNMPv2 Protocol, Compatibility with SNMP v1

UNIT-III

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial network management Systems, System Management, and Enterprise Management Solutions – Web – Based Management: NMS with Web Interface and Web -Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web – Based Enterprise Management, WBEM: Windows Management Instrumentation. Java management Extensions, M anagement of a Storage Area Network: Future Directions.

UNIT-IV

Performance Modeling and Estimation: Overview of Probability and Stochastic Processes -Probability, Random Variables Stochastic Processes, Queuing Analysis –How Queues Behave – A Simple Example Why Queuing Analysis, Queuing Models, Single – Server Queues. Multi server Queues, Examples, Queues with Priorities, Networks of Queues. Other Queuing Models. Estimating Model Parameters – Modeling and Estimation of Self-Similar Traffic: Self – Similar Traffic.-Self-Similarity, Self – Similar Data Traffic, Examples of Self –Similar Data Traffic, and Performance Implications of Self –Similarity. Modeling and Estimation of Self-Similar Data Traffic.

UNIT-V

Quality of Service in IP Networks: Exterior Routing Protocols and Multicast –Path- Vector Protocols: BGPand [DKH Multicasting. Integrated and Differentiated Services – Integrated Services Architecture (ISA), Queuing Discipline, Random Early Detection, Differentiated Services, Protocols for QOS Support –Resource Reservation: RSVP. Multiprotocol Label

Switching, Real-Time Transport Protocol (RTP).

Course Outcomes:

After the completion of this course the student should be able to

1. Understand the challenges of Information Technology, Goals, Organization, and Functions.
2. Analyze Functional model, SNMP Management, SNMPv2 System Architecture, along with Structure of Management Information.
3. Understand overview of Probability and stochastic Processes.
4. Model and Estimate Self-Similar Traffic.
5. Implement QOS support and services and Develop resource reservation RSVP Multiprotocol label.

TEXT BOOKS :

1. Mani Subramanian. “Network Management, Principles and Practice”, Pearson Education, 2000, 2007.
2. William Sellings. “High –Speed Networks and Internets: Performance and Quality of Service -2nd”, Prentice Hall/Pearson Education, 2002.

REFERENCES:

1. Benou Claise and Ralf Wolter, “Network Management: Accounting and Performance Strategies”, Pearson Education. 2007, 2008,
2. J. Richard Burke, “ Network Management –Concepts and Practice: A Hands-on Approach”. PI U, 2004, 2008.
3. Stephen B. Morris, “Network Management, MBs and MPLS”, Pearson Education, 2003. 2005.
4. Anurag Kumar, D.Manjunath and Joy Kuri, “Communication Networking: An Analytical Approach’1, Elsevier, 2004.
5. Engineering Internet Qos, Sanjay Jha and Mahbub Hassan, Artech House. 2002
6. Thomas G. Robertazzi, “Computer Networks and Systems –Queuing Theory and Performance Evaluation –3rd”, Springer, 2000, 2002.
7. Gary N. Higginbottom, “Performance Evaluation of Communication Networks”. Artech House. 1998.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

**(A978208) STORAGE AREA NETWORKS
(CORE ELECTIVE-IV)**

Objectives:

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

UNIT I: Introduction to Storage Technology

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

UNIT II: Storage Systems Architecture

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

UNIT III: Introduction to Networked Storage

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

UNIT IV: Information Availability & Monitoring & Managing Datacenter

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

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

UNIT V: Securing Storage and Storage Virtualization

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

Case Studies

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

Course Outcomes:

After the completion of this course the student should be able to

1. Understand Storage Area Networks characteristics and components.
2. Learn SAN vendors and their products.
3. Discuss Fibre Channel protocols and how SAN components use them to communicate with each other.
4. Describe Cisco MDS 9000 Multilayer Directors and Fabric Switches Thoroughly learn Cisco SAN-OS features.
5. Implement EMC with examples.

TEXT BOOK:

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

REFERENCE BOOKS:

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

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

**(A978209) DISTRIBUTED SYSTEMS SECURITY
(CORE ELECTIVE-IV)**

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, OceanStore.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 student 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.
3. Classify the cryptographic algorithms and identify which suits best for securing the distributed system.
4. Design case study on Global Name Service, X.500 Directory Service and CORBA Services.
5. Implement the security techniques and cryptographic algorithms and plan a case study on CORBA.

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, Cambridge, rp 2010

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

(A978210) 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 student should be able to

1. Understand the different kinds of security attacks, services and mechanisms.
2. Gain complete knowledge in number system and areas of applications in public key cryptography algorithms and Interpret the importance of digital signatures, digital Certificates, Certificate Authority for electronic document transfer on internet.
3. Demonstrate IP security architecture.
4. Explain how Pretty Good Privacy (PGP) and S/MIME provides Email privacy.
5. Develop information security standards, Copy Right Law, and Patent Law.

Text Books:

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

5. CHANDER, HARISH, "Cyber Laws And It Protection ", PHI Learning Private Limited, Delhi ,India

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/-/ 4

(A978211) INFORMATION SYSTEMS CONTROL AND AUDIT
(CORE ELECTIVE-IV)

OBJECTIVE:

To gain application ability of necessary controls, laws and standards in computerized Information system.

UNIT-I: Information Systems Concepts:

General Systems Concepts – Nature and types of systems, nature and types of information, attributes of information. Management Information System – Role of information within business Business information systems – various types of information systems – TPC, MIS, DSS, EIS, ES.

UNIT-II: Systems Development Life Cycle Methodology:

Introduction to SDLC/Basics of SDLC Requirements analysis and systems design techniques Strategic considerations: Acquisition decisions and approaches Software evaluation and selection/development Alternate development methodologies- RAD, Prototype etc Hardware evaluation and selection Systems operations and organization of systems resources Systems documentation and operation manuals User procedures, training and end user computing System testing, assessment, conversion and start-up Hardware contracts and software licenses System implementation Post-implementation review System maintenance System safeguards Brief note on IS Organisation Structure

UNIT-III: Control objectives

Information Systems Controls Need for control Effect of computers on Internal Audit Responsibility for control – Management, IT, personnel, auditors Cost effectiveness of control procedure Control Objectives for Information and related Technology (COBIT) Information Systems Control Techniques Control Design: Preventive and detective controls, Computer-dependent control, Audit trails, User Controls (Control balancing, Manual follow up) Non-computer-dependent (user) controls: Error identification controls, Error investigation controls, Error correction controls, Processing recovery controls over system selection, acquisition/development Standards and controls applicable to IS development projects Developed / acquired systems Vendor evaluation Structured analysis and design Role of IS Auditor in System acquisition/selection

UNIT-IV: Audit Tests of General and Automated Controls

Introduction to basics of testing (reasons for testing);

Various levels/types of testing such as: (i) Performance testing, (ii) Parallel testing, Concurrent Audit modules/Embedded audit modules, etc.

UNIT-V: Risk assessment methodologies and applications:

Meaning of Vulnerabilities, Threats, Risks, Controls, Fraud, error, vandalism, excessive costs, competitive disadvantage, business, interruption, social costs, statutory sanctions, etc. Risk Assessment and Risk Management, Preventive/detective/corrective strategies

Business Continuity Planning and Disaster recovery planning:

Fundamentals of BCP/DRP, Threat and risk management, Software and data backup techniques.

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

1. Discuss the fundamental of auditing in information systems and applications.
2. Describe the basics of threats, computer security and remedies.
3. Adapt the trends on various Information Control Techniques.
4. Analyze the Types of testing such as Performance, Parallel Testing.
5. Develop methods to execute security threats and plan to protect computer systems from various security threats.

TEXT BOOK:

1. Information Systems Control and Audit- Board of Studies Institute of Chartered Accountants of India New Delhi.

**VAAGDEVI COLLEGE OF ENGINEERING
(UGC AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

(A978212) 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 student 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:

- E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
- E-Commerce, S.Jaiswal – Galgotia.

- E-Commerce, Efrain Turbon, Jae Lee, David King, H. Michael Chang. Electronic Commerce – Gary P. Schneider – Thomson.

-63-

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

**(A978213) 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 student 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:

- Debirag E.Bouchoux: “Intellectual Property” 4e . Cengage learning, New Delhi
- M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.
- Cyber Law. Texts & Cases, South-Western’s Special Topics Collections
- Prabhuddha Ganguli: ‘ Intellectual Property Rights’ Tata Mc-Graw –Hill, New Delhi
- J Martin and C Turner “Intellectual Property” CRC Press
- Richard Stimm “ Intellectual Property” Cengage Learning

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

M.Tech. I Year II Semester (CNIS)

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

(A978214) MOBILE COMPUTING

(OPEN ELECTIVE-II)

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

UNIT-V

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

Course Outcomes:

After the completion of this course the student 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

(AUTONOMOUS)

M.Tech. I Year II Semester (CNIS)

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

(A978215) 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 HTTPOnly Flag Support, Lack of SECURE Flag Support, Handling Browser Cache, WAP Limitations.

UNIT III:

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

UNIT IV:

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

UNIT V

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

Course Outcomes:

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

1. Understand the mobile devices and its platforms.
2. Describe the knowledge on mobile operating system wireless communication with and architecture.
3. Implement Bluetooth security for mobile applications.
4. Categorize appropriate methodologies on PDUs, converting XML.
5. Implement Secure Local storage on Enterprise Security.

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.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

M.Tech. I Year II Semester (CNIS)

L/T/P C

4/0/- 4

**(A978216) 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. Understand the importance of Information Security.
2. Illustrate the Legal Ethics.
3. Deploy the security Technologies and adapt various firewalls and Intrusion detection systems.
4. Implement the techniques used in cryptography.
5. Plan methods for information security and demonstrate it with Real Time problems.

TEXT BOOKS:

1. Principles of Information Security by Whitman, Thompson

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

M.Tech. I Year II Semester (CNIS)

L/T/P C

- / - /4 2

(A978217) NETWORK SECURITY LAB

Experiments List:

1. Learn to install wine / virtual box or any other equivalent software on the host os.
2. Perform an experiment to grab a banner with telnet and perform the task using netcat utility.
3. Perform an experiment for port scanning with nmap, superscan or any other software.
4. Using nmap 1)find open ports on a system 2) find the machines which are active 3)find the version of remote os on other systems 4)find the version of s/w installed on other system
5. Perform an experiment on active and passive finger Printing using xprobe2 and nmap.
6. Performa an experiment to demonstrate how to sniff for router traffic by using the tool wireshark
7. Perform an experiment how to use dump sec
8. Perform an wireless audit of an access point / router and decrypt wep and wpa.
9. Perform an experiment to sniff traffic using arp poisoning.
10. Install ipcop on a linux system and learn all the function available on the software.
11. Install jcrypt tool (or any other equivalent) and demonstrate asymmetric, symmetric crypto algorithm, hash and digital/pki signatures
12. Demonstrate intrusion detection system (ids) using any tool
Eg . Snort or any other s/w
13. Install rootkits and study variety of options
14. Generating password hashes with openssl
15. Setup a honey pot and monitor the honeypot on network.

Course Outcomes:

1. Implement Simplified DES Algorithm for encryption and decryption and also check how to break the DES coding.
2. Apply the RSA the public key cryptography algorithm to transfer data securely across any network.
3. Verify the correctness of the Email system using digital signatures by using a mail agent and also verify email authentication using S/MIME.
4. Examine the working of Sniffers for network communication monitoring.