ACADEMIC REGULATIONS, COURSE STRUCTURE
AND DETAILED SYLLABUS

M.Tech (COMPUTER NETWORKS & INFORMATION SECURITY)

FOR
MASTER OF TECHNOLOGY TWO YEAR POST GRADUATE COURSE
(Applicable for the batches admitted from 2015-2016)

R15

ANURAG GROUP OF INSTITUTIONS
(AUTONOMOUS)
SCHOOL OF ENGINEERING
Venkatapur, Ghatkesar, Hyderabad – 500088
Applicable for the students of M. Tech. (Regular) programme from the Academic Year 2015-16 and onwards

The M. Tech. Degree of 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.

1.0 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.

2.0 AWARD OF M. Tech. DEGREE

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

3.0 COURSES OF STUDY

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

1. CAD/CAM
2. Computer Networks and Information Security
3. Computer Science
4. Computer Science and Engineering
5. Construction Management
6. Electrical Power Systems
7. Electronics and Communication Engineering
8. Embedded Systems
9. Machine Design
10. Power Electronics and Electrical Drives
11. Software Engineering
12. Structural Engineering
13. VLSI System Design
14. Wireless and Mobile Communication
4 Course Registration

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

4.2 Academic Section of the College invites ‘Registration Forms’ from students with in 15 days from the commencement of class work through ‘ON-LINE SUBMISSIONS’, ensuring ‘DATE and TIME Stamping’. The ON-LINE Registration Requests for any ‘CURRENT SEMESTER’ shall be completed BEFORE the commencement of SEE (Semester End Examinations) of the ‘PRECEDING SEMESTER’.

4.3 A Student can apply for ON-LINE 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 ON-LINE 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 ON-LINE 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

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

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 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 on genuine medical grounds and valid reasons on representation by the candidate with supporting evidence.
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 fees hall be payable towards condonation of shortage of attendance.

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

5.7 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 in to 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 (10 marks) consisting of 5 sub-questions carrying 2 marks each, and Part B with 3 questions to be answered out of 5 questions, each question carrying 10 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 questions, one from each unit and carries 4 marks each.

- Part-B to be answered 5 questions carrying 8 marks each. There will be two 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 The practical end semester examination shall be conducted with an external examiner and the laboratory teacher. The external examiner shall be appointed by the Principal from the panel of examiners recommended by Chairman, Board of Studies in respective Branches.

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 from the panel of 3 examiners recommended by Chairman, Board of Studies in respective Branches. 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 re-registered 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 re-register 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:

<table>
<thead>
<tr>
<th>% of Marks Secured (Class Intervals)</th>
<th>Letter Grade (UGC Guidelines)</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% and above</td>
<td>O (Outstanding)</td>
<td>10</td>
</tr>
<tr>
<td>(≥ 80%, ≤ 100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 80% but not less than 70%</td>
<td>A+ (Excellent)</td>
<td>9</td>
</tr>
<tr>
<td>(≥ 70%, &lt; 80%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 70% but not less than 60%</td>
<td>A (Very Good)</td>
<td>8</td>
</tr>
<tr>
<td>(≥ 60%, &lt; 70%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 60% but not less than 55%</td>
<td>B+ (Good)</td>
<td>7</td>
</tr>
<tr>
<td>(≥ 55%, &lt; 60%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 55% but not less than 50%</td>
<td>B (Above Average)</td>
<td>6</td>
</tr>
<tr>
<td>(≥ 50%, &lt; 55%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 50%</td>
<td>F (Fail)</td>
<td>0</td>
</tr>
<tr>
<td>( &lt; 50%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>Ab</td>
<td>0</td>
</tr>
</tbody>
</table>

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

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

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

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

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

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

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

7.9 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (\( \Sigma CP \)) 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

\[
SGPA = \frac{\sum_{i=1}^{N} C_i G_i}{\sum_{i=1}^{N} C_i} \text{ For each Semester,}
\]

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 is the no. of Credits allotted to the ith Subject, and G represents the Grade Points (GP) corresponding to the Letter Grade awarded for that ith 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

\[
CGPA = \frac{\sum_{j=1}^{M} C_j G_j}{\sum_{j=1}^{M} C_j} \text{ … for all S Semesters registered}
\]

(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 is the no. of Credits allotted to the jth Subject, and G represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

7.11 For Calculations listed in Item 7.6 – 7.10, performance in failed Subjects/ Courses (securing F Grade) will also be taken into account, and the Credits of such Subjects/ Courses will also be included in the multiplications and summations.
8. **EVALUATION OF PROJECT/DISSERTATION WORK**

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

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

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

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

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

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

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

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

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 as per the recommendations of PRC.

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.
he fails to fulfill minimum marks, he has to reappear as per the recommendations of PRC.

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 Institution. 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 Institution. For this, Chairmen, BOS of the respective departments shall submit a panel of 3 examiners, who are eminent in that field with the help of the concerned guide and senior faculty of the department.

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 un favourable again, the thesis shall be summarily rejected.

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

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

9. AWARD OF DEGREE AND CLASS

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

9.2 Award of Class

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

<table>
<thead>
<tr>
<th>Class Awarded</th>
<th>CGPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class with Distinction</td>
<td>≥ 7.75</td>
</tr>
<tr>
<td>First Class</td>
<td>6.75 ≤ CGPA &lt; 7.75</td>
</tr>
<tr>
<td>Second Class</td>
<td>6.00 ≤ CGPA &lt; 6.75</td>
</tr>
</tbody>
</table>

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 institution 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 equivalents 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 Academic Council is final.

12.6 The Academic Council 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 Academic Council.
MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

<table>
<thead>
<tr>
<th>Nature of Malpractices/Improper conduct</th>
<th>Punishment</th>
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<tbody>
<tr>
<td>If the candidate:</td>
<td></td>
</tr>
<tr>
<td>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)</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject only</td>
</tr>
<tr>
<td>(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.</td>
<td>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.</td>
</tr>
<tr>
<td>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.</td>
<td>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidates 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 controller of examinations, AGI.</td>
</tr>
<tr>
<td>3. Impersonates any other candidate in connection with the examination.</td>
<td>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</td>
</tr>
</tbody>
</table>
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 the performance in that subject and all other subjects the candidates 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 semester 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.

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 office relations whether

In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subjects 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.
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.

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<tbody>
<tr>
<td>7.</td>
<td>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</td>
</tr>
<tr>
<td></td>
<td>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidates 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 semester examinations. The continuation of the course by the candidate is subject to the academic regulation in connection with forfeiture of seat.</td>
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</tbody>
</table>

| 8. | Posses any lethal weapon or firearm in the examination hall. |
|     | Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidates 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. |

<p>| 9. | If student of the college, who is not a candidate for the particular examination or any person not connected with college indulges in any malpractice or improper conduct mentioned in clause 6 to 8 |
|     | Student of the college’s expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidates has already appeared including practical examinations and project work and shall |</p>
<table>
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<tbody>
<tr>
<td>not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeiture the seat.</td>
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<tr>
<td>Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.</td>
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<tr>
<td>10.</td>
<td>Comes in a drunken condition to the examination hall.</td>
<td>Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidates 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.</td>
</tr>
<tr>
<td>11.</td>
<td>Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.</td>
<td>Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of the semester/year examinations.</td>
</tr>
<tr>
<td>12.</td>
<td>If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the Malpractices committee, AGI for further action to award suitable punishment.</td>
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<tr>
<td>Code</td>
<td>Subject Name</td>
<td>Int</td>
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<tr>
<td>Core Course I</td>
<td>Advanced Data Structures and Algorithms</td>
<td>40</td>
</tr>
<tr>
<td>Core Course II</td>
<td>Web Technologies and Services</td>
<td>40</td>
</tr>
<tr>
<td>Core Course III</td>
<td>Advanced Computer Networks</td>
<td>40</td>
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<tr>
<td>Open Elective I</td>
<td><strong>Open Elective I</strong></td>
<td></td>
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<tr>
<td></td>
<td>1. Principles of Information Security</td>
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<td></td>
<td>2. Social Media Intelligence</td>
<td></td>
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<td></td>
<td>3. Entrepreneurship</td>
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<tr>
<td>Core Elective -I</td>
<td><strong>Core Elective-I</strong></td>
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<td>Distributed Systems</td>
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<td>Ethical Hacking</td>
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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


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.

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.

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
WEB TECHNOLOGIES AND SERVICES

Learning Objective:

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

Client Side: HTML, CSS, Javascript, Ajax, JQuery and JSON  
Server Side: Servlets, JSP  
Database: MySQL with Hibernate and Connection Pooling  
Framework: Struts with validation framework, Internationalization (I18N)  
SOA: Service Oriented Architecture, Web services fundamentals, Axis framework for WS

UNIT I

Client Side Technologies:

Overview of HTML - Common tags for text formatting, Lists, Tables, Images, Forms, Frames etc., XHTML  
Cascading Style sheets, linking to HTML Pages, Classes in CSS, General CSS statements for Text, Table, List and Page formatting  
Introduction to JavaScript, variables, arrays, methods and string manipulation, BOM/DOM (Browser/Document Object Model), accessing elements by ID, Objects in JavaScript  
Dynamic HTML with JavaScript and with CSS, form validation with JavaScript, Handling Timer Events, JQuery

UNIT II

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

Introduction to Hibernate

UNIT III

Introduction to JSP:

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

**UNIT IV**

Introduction to Struts Framework:

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

**UNIT V**

Service Oriented Architecture and Web Services

Overview of Service Oriented Architecture - SOA concepts, Key Service Characteristics, Technical Benefits of a SOA Introduction to Web Services- The definition of web services, basic operational model of web services, basic steps of implementing web services. Core fundamentals of SOAP – SOAP Message Structure, SOAP encoding, SOAP message exchange models, Describing Web Services -Web Services life cycle, anatomy of WSDL. Introduction to Axis- Installing axis web service framework, deploying a java web service on axis. Web Services Interoperability – Creating java and Net client applications for an Axis Web Service.

**TEXT BOOKS:**


**REFERENCE BOOKS:**

2. Core SERVLETS AND JAVASERVER 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.
7. Java Server Programming, Ivan Bayross and others, The X Team, SPD
9. Beginning Web Programming - Jon Duckett, WROX.
ANURAG GROUP OF INSTITUTIONS
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ADVANCED COMPUTER NETWORKS

Objectives:

- The objective of this course is to build a solid foundation in computer networks concepts and design
- To understand computer network architectures, protocols, and interfaces.
- The OSI reference model and the Internet architecture network applications.
- The course will explore computer networks - wireless and mobile, multimedia-based.
- Students completing this course will understand the key concepts and practices employed in modern computer networking

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


UNIT I: Review


UNIT II: Network Routing

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

UNIT III: LAN Switching

Switching and its concepts: Structure of a Switch, Basic Switch Configuration, Virtual LANs (VLANs), VLAN Trunking Protocol (VTP), Spanning Tree Protocol (STP), Inter-VLAN Routing.
UNIT IV: Wide Area Networks (WANs)
Introduction to WANs, Point-to-Point Protocol (PPP) concepts, Frame Relay concepts, Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), IPv6.

UNIT V: Network Programming using Java
TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI) - Basic RMI Process, Implementation details - Client-Server Application.

TEXT BOOKS:
2. Network Fundamentals, Mark Dye, Pearson Education.
4. LAN Switching & Wireless, Wayne Lewis, Pearson Education.
5. Accessing the WAN, Bob Vachon, Pearson Education.

REFERENCE BOOKS:
PRINCIPLES OF INFORMATION SECURITY

Objectives:

- Upon completion of this material, you should be able to define information security
- Recount the history of computer security and how it evolved into information security
- Define key terms and critical concepts of information security
- Enumerate the phases of the security systems development life cycle
- Describe the information security roles of professionals within an organization

UNIT - I


UNIT - II

Cryptography: Concepts and Techniques, symmetric and asymmetric key cryptography, steganography, Symmetric key Ciphers: DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation, AES structure, Analysis of AES, Key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange

UNIT - III


UNIT - IV

\Security at layers(Network, Transport, Application): IPSec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME

UNIT - V

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls
TEXT BOOKS:


REFERENCE BOOKS:

5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
UNIT – I

The Beginnings of Social Media Intelligence: What is Social Media monitoring? Anecdotal referencing of Social Media Comments, Text Mining, Some Simple Metrics, Using Social Media as Early Warning System. Fundamental of Opinion Formation: Affecting Opinion versus Biasing Expression, How Do We Form Opinions?, How Do Expectations Affect Opinion?, How Do Expertise and Knowledge Influence How We Form Opinions?, Opinion Formation in a Social Context, Bandwagon behavior and Information Cascades, Implications for Social Media Intelligence

UNIT – II


UNIT – III

UNIT – IV

Managing Social Media Communities for Better Social Media Intelligence: Creating an Inviting Environment, The Benefits of a Well-Managed Opinion Community (and the Costs of Not Managing the Community at All) Quality of Intelligence Depends on the Quality of the Opinion Community, Creating and Manipulating Buzz, Buzz Campaign or Fraud?, Identifying Fraudulent Opinions Cutting Through the Online Chatter : A New Paradigm for Marketing Research, Measure What Matters, Cast a Wide Net, Analyze the Text, Understand the biases, Establish Links to Performance metrics.

UNIT – V


Text Book:

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(AUTONOMOUS)

M. Tech – I Year – I Sem.  L   P   C
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ENTREPRENEURSHIP

(OPENS ELECTIVE –I)

Course Outcomes:
Student will be able to:
1. Have the knowledge on various concepts of business management and approaches.
2. Understand and analyze the interconnections between the development of key functional
   areas of business organization and the management thought process.
3. Acquire team management skills and to become a competent leader, who possesses
   complex and integrated real world skills.
4. Be ethically conscious and socially responsible managers, capable of contributing to the
   development of the nation and quality of life.

Unit-I: Understanding Entrepreneurial Mindset- The revolution impact of entrepreneurship-
The evolution of entrepreneurship- Approaches to entrepreneurship- Process approach-
Twenty first century trends in entrepreneurship.
   Case 3: From candle seller to CEO (Arya Kumar P.No. 48)

Unit-II: The individual entrepreneurial mind-set and Personality- The entrepreneurial journey-
Stress and the entrepreneur- the entrepreneurial ego- Entrepreneurial motivations. Corporate
Entrepreneurial Mindset-the nature of corporate entrepreneur- conceptualization of corporate
entrepreneurship Strategy-sustaining corporate entrepreneurship.
   Case : Globalizing Local Talent, (B. Janakiram, M. Rizwana, page 228).

Unit-III: Launching Entrepreneurial Ventures- opportunities identification- entrepreneurial
Imagination and Creativity- the nature of the creativity process-Innovation and entrepreneurship.
Methods to initiate Ventures- Creating new ventures-Acquiring an Established entrepreneurial
venture- Franchising-hybrid-disadvantage of Franchising.
   Case 1: Water, Water everywhere: but not a drop to drink, (Richard Blundel , Page 48).
   Case 3: Pets.com (Arya Kumar P.No. 88)
   Case 4: creativity in start-ups (Arya Kumar P.No. 166)
   Case 5: Opportunity – Earthmoving Industry (Arya Kumar P.No. 211)

  Case 1: Victoria, Tomlinson; Network. (Richard Blundel, Page 99).
  Case 2: Tim Lockett, Knowing your Customers & Suppliers (Richard Blundel Page128).
  Case 3: Google (Arya Kumar P.No. 248)
  Case 4: Tata Motors – Nano (Arya Kumar P.No. 279)

Unit-V: Strategic perspectives in entrepreneurship- Strategic planning-Strategic actions-strategic positioning-Business stabilization- Building the adaptive firms-Understanding the growth stage-Unique managerial concern of growing ventures.

  Case 1: To Lease or Not: A Cash flow Question (David H.Holt, Page 452).
  Case 2:- Public Sector - address seed capital (David H.Holt, Page 453).

Text Books:

1. D F Kuratko and T V Rao “Entrepreneurship- A South-Asian Perspective “Cengage Learning, 2012. (For PPT, Case Solutions Faculty may visit : login.cengage.com) Cases:

Journal:

1. The Journal of Entrepreneurship, Entrepreneurship Development Institute of India, Ahmedabad,

Reference Books:

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

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

UNIT II

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 Ivvy case study, Release consistency and Munin case study, other consistency models, CORBA case studyIntroduction, CORBA RMI, CORBA Services.

TEXT BOOKS:

REFERENCE BOOKS:
ANURAG GROUP OF INSTITUTIONS
(AUTONOMOUS)

M. Tech – I Year – I Sem. L P C

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ETHICAL HACKING (ELECTIVE-I)

Objectives:
- To learn the ethics and legality of hacking
- To learn about the hacking tools
- To learn the hacking of servers and OS

UNIT I
Introduction to Ethical Hacking, Ethics, and Legality

UNIT II
Scanning and Enumeration

System Hacking
Understanding Password-Cracking Techniques, Understanding the LanManager Hash Cracking Windows 2000 Passwords, Redirecting the SMB Logon to the Attacker, SMB Redirection, SMB Relay MITM Attacks and Countermeasures, NetBIOS DoS Attacks, Password-Cracking Countermeasures, Understanding Different Types of Passwords, Passive Online Attacks, Active Online Attacks, Offline Attacks, Nonelectronic Attacks, Understanding Keyloggers and Other Spyware Technologies, Understand Escalating Privileges, Executing Applications, Buffer Overflows, Understanding Rootkits, Planting Rootkits on Windows 2000 and XP Machines, Rootkit Embedded TCP/IP Stack Rootkit Countermeasures,
Understanding How to Hide Files, NTFS File Streaming NTFS Stream Countermeasures, Understanding Steganography Technologies, Understanding How to Cover Your Tracks and Erase Evidence, Disabling Auditing, Clearing the Event Log

UNIT III

UNIT IV

UNIT V
TEXT BOOKS:

1. CEH official Certified Ethical Hacking Review Guide, Wiley India Edition
2. Certified Ethical Hacker: Michael Gregg, Pearson Education
3. Certified Ethical Hacker: Matt Walker, TMH.

REFERENCE BOOKS:

ANURAG GROUP OF INSTITUTIONS
(AUTONOMOUS)

M. Tech – I Year – I Sem. L P C
4 0 4
INFORMATION RETRIEVAL SYSTEMS (ELECTIVE-I)

Objectives:

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

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

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

UNIT II

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

UNIT IV
UNIT V

TEXT BOOKS:

REFERENCE BOOKS:
EMBEDDED SYSTEMS (ELECTIVE-II)

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

UNIT I

UNIT II
8051 and Advanced Processor Architecture:
8051 Architecture, 8051 Micro controller Hardware,

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

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

**TEXT BOOK:**

**REFERENCE BOOKS:**
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. Micro Controllers, Ajay V Deshmukhi, TMH.
7. Introduction to Embedded Systems,Shibu K.V, TMH.
ANURAG GROUP OF INSTITUTIONS
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DATA WAREHOUSING AND MINING (ELECTIVE -II)

Objectives:
- Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors.
- Building basic terminology.
- Learn how to gather and analyze large sets of data to gain useful business understanding.
- Learn how to produce a quantitative analysis report/memo with the necessary information to make decisions.
- Describing and demonstrating basic data mining algorithms, methods, and tools
- Identifying business applications of data mining
- Develop and apply critical thinking, problem-solving, and decision-making skills.

UNIT I
Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II
Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Usage of Data Warehousing Online Analytical Processing and Mining

Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes, Attribute-Oriented Induction for data characterization and its implementation

UNIT III
Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent itemsets using candidate generation, Generating association rules from frequent itemsets, Mining frequent itemsets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis
UNIT IV
Classification and Prediction: Description and comparison of classification and prediction, preparing data for Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor

UNIT V
Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, clustering based on density distribution function, wavelet transformation based clustering, conceptual Clustering, Constraint-Based Cluster Analysis, Outlier Analysis.

TEXT BOOKS:
1. Data Mining - Concepts and Techniques - Jiawei Han, Micheline Kamber and Jian Pei, 3rd edition, Morgan Kaufmann Publishers, ELSEVIER.
2. Introduction to Data Mining - Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

REFERENCE BOOKS:
1. Data Warehousing in the Real World - Sam Aanhory & Dennis Murray Pearson Edn Asia.
2. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008
3. Data Warehousing Fundamentals - Paulraj Ponnaiah Wiley student Edition
4. The Data Warehouse Life cycle Tool kit - Ralph Kimball Wiley student edition
6. Data Mining Introductory and advanced topics -Margaret H Dunham, Pearson education
Objectives:

- To understand 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

Linux Utilities- File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking utilities, Filters, Text processing utilities and Backup utilities.

Bourne again shell(bash) - Introduction, pipes and redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples.

Review of C programming concepts-arrays, strings (library functions), pointers, function pointers, structures, unions, libraries in C.

UNIT - II

Files- File Concept, File types File System Structure, Inodes, File Attributes, file I/O in C using system calls, kernel support for files, file status information-stat family, file and record locking-lock and fcntl functions, file permissions- chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links - symlink, link, unlink.


Process- Process concept, Kernel support for process, process attributes, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process.

UNIT - III

Signals- Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.

Interprocess Communication - Introduction to IPC mechanisms, Pipes- creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions, Introduction to message queues, semaphores and shared memory. Message
Queues- Kernel support for messages, UNIX system V APIs for messages, client/server example.

Semaphores-Kernel support for semaphores, UNIX system V APIs for semaphores.

UNIT - IV

Shared Memory- Kernel support for shared memory, UNIX system V APIs for shared memory, client/server example.

Network IPC - Introduction to Unix Sockets, IPC over a network, Client-Server model ,Address formats(Unix domain and Internet domain), Socket system calls for Connection Oriented -

Communication ,Socket system calls for Connectionless - Communication, Example-Client/Server Programs- Single Server-Client connection, Multiple simultaneous clients, Socket options - setsockopt , getsockopt , fcntl.

UNIT-V

Network Programming in Java-Network basics, TCP sockets, UDP sockets (datagram sockets), Server programs that can handle one connection at a time and multiple connections (using multithreaded server), Remote Method Invocation (Java RMI)-Basic RMI Process, Implementation details-Client-Server Application.

TEXT BOOKS:

1. Unix System Programming using C++, T.Chan, PHI. (Units II, III, IV)
4. Unix Network Programming ,W.R. Stevens, PHI.(Units II,III,IV)

REFERENCE BOOKS:

1. Linux System Programming, Robert Love, O’Reilly, SPD.
6. UNIX Internals, U.Vahalia, Pearson Education.
8. C Programming Language, Kernighan and Ritchie, PHI
ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

Objectives:

- The fundamental design, analysis, and implementation of basic data structures.
- Basic concepts in the specification and analysis of programs.
- Principles for good program design, especially the uses of data abstraction.

Sample Problems on Data structures:

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
   a) Linear search
   b) Binary search

2. Write Java programs to implement the following using arrays and linked lists
   a) List ADT

3. Write Java programs to implement the following using an array.
   a) Stack ADT
   b) Queue ADT

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

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

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

7. Write Java programs to implement the following using a singly linked list.
   a) Stack ADT
   b) Queue ADT

8. Write Java programs to implement the deque (double ended queue) ADT using
   a) Array
   b) Singly linked list
   c) Doubly linked list.

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

10. Write a Java program to perform the following operations:
    a) Construct a binary search tree of elements.
    b) Search for a key element in the above binary search tree.
    c) Delete an element from the above binary search tree.

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

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

13. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
a) Preorder   b) Inorder   c) Postorder.

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

15. Write Java programs for implementing the following sorting methods:
   a) Bubble sort   d) Merge sort   g) Binary tree sort
   b) Insertion sort   e) Heap sort
   c) Quick sort   f) Radix sort

16. Write a Java program to perform the following operations:
   a) Insertion into a B-tree   b) Searching in a B-tree

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

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

**REFERENCE BOOKS:**

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

(Note: Use packages like java.io, java.util, etc)
Objectives:
The main objective of this course is to provide the students with the competences required for understanding and using the communications component of an universal communications environment. Students will be provided, in particular, with the knowledge required to understand

- Emerging communications networks,
- Their computational demands,
- The classes of distributed services and applications enabled by these networks, and
- The computational means required to create the new networks and the new applications.

UNIT I

UNIT II

UNIT III

UNIT IV
MOBILE NETWORK LAYER: Mobile IP: Goals, Assumptions, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Dynamic Host Configuration Protocol (DHCP)

UNIT V
MOBILE TRANSPORT LAYER: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP, TCP over 2.5G/3G Wireless Networks.
TEXT BOOKS:

REFERENCE BOOKS:
2. Matthew S.Gast, “802.11 Wireless Networks”, SPD O’REILLY.
ANURAG GROUP OF INSTITUTIONS
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M. Tech – I Year – II Sem.

APPLICATIONS OF NETWORK SECURITY

: Objectives

• To understand the latest technologies related to network security
• To understand the IEEE 802.11 security
• To understand the GSM and UMTS security
• To understand IDS, IPS
• To understand Computer Forensics

UNIT - I
IEEE 802.11 Wireless LAN Security: Background, Authentication: Pre- WEP Authentication, Authentication in WEP, Authentication and key agreement in 802.11i, Confidentiality and Integrity: Data protection in WEP, Data protection in TKIP and CCMP

UNIT - II

UNIT - III

UNIT - IV
Web Services Security: Motivation, Technologies for Web Services: XML, SOAP, WSDL and UDDI,
SSL, WS-Security, SAML, Ws-Trust, WS-Security Policy

UNIT - V
TEXT BOOKS:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

REFERENCE BOOKS:

1. Cyber Security: Nina Godbole, Sunit Belapure, Wiley India.
2. Network Security Hacks: Andrew Lockhart, O'Reilly, SPD.
7. Computer Evidence: Collection & Preservation, Christopher
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M. Tech – I Year – II Sem.  
L  P  C  
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INFORMATION SECURITY MANAGEMENT AND STANDARDS

Objectives:
- Compile, analyze, and assess the applicability of best practices in addressing information security issues relevant to the cyber security community
- Evaluate the impact of business constraints and processes on the implementation of information security programs
- Integrate principles and techniques of risk analysis, project planning and change management in the development of information security strategies
- Demonstrate secondary research skills in the investigation and selection of best practice solutions to address information security challenges
- Demonstrate mastery of theory, concepts and skills in addressing specialized aspects of information security management

UNIT I
Information Security Management, Information Security Awareness Scenario in Indian Organizations, Building Blocks of Information Security

UNIT II
Risk Management: Overview of Risk Management, Risk Identification, Risk Assessment, Risk Control, Quantitative and Qualitative Approaches, Introduction to OCTAVE and COBIT approach.

UNIT III
Finding Networking vulnerabilities, Firewalls - Processing modes, Categorization, Architectures,
Selecting the right firewall, managing the firewalls. Intrusion Detection and Prevention Systems (IDS & IPS), Protecting Remote Connections - Virtual Private Networks for security

UNIT IV
Introduction to security audits, need for security audits, organizational roles, Auditor’s roles, Types of security audits, Audit approaches, Technology based audits. Business Continuity and Disaster Recovery Planning.
UNIT V

TEXT BOOKS:
1. Information Systems Security, Nina Godbole, Wiley India, 2009

REFERENCES:
1. Microsoft Security Risk Management Guide
3. OCTAVE approach http://www.cert.org/octave/
4. COBIT http://www.isaca.org/
Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

UNIT I


UNIT II

Routing Protocols for Ad Hoc Wireless Networks Issues in Designing a Routing Protocol for Ad hoc Wireless Networks, Classifications of Routing Protocols

Transport Layer for Ad Hoc Wireless Networks Issues in Designing a Transport layer protocol for Ad hoc Wireless Networks, Design goals of a Transport layer protocol for Ad hoc Wireless Networks, Classification of Transport layer solutions, TCP over Ad hoc Wireless Networks, Other Transport layer protocols for Ad hoc Wireless Networks.

UNIT III


UNIT IV

Basics of Wireless, Sensors and Applications: The Mica Mote, Sensing and Communication

Range, Design Issues, Energy consumption, Clustering of Sensors, Applications Data Retrieval in Sensor Networks: Classification of WSNs, MAC layer, Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

UNIT V

TEXT BOOKS:

REFERENCE BOOKS:
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COMPUTER FORENSICS  
(OPENS ELECTIVE - II)  

Objectives:
1. To understand the cyberspace
2. To understand the forensics fundamentals
3. To understand the evidence capturing process.
4. To understand the preservation of digital evidence.

UNIT I  


UNIT II  


UNIT III  


UNIT IV  


UNIT V


TEXT BOOKS:


REFERENCES:

3. Brian Carrier , "File System Forensic Analysis" , Addison Wesley, 2005
Objectives:

1. Identify the major categories and trends of e-commerce applications.
2. Identify the essential processes of an e-commerce system.
3. 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.
4. Understand the main technologies behind e-commerce systems and how these technologies interact.
5. 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


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


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.
TEXT BOOK:

REFERENCES BOOKS:
1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
MOBILE APPLICATION DEVELOPMENT USING J2ME AND ANDROID
(ELECTIVE - III)

Objectives:

- Design, implement and evaluate a User Interface for a mobile application.
- Create a small but realistic working mobile application using features such as data persistence and data communications.
- Categorize the challenges posed by developing mobile applications and be able to propose and evaluate and select appropriate solutions.

UNIT I


UNIT II


High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

UNIT III

J2ME Data Management System & Networking: Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener JDBC Objects: The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions JDBC and Embedded SQL: Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data form a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Sub queries, VIEWs. Generic Connection Framework: The Connection, Hypertext Transfer Protocol, Communication, Management Using HTTP Commands, Session
UNIT IV

UNIT V
Android development: Building User Interfaces, Intents and Broadcast Receivers, Using Internet Resources, Files, Saving State and Preferences, Databases and Content providers.

TEXT BOOKS:

REFERENCE BOOKS:
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DATABASE SECURITY
(ELECTIVE - III)

Objectives:

- To learn the security of databases
- To learn the design techniques of database security
- To learn the secure software design

UNIT I
Introduction
Introduction to Databases Security Problems in Databases Security Controls
Conclusions

Security Models -1
Introduction Access Matrix Model Take-Grant Model Acten Model PN Model Hartson and Hsiao's Model Fernandez's Model Bussolati and Martella's Model for Distributed databases

UNIT II
Security Models -2

UNIT III
Security Software Design

UNIT IV
UNIT V
Models For The Protection Of New Generation Database Systems -1
Introduction A Model for the Protection of Frame Based Systems A Model for the Protection of ObjectOriented Systems SORION Model for the Protection of Object-Oriented Databases
Models For The Protection Of New Generation Database Systems -2

TEXT BOOKS:
2. Database Security, Castano, Second edition, Pearson Education. REFERENCE BOOK:
1. Database security by alfred basta, melissa zgola, CENGAGE learning.
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WIRELESS SECURITY
(ELECTIVE - III)

Objectives:
- To learn Security Issues in Mobile Communication
- To learn Application Level Security in Cellular Networks, MANETs
- To learn Application Level Security in Ubiquitous networks
- To learn Security for mobile commerce applications

UNIT - I

UNIT - II

UNIT - III

UNIT - IV
UNIT - V

Security for mobile commerce applications: M-Commerce Applications, M-Commerce Initiatives, Security Challenges in mobile e-commerce, Types of attacks on mobile e-commerce, A Secure M-commerce model based on wireless local area network, Some of M-Commerce Security Solutions

TEXT BOOKS:

REFERENCE BOOKS:
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SEMANTIC WEB AND SOCIAL NETWORKS
(ELECTIVE-IV)

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

UNIT -I

UNIT -II

UNIT-III

UNIT-IV

UNIT-V
Social Network Analysis and semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis - Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.
TEXT BOOKS:


REFERENCE BOOKS:

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M. Tech – I Year – II Sem.

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NETWORK MANAGEMENT SYSTEMS
(ELECTIVE - IV)

Objectives:

- To learn about network management
- To understand SNMP
- To learn Network Management Tools and Systems
- To learn Performance Modeling and Estimation

UNIT I

UNIT II


UNIT III

UNIT IV

UNIT V


TEXT BOOKS:


REFERENCE BOOKS

7. Engineering Internet Qos, Sanjay Jha and Mahbub Hassan, Artech House, 2002
ANURAG GROUP OF INSTITUTIONS
(AUTONOMOUS)
M. Tech – I Year – II Sem.

CLOUD COMPUTING
(ELECTIVE-IV)

Objectives:
Prerequisite: Computer Networks and Operating Systems Course Description:

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

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

UNIT II

UNIT III


UNIT IV

UNIT V
TEXT BOOKS:

REFERENCE BOOKS:
OBJECTIVES:
• The Network Security Lab tries to present several hands-on exercises to help reinforce the students knowledge and understanding of the various network security aspects.
• The lab exercises are divided into two parts A & B.
• Part A deals with the implementation of cryptographic algorithms.
• Part B deals with usage of various security attacks/defenses related tools and utilities.

PART - A
The following exercises are based on the cryptographic algorithms. They can be implemented using C, C++, Java, etc.
1. Write a C program that contains a string(char pointer) with a value ‘Hello world’. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string(char pointer) with a value ‘Hello world’. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
   a. Caesar cipher     b. Substitution cipher     c. Hill Cipher
4. Write a C program to implement the DES algorithm logic.
5. Write a JAVA program to implement the DES algorithm logic.
6. Write a Java program that contains functions, which accept a key and input text to be encrypted/decrypted. This program should use the key to encrypt/decrypt the input by using the triple Des algorithm. Make use of Java Cryptography package.
7. Write a C/JAVA program to implement the Blowfish algorithm logic.
8. DES-2 and DES-3 using Java cryptography package.
9. Write the RC4 logic in Java
11. Implement Rijndael algorithm logic.
12. Write a Java program to implement RSA algorithm.
13. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript. Consider the end user as one of the parties(Alice) and the JavaScript application as the other party(Bob)
14. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
15. Calculate the message digest of a text using the MD5 algorithm in JAVA.
16. Explore the Java classes related to digital certificates.
17. Create a digital certificate of your own by using the Java keytool.
18. Write a Java program to encrypt users passwords before they are stored in a database table, and to retrieve them whenever they are to be brought back for verification.
19. Key generation(public and private key pair) can be performed using Java. Write a program which can do this.
20. Write a program in java, which performs a digital signature on a given text.
21. Study phishing in more detail. Find out which popular bank sites have been phished and how.

PART – B
The following exercises have to be performed using various software tools/utilities mentioned
1. Passive Information Gathering
   a. IP Address and Domain Identification of log entries - DNS, RIR, etc tools
   b. Information Gathering of a web site: WHOIS, ARIN, etc tools
   c. Banner Grabbing: Netcat, etc tools
2. Detecting Live Systems
   a. Port Scanning : Nmap, SuperScan
   b. Passive Fingerprinting: Xprobe2
   c. Active Fingerprinting: Xprobe2
3. Enumerating Systems
4. Automated Attack and Penetration Tools
5. Defeating Malware
   b. Finding malware
6. Securing Wireless Systems

TEXT BOOK:
1. Build Your Own Security Lab, Michael Gregg, Wiley India.