ACADEMIC REGULATIONS

COURSE STRUCTURE AND DETAILED SYLLABUS

(As per AICTE Model Curriculum)

For

M. Tech Two Year Degree Course

COMPUTER NETWORKS AND INFORMATION SECURITY

(CNIS)

(2019-2020)

DEPARTMENT OF INFORMATION TECHNOLOGY

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

Yamnampet, Ghatkesar Mandal, Hyderabad - 501 301.

ACADEMIC REGULATIONS
FOR
M. Tech (Full-Time) PROGRAMS - 2019-20 (A-19)

(Effective for the students admitted into first year from the academic year 2019-20 and onwards)

1.0 **Post-Graduate Degree Programmes in Engineering & Technology (PGP in E&T)** offered BY Sreenidhi Institute of Science And Technology is a **Two Year** (**Four Semesters**) full-time Master of Technology (M.Tech.) Post Graduate Programmes, under Choice Based Credit System (CBCS) and is affiliated to JNTUH.

2.0 **ELIGIBILITY FOR ADMISSIONS:**

2.1 Admission to the PGPs shall be made subject to eligibility, qualification and specializations prescribed by the University and as adopted by Sreenidhi Institute of Science and Technology from time to time, for each specialization under each M.Tech program.

2.2 Admission to the post graduate program shall be made on the basis of either the merit rank or Percentile obtained by the qualified student in the relevant qualifying GATE Examination / the merit rank obtained by the qualified student in an entrance test conducted by Telangana State Government (PGECET) for M.Tech programs, or on any other exams approved by the University, subject to reservations as laid down by the Government from time to time.

2.3 The medium of instruction for all PG Programs will be **ENGLISH** only.

3.0 **M.Tech Programs Structure:**

3.1 The M.Tech Programs are of Semester pattern, with **Four** Semesters consisting of **Two** academic years, each academic year having **Two** Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per Semester.

3.2 **The student shall not take more than four academic years to fulfill all the academic requirements for the award of M.Tech degree from the date of commencement of first year first semester, failing which the student shall forfeit the seat in M.Tech program.**

3.3 **UGC/AICTE** specified definitions / descriptions are adopted appropriately for various terms and abbreviations used in this PG academic regulations.

3.3.1 **Semester Scheme:**

Each Semester shall have 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) are taken as 'references' for the present set of Regulations. The terms 'SUBJECT' imply the same meaning here and refer to 'Theory Subject', or 'Lab Course', or 'Seminar', or 'Comprehensive Viva', "Project"

or ‘Technical Paper Writing’ as the case may be.

3.3.2 Credit Courses:

All students in a semester to earn credits which shall be assigned to each subject / course in an L: T: P: C (Lecture Periods: Tutorial Periods: Practical Periods: Credits) structure based on the following general pattern:

□□□□□□□□ One credit for every one hour of theoretical lectures undergone per week during the entire semester. In case of tutorials one credit for every one hour of tutorials undergone per week during the entire semester. One credit for every two hours of laboratory practical, technical seminar, Comprehensive Viva Voce, Mini Project with seminar, Project phase – I with seminar, Project phase – II with seminar, for the instruction undergone per week during the entire semester.

3.3.2.2 Other student activities like guest lecture, conference / workshop participations, and technical paper presentations are not given any credits. However, if they produce evidence that they have attended such programs, attendance will be given for the respective subject periods shown as per the time table which are lost due to their participation elsewhere. For the mandatory courses, they have to put in attendance which will be added to the attendance to the other subjects and decide whether a student can be permitted to write the examinations or not. There will be no credits given for the mandatory and audit courses but their performance will be judged and graded as follows

Percentage of marks secured in a Audit course	Grade
Greater than or equal to 90%	Outstanding
80% and above but less than 90%	Excellent
70% and above but less than 80%	Very good
60% and above but less than 70%	Good
50% and above but less than 60%	Above Average
Less than 50%	Fail
Absent	Ab

3.3.3 Additional Credits:

In case of M.Tech programs, a student can register a minimum of 17 credits and maximum of 24 credits to complete theory courses to concentrate on Project work in the II year. However, he / she will be given provisional certificate only at the end of two years even if he / she has completed all the requirements before that. **The candidate has to complete the course within four academic years from the date of his / her admission**.

3.3.4 **Subject Course Classification:**

All subjects / courses offered for the Post-Graduate Programs of M. Tech are classified as follows. The Institution has followed the general guidelines issued by AICTE.

S.No.	Broad Course Classification	Course Group/ Category	Course Description
1	Core Courses (CoC)	PC - Professional Core	Includes subjects related to the parent Discipline / Department / Branch.
		Project Work	M.Tech Project or Mini - Project or Major-Project or as applicable.
		Seminar, Technical seminar	Seminar on core contents related to parent discipline / department / branch.
		Comprehensive Viva-Voce	Viva-voce covering all the PG subjects studied during the course work.
2	Elective Courses (Ele)	PE - Professional Electives	Includes elective subjects related to the parent discipline / department / branch
		OE - Open Electives	Elective subjects which include inter-disciplinary subjects or subjects in an area outside the parent discipline / department / branch.
3.	Audit course	AC - Audit courses	1. English for Research paper writing (Grade evaluation). 2.Ethics, Morals, Gender sensitization and Yoga
Total number of Credits – 68 for M.Tech			

4. M.TECH COURSES

Departments offering M.Tech. Programmes with specializations are noted below:

Sl. No.	Department	M.Tech Course
1	CSE	Computer Science
2	CSE	Computer Science and Engineering
3	EEE	Electrical Power Engineering
4	ECE	Digital Systems and Computer Electronics
5	ME	CAD / CAM
6	ME	Thermal Engineering
7	IT	Computer Networks and Information Security

5.0 Attendance Requirements:

5.1 A student shall be eligible to appear for the semester end examinations, if student acquires a minimum of 75% attendance in aggregate of all the subjects / lab subjects / seminars / Mini and major projects (excluding attendance in mandatory / audit courses, NCC / NSO and NSS) for that semester.

5.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the College Academic Committee on genuine and valid grounds, based on the student's representation with supporting evidence.

5.3 A stipulated fee shall be payable towards condoning of shortage of attendance.

5.4 Shortage of attendance below 65% in aggregate shall in **NO CASE** be condoned.

5.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their admission for that semester shall stand cancelled. They shall not be promoted to the next semester. They may seek re-admission in that semester in which student was detained as and when offered. In case, if there are any professional electives and / or open electives, the same may also be opted, if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the same set of elective subjects offered under that category.

5.6 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same semester.

6.0 Academic Requirements:

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no. 5. The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks per subject (theory / practical), on the basis of Continuous Internal Evaluation and Semester End Examination.

6.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject, if he / she secures not less than 40% of marks (30 out of 75 marks) in the End Semester Examination, and a minimum of 50% of marks in the sum total of CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of Letter Grades and this implies securing "B" Grade or above in a subject.

6.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to a subject, if he / she secures not less than 50% of the total marks. The student is deemed to have failed, if he / she (i) does not attend the comprehensive viva-voce as per the schedule given, or (ii) does not present the seminar as required, or (iii) does not present the Technical seminar as required. In such a case, he / she may reappear for comprehensive viva-voce in supplementary examinations and for seminar / technical paper writing, in the subsequent semesters, as and when scheduled by paying required fee as per the norms of the Institution.

6.3 A student shall register for all subjects with the total credits of 68 for M.Tech courses as specified and listed in the course structure for the chosen specialization, and has to put in required attendance and fulfill all the academic

requirements of securing a minimum of 'B' Grade or above in each subject, and securing Semester Grade Point Average **(SGPA) of 6.0** (in each semester) and final Cumulative Grade Point Average **(CGPA)** (i.e., CGPA at the end of PGP**) of 6.0**, to complete the PGP successfully.

Note: (1) The SGPA will be computed and printed on the marks memo only if the candidate passes in all the subjects offered and gets minimum B grade in all the subjects.

(2) CGPA is calculated only when the candidate passes in all the subjects offered in all the semesters.

(3) The Institution will give grade card / marks memo at the end of each semester. In any semester in which a mandatory / audit course is offered the results of these subjects will be given in the letter grade as mentioned in item 10.2 given in latter sections of these regulations in the grade cards / marks memo of the corresponding semester.

6.4 Marks and Letter Grades obtained in all those subjects covering the above specified credits alone shall be considered for the calculation of final GPA, which will be indicated in the Grade Card /Marks Memo of second year second semester. In addition, the letter grades secured by the students in the mandatory / audit subjects will also be mentioned in the grade card / marks memo of II year II semester.

6.5 If a M.Tech student registers for extra subject(s) (in the parent department or other departments / branch) other than those listed subjects totaling to 68 credits respectively as specified in the course structure, the performance in extra subject(s) (although evaluated and graded using the same procedure as that of the required 68 credits) will not be taken into account while calculating the SGPA and CGPA. The extra subject(s) shall be from open elective / professional elective. Additional fee has to be paid for registering for extra subjects which are not required with regard to the credit requirements. For such extra subject(s) registered, percentage of marks and Letter Grade alone will be indicated in the Grade Card / Marks Memo, as a performance measure, subject to satisfying the attendance and academic requirements as stated in items 5 and 6.1 - 6.3.

6.6 When a student is detained due to shortage of attendance in any semester, no Grade allotment will be made. However, the student is eligible for re-admission in the subsequent semester(s), as and when next offered, with the academic regulations of the batch into which the student is re-admitted, by paying the prescribed fee as per the norms of Institution. In all these re-admitted cases, the student shall have to secure a fresh set of internal marks and Semester End Examination marks for performance evaluation and SGPA / CGPA calculations.

6.7 A student eligible to appear for the Semester End Examination in any subject, but absent from it or failed (failing to secure 'B' Grade or above), may reappear for that subject at the supplementary examination as and when conducted. In such cases, his Internal Marks assessed earlier for that subject will be carried over, and added to the marks secured in the supplementary examination, for the purpose of

evaluating his performance in that subject(s).

6. 8 A student can opt for one extra subject from II year I semester in M. Tech. I year I semester and also in I year II semester so that the student can complete all the subjects of II year I semester in advance and student can concentrate on Project work in the entire II year either in the institution or in the industry to complete quality work.

6.9 **A Student who fails to earn 68 credits in M.Tech program as per the specified course structure, and as indicated above, within four academic years from the date of commencement of his / her first year first semester, shall forfeit his / her seat in M.Tech program and his / her admission shall stand cancelled.**

7.0 EVALUATION:

The performance of a student in each semester shall be evaluated subject- wise (irrespective of credits assigned) for a maximum of 100 marks. The M.Tech project work (major project) will also be evaluated for 100 (30 CIE and 70 SEE) marks.

7.1 Each subject / Lab will have total of 100 marks (30 CIE and 70 SEE). There shall be two midterm examinations in every theory subject. 23 marks are earmarked for each midterm examination. **The marks shall be awarded considering the average of two midterm examination marks in each subject.** If any candidate is absent or if he wishes to improve the sessional marks he can appear for third mid-term examination. The syllabus for the third Mid examination shall be the entire syllabus of the subject concerned, and conducted on the same day of main examination. **The result of third mid test will be treated equal to that of a mid test and average of the better two out of the three mid tests will be considered**.

Each mid test will have compulsory questions without choice and long answer questions as detailed in the following paragraphs.

- Separate registration for the third mid examination has to be done by the student for each of the subjects the student wishes to appear for. He has to pay an examination fee as prescribed by the college per subject from time to time.

- **The midterm examination** question paper shall be of three parts, i.e. Part 'A', Part 'B' and Part 'C'.

The following procedure is to be followed for internal evaluation as given in the below table

Item	Proposed Marks
a) Part – A of Mid Test	12 questions – Short type questions **6 marks**
b) Part – B of Mid Test will have 3 questions (1 from each unit) and student has to answer 2 questions	2 Questions out of 3 questions **14 marks**
c) Part – C Mid test	Question Paper will have 3 questions, one question from each unit will be chosen out of 3 questions given for assignment. Student has to answer any one question out of 3 questions. **3 marks**
d) Assignment	For assignment -1, three questions from each unit- total of 9 questions to be submitted before first mid test. Similarly assignment – II will be given to be submitted before II Mid test and average of two assignments will be considered. **2 marks**
e) Class room participation and attendance	**3 marks**
f) Class notes	**2 marks**
Total Marks	**30 Marks**

- Mid Exam – I – First three Units - Duration – 2 hours
- Mid Exam – II – Last three Units - Duration – 2 hours
- Mid Exam – III – All six units - Duration – 2 ½ hours

- Two assignments shall be given for a total weightage of 2 marks.

    - Assignment - I for 2 Marks is to be submitted at least one week before the first mid examinations.
    - Second assignment also will carry 2 marks for the remaining 3 units which is to be submitted at least one week before the second mid examination.

    - The average of the two assignments will be taken with a total weightage of 2 marks.

    - Students will have to be give back the assignment before each mid examination.

    - Besides this 2 marks are allotted for class notes which is to be signed by concerned teacher for every fortnight.

Three marks for each theory subject shall be given for the students based on class room participation and attendance which they have put in a graded manner as per the table given below:

S.No.	Attendance Range	Marks Awarded
1.	65 % and above but less than 75%	1
2.	75% and above but less than 85%	2
3	More than 85 %	3

- **Calculation of final sessional marks for each subject:**

Sl.No	The item of evaluation of sessional marks	Maximum marks	Total marks scored in the subject by the student
1	Mid sessional examinations	23	
2	Assignments	2	
3	Class room participation & Attendance	3	
4	Class notes	2	
Total marks		**30 marks**	

7.1.1 The external examination question paper shall be of two parts, Part 'A' and Part 'B'.

Pattern for External Examinations (70 marks):

1. **For Theory Subjects**

There shall be external examination in every theory subject and it consists of two parts (Part-A & Part-B). The total time duration will be 3 hours.

- Part - A will be of 20 marks, which will have 10 short questions, which is compulsory.
- Part-B will be of 50 marks, which will have subjective type questions and shall have 7 questions out of which 5 are to be answered. At least one question must appear from each unit such that not more than 2 questions from any unit. All the questions carry equal marks.

Pattern of Evaluation for Lab Subjects (100 marks):

It is decided to offer one lab subject in I semester and one lab subject in the II semester of I year for M.Tech courses. For practical subjects there shall be a continuous evaluation during the semester for 30 sessional marks and 70 marks for end examination.

Assessment of internal marks (30 marks) will be as follows:

1.	Day-to-Day work	- 05 marks
2.	Final Record and viva	- 05 marks
3.	Average of two tests including viva	- 10 marks
4.	Lab based project report and viva	- 05 marks
5.	Lab Project demo	- 05 marks
	Total	**- 30 marks**

Pattern of end examinations:

The end examination in each lab subject will be for 70 marks. The conduct of the end examination shall be the team consisting of an external examiner and an internal examiner appointed by the Chief Superintendent of Examinations of the college. The marks are distributed as follows:

1.	Procedure of experiment and calculation	- 10 marks
2.	Conduct of experiment, observation, calculation	- 20 marks
3.	Results including graphs, discussions and conclusion	- 20 marks
4.	Viva voce and record	- 20 marks
	Total	**- 70 marks**

In case of computer lab subjects the assessment will be as follows:

Assessment of sessional marks (30):

1.	Flowchart and algorithms	- 05 marks
2.	Program writing and execution	- 15 marks
3.	Result and conclusions	- 05 marks
4.	Viva voce and record	- 05 marks
	Total	**- 30 marks**

Assessment in the end semester examination (70 marks):

1.	Program description	- 10 marks
2.	Program writing	- 15 marks
3.	Program Execution	- 10 marks
4.	Results and Conclusion	- 20 marks
5.	Viva Voce	- 10 marks
6.	Record and Observation	- 05 marks
	Total	**- 70 marks**

For practical subjects there will be no recounting or re-valuation.

7.2 Each faculty member in-charge of the lab subject concerned must draw the normal distribution curve and submit to the HoD who in turn shall present the sessional marks analysis to the college academic committee. After discussion on the matter a decision will be taken by CAC whether to forward the entire material available with the teacher concerned for verification of the sessional marks awarded. A decision will be taken by the committee whether to moderate the marks awarded or not. The marks awarded by the committee shall be final and binding.

7.3 A candidate shall be deemed to have secured the minimum academic requirement in a theory subject / practical subject / other subjects if any which have both internal assessment and external assessment components, if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks allotted for that subject

(internal marks and end semester exam marks put together). In case there is only internal assessment for a subject the marks secured in the sessional marks shall have to be at least 50%.

7.4 In case the candidate does not secure the minimum academic requirement in any subject in theory or practicals or others if any (as specified in 7.3) he/she has to reappear for the supplementary examination in that subject.

7.5. Distribution of marks for Seminars and Comprehensive Viva:

7.5.1 **Technical seminar for M.Tech courses :**

Technical seminar is divided into four parts one in each semester as stated below:

Semester	Subject	Credits	Internal marks	External marks
I year I semester	Technical seminar - I	1	100	-
I year II semester	Technical seminar – II	1	100	-
I year II semester	Mini project with seminar (Carried out in I year II semester and evaluated in II year I semester	3	30	70
I year II semester	Comprehensive Viva Voce	1	30	70
II year I semester	Project Phase – I and Seminar	5	30	70
II year II Semester	Project Phase – II and Seminar	6	30	70
II year II Semester	Dissertation and defense viva	7	30	70

There shall be technical seminar during I year I semester and I year II semester, comprehensive viva voce in I year II semester and Mini Project with seminar during I year II Semester. For technical 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 Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 100 marks. A candidate has to secure a minimum of 50% to be declared successful. The comprehensive Viva voce in the subjects of I year I semester and I year II semester put together will be conducted by the External examiner and it will be for 70 marks and internal evaluation will be for 30 marks (total 100 marks), will be conducted at the end of 1st year 2nd semester. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester seminar report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Mini project with seminar in the form of

Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

Selection of topic, literature survey Review by the guide	10 marks
Final report and viva	10 marks
Level of content	15 marks
Presentation	20 marks
Discussion & Involvement	15 marks
Class notes	15 marks
Attendance	15 marks
Total	**100 Marks**

7.6 Comprehensive Viva-Voce:

There shall be a Comprehensive Viva-Voce Examination at the end of I year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and one Senior Faculty member of the Department and external examiner. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects, he / she studied during the M.Tech I year I semester and I year II semester. The Comprehensive viva voce is valued for 100 marks. There are 30 internal marks. For awarding these marks internal viva-voce test must be conducted twice in the semester – one at the end of 7 weeks and the other one at the end of 14 weeks. The average of two internals will be considered for 30 marks. 70 marks are to be awarded for external examination for comprehensive viva voce and he / she has to secure 40% of the marks to be successful in the external. A candidate has to secure a minimum of 50 % of marks in the sum total of internal and external to be declared successful.

S. No.	Description	Marks
1	Average of First & Second Mid Sessional Viva (Internal)	30
2	Final Viva during practical examinations (External)	70
	Total	**100**

7.7 Project Seminars:

In II year I semester and II semester there will be Project Phase – I with seminar, Project Phase – II with seminar. It shall be conducted for 30 marks internal and 70 marks external. A candidate has to secure a minimum of 40% of marks in the external examination. The Internal

evaluation for the project shall be done in 2 stages (not less than 4 weeks between two consecutive stages). A candidate shall secure a minimum 50% of marks in sum total of internal and external to be declared successful.

Project work Phase I and II:

The student shall submit a project status report at the end of II year I semester along with a review paper on the subject of the thesis and same shall be evaluated at the end of the semester by the Project Review Committee (PRC).

8.0 EVALUATION OF PROJECT / DISSERTATION WORK:

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

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 Department offering the M. Tech programs.

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 four stages at least with a gap of 4 weeks between two consecutive stages for M. Tech programs and shall submit his / her project status report in two stages at least with a gap of 4 weeks between two consecutive stages.

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 for M. Tech program. A candidate is permitted to submit Project Thesis only after successful completion of all theory and practical courses (no backlogs) 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 After approval from the PRC, the soft copy of the thesis should be submitted to the College for ANTI-PLAGIARISM for the quality check and the plagiarism report should be included in the final thesis. If the copied information is less than 24%, then only thesis will be accepted for submission.

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

8.9 The thesis shall be evaluated by one examiner selected by the college. For this, the Head of the Department shall submit a panel of 5 examiners i.e., eminent persons with Ph. D or should have guided at least 5 M.Tech projects or should have been working in an R&D organization

at the level of not less than Scientist-C, with the help of the guide concerned. The Principal will select one of the examiners and thesis will be sent for evaluation. If the report is favorable, the Head of the Department must organize for viva-voce examination.

8.10 If the report of the examiner is not favorable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected. Then the candidate has to work on the thesis once again and shall submit to the PRC for its evaluation and further action on the matter.

8.11 For M.Tech Project Evaluation (Viva Voce) in II Year II Semester there are external marks of 70 and with 30 marks internal for 7 credits.

8.12 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. Candidate has to secure minimum of 50% marks in Project Evaluation (Viva-Voce) examination.

8.13 If the candidate fails to secure at least 40% in the external examination and 50% in the sum total of internal and external examinations candidate is declared to be failed and the candidate has to reappear for the Viva-Voce examination only after 3 months. In the reappeared examination also, the candidate fails to fulfill the minimum qualifying requirements, he / she will not be eligible for the award of the degree.

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

9.0 Re-Admission:

9.1 Re-Admission for Discontinued Student:

A student, who has discontinued the M.Tech degree program due to any reason whatsoever, may be considered for 'readmission' into the same degree program (with the same specialization) with the academic regulations of the batch into which he gets readmitted, with prior permission from the authorities concerned.

9.2 If a student is detained due to shortage of attendance in any semester, he / she may be permitted to re-register for the same semester(s).

9.3 A candidate shall be given one chance to re-register for a maximum of two subjects, if the internal marks secured by a candidate are less than 50% and failed in those subjects. A candidate must re-register for failed subjects within four weeks of commencement of the class work and secure the required minimum attendance. In the event of the student taking this chance, his Continuous Internal Evaluation (internal) marks and Semester End Examination marks obtained in the previous attempt stand cancelled.

10.0 Examinations and Assessment - The Grading System:

10.1 Grades will be awarded to indicate the performance of each student in each Theory Subject, or Lab / Practical, or Seminar, or Technical Paper Writing or Project, etc., based on the percentage of marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination, both taken together) as specified in item 7 above, and a corresponding Letter Grade shall be given.

10.2 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:

Percentage of Marks Secured in a subject / Course (Class Intervals)	**Letter Grade (as per UGC guidelines)**	**Grade Points**
90% and above (□ 90% , ≤ 100%)	O (Outstanding)	10
Below 90% but not less than 80% (□80% , <90%)	A^+ (Excellent)	9
Below 80% but not less than 70% (□70% , <80%)	A (Very Good)	8
Below 70% but not less than 60% (□60% , <70%)	B^+ (Good)	7
Below 60% but not less than 50% (□ 50% , <60%)	B (above Average)	6
Below 50%	F (FAIL)	0
Absent	**Ab**	**0**

10.3 A student obtaining 'F' Grade in any Subject is deemed to have 'failed' and is required to reappear as 'Supplementary Candidate' for the Semester End Examination (SEE), as and when conducted. In such cases, his Internal Marks (CIE Marks) in those subjects will remain as obtained earlier.

10.4 If a student has not appeared for the examinations, 'Ab' Grade will be allocated to him for any subject and shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' for the Semester End Examination (SEE), as and when conducted.

10.5 A Letter Grade does not imply any specific marks percentage; it is only the range of percentage of marks.

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

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

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

10.8 The student passes the Subject / Course only when he gets GP □6 (B Grade or above).

10.9 The Semester Grade Point Average (SGPA) is calculated by dividing the sum of Credit Points (□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

$$SGPA = \sum_{i=1}^{n} C_i \, G_i / \sum_{i=1}^{n} C_i$$

$$CGPA = \sum_{J=1}^{n} C_J \, G_J / \sum_{J=1}^{n} C_J$$

For each Semester

where 'i' is the subject indicator index (taking 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_{iii}' is the no. of Credits allotted to the i^{th} subject, and 'G_i'$_i$ represents the Grade Points (GP) corresponding to the Letter Grade awarded for that i^{th} subject.

10.10 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

$$CGPA = \{\sum_{j}^{M} =1 \; C_i \; G_i \} / \{ \sum_{j}^{M} = C_i \} \quad \ldots\ldots \text{For all 'S' Semesters registered}$$

(ie., upto and inclusive of 'S' Semesters, where 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' for from the 1^{st} semester onwards upto and inclusive of the semester 'S' (obviously M > N), 'j' is the subject indicator index (taking into account all subjects from 1 to 'S' semesters), 'C_{ij}'$_j$ 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.

Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade points	Credit Points
Course 1	4	A	8	4*8 = 32
Course 2	4	O	10	4*10 = 40
Course 3	4	B	6	4*6 = 24
Course 4	3	B	6	3*6 = 18
Course 5	3	A+	9	3*9 = 27
Course 6	3	B	6	3*6 = 18
	21			159

SGPA = 159/21 = 7.57

Illustration of calculation of CGPA

Semester	Credits	SGPA	Credits * SGPA
Semester I	24	7	24*7 = 168
Semester II	24	6	24*6 = 144
Semester III	24	6.5	24*6.5 = 156
Semester IV	24	6	24*6 = 144
	96		612

CGPA = 612/96 = 6.37

11.0 Award of Degree and Class:

11.1 If 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 68 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 the specialization that he was admitted into.

11.2 Award of Class:

11.2.1 Award of degree marks equivalent to the computed final CGPA, the following

% of marks = (final CGPA – 0.5) x 10

11.2.2 A student who registers for all specified subjects / courses as listed in the course structure and secures the total number of credits (with CGPA ≥ 6), within two academic years from the date of commencement of first academic year, shall be declared to have **qualified for the award of M. Tech. degree in the chosen branch of engineering as selected at the time of *admission.***

11.2.3 A student who qualifies for award of degree as listed in item 11.2.2 shall be placed in the following classes.

11.2.4 Students with final CGPA (at the end of PG program) 8.00 and above and fulfilling the following conditions.

i) Should have passed all the subjects /courses in "first appearance" within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

ii) Should have secured a CGPA 8.0 at the end of each of semesters, starting from first year first semester onwards.

iii) Should not have been detained or prevented from writing the end semester examinations in any semester due to shortage of attendance or any other reason, shall be placed in "FIRST CLASS WITH DISTINCTION", otherwise FIRST CLASS only.

11.3 Students with final CGPA (at the end of the under graduate programme), ≥ 6.75 but $\leq$ 8.00 shall be placed in **FIRST CLASS**.

11.4 Students with final CGPA (at the end of under graduate programme) ≥ 6 but ≤ 6.75 , shall be placed in **"SECOND CLASS"**.

11.5 Students fulfilling the conditions listed under item 11.2.4 alone will be eligible for award of **"University rank" and "gold medal".**

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

12.0 Withholding of Results:

If the student has not paid the dues, if any, to the University / Institute or if any case of indiscipline is pending against him, the result and degree of the student will be withheld and he will not be allowed into the next semester.

13.0. Transitory Regulations:

13.1 A student who has been detained in any semester of I Year of A15 / A17 Regulations due to lack of attendance, shall be permitted to join the same semester of I Year of A19 Regulations and he is required to complete the study of M.Tech programme within the stipulated period of four academic years from the date of first admission in I Year I semester. The A19 Academic Regulations under which a student has been readmitted shall be applicable to that student from that semester.

13.2 The candidate who fails in any subject under A15 / A17 regulations will be given two chances to pass the same subject in the same regulations; otherwise, he has to identify an equivalent subject and fulfill the academic requirements of that subject as per A19 Academic Regulations.

13.3 For student readmitted to A19 Regulations, the maximum credits that a student acquires for the award of the degree, shall be the sum of the total number of credits secured in A15 / A17 regulations of his / her study including A19 Regulations.

13.4 If a student readmitted to A19 Regulations, has any subject with 80% of syllabus common with his / her previous regulations, that particular subject in A19 regulations will be substituted by another subject to be suggested by the concerned Chairman of the Board of Studies of the Department to which the student belongs to.

14.0 General:

14.1 **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.

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

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

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

14.5 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the **University / College Academic Council** is FINAL.

14.6 **The University / College 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 **University / College Academic Council.**

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No	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 to 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. Incase 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 to 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.

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.	Incase 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 par there of 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.	In case of student of the college, 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 clauses1to11shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators:

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

M. Tech (Computer Networks and Information Security)
Course Structure and Syllabus-2019

I Year - I Semester

Sno	Code	Subject	L	T	P	C	Max. Marks		Total
							Internal	External	
1	7R101	Data Structures and Algorithms	2	1	-	3	30	70	100
2	7R102	Advanced JAVA Programming-	2	1	-	3	30	70	100
3	7R103	Advanced Computer Networks	3	1	-	4	30	70	100
4	7R104	Principles of Information Security	3	-	-	3	30	70	100
5		**Program Elective – I**	3	-	-	3	30	70	100
6	7R110	Research Methodologies and Intellectual Property Rights	2	-	-	2	30	70	100
7	7HC19	Audit Course2-Ethics, Morals, Gender Sensatisation and Yoga*(Grade Evaluation) Audit Course-1	2	-	-	0	30	70	100
8	7R111	Lab 1-JAVA Programming	-	-	4	2	30	70	100
9	7R112	Technical Seminar and Comprehensive Viva Voce	-	-	2	1	100	-	100
		Total Credits	**17**	**3**	**6**	**21**	**340**	**560**	**900**

Code	Professional Elective – I
7R105	Web Security and Ethical hacking
7R106	Data Warehousing and Data Mining
7R107	Intrusion Detection
7R108	Information Theory and Coding
7R109	Information Retrieval Systems

I Year - II Semester

S. no	Code	Program Core Subject Name	L	T	P	C	Max. Marks		Total
							Internal	External	
1	7R201	Information Security, Management and Standards	3	1	-	4	30	70	100
2	7R202	Wireless Networks and Mobile Computing	2	1	-	3	30	70	100
3	7R203	Network Security	3		-	3	30	70	100
4	7HC18	Audit Course1-English For Research Paper Writing.	2	-	-	0	30	70	100
5		**Program Elective – II**	3	-	-	3	30	70	100
6		**Program Elective – III**	3	-	-	3	30	70	100
7	7R214	Technical Seminar - II	-	-	2	1	100	-	100
8	7R215	Comprehensive Viva Voce	-	-	2	1	30	70	100
9	7R216	Mini Project with Seminar	-	-	*Evaluation in II year I sem				
10	7R217	Lab2-Information Security through Java	-	-	4	2	30	70	100
		Total Credits	**16**	**2**	**8**	**20**	**340**	**560**	**900**

Program Elective – II		**Program Elective – III**	
Code	**Subject**	**Code**	**Subject**
7R204	Data Encryption and Compression	7R209	Internet of Things
7R205	Machine Learning	7R210	Python Programming
7R206	Introduction to Data Science	7R211	Wireless Security
7R207	Data Base Security	7R212	Artificial Intelligence and Deep Learning
7R208	Steganography and Water Marking	7R213	Adhoc and Sensor Networks

Note: **** Any one of the Program Elective courses may be preferably offered through MOOCs**

II Year – I Semester

S.no	Code	Subject	L	P	Credits	Max. Marks		Total
						Internal	External	
1	7R301	Data Base Security and Access Control	3	-	3	30	70	100
2		**Open Elective**	3	-	3	30	70	100
3	7R302	Mini Project with Seminars (Project Conducted in summer)	-	6	3	30	70	100
4	7R303	Main Project Phase -1 And Seminar	-	10	5	30	70	100
		Total Credits	**6**	**16**	**14**	**120**	**280**	**400**

Code	OPEN ELECTIVE
7ZC28	Cost Management Of Engineering Projects
7ZC03	Banking, Operations, Insurance and Risk Management
7WC18	Operation Research
7T217	Embedded Systems
7QC47	BioInformatics

II Year – II Semester

S.no	Code	Subject	L	P	C	Max. Marks		Total
						CIE	SEE	
1	7R401	Main Project Phase-2 and Seminar	-	12	6	30	70	100
2	7R402	Dissertation and Defense Viva	-	-	7	30	70	100
		Total Credits	**-**	**12**	**13**	**60**	**140**	**200**

M.Tech I Year I Semester
Computer Networks and Information Security
Data Structures and Algorithms-PC1

7R101	L	T	P	C
	2	1	-	3

Unit I

Basic concepts-Data types, Abstract Data Types, Data structures, Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Analysis-Big O, Omega and Theta notations.

Unit II

Linear data structures- Linear Lists, Sequential and Linked allocation ,The list ADT, array and linked Implementations, Singly Linked Lists-Operations-Insertion, Deletion, Doubly Linked

Lists- Operations- Insertion, Deletion, Stack ADT, definitions, operations, array and linked implementations, applications-infix to postfix conversion, recursion implementation, Queue ADT, definitions and operations ,array and linked Implementations, Circular Queues-insertion, deletion.

Unit III

Non Linear data structures- Trees – Basic Terminology, Binary tree, definition, array and linked representations, recursive and non-recursive traversals, Priority Queues-Definition, Operations, Realizing a Priority Queue using Heap.

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, B-Trees, Definition, Operations- insertion and searching, Comparison of Search Trees.

Graphs – Basic Terminology, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS

Unit IV

Searching and Sorting- Linear Search, Hashing-Introduction, hash tables, hash functions, collision resolution methods.

Bubble Sort, Insertion Sort, Selection Sort, Heap Sort, Radix Sort, Divide and Conquer method-applications-Binary Search, Quick sort, Merge sort, Comparison of Searching and Sorting methods.

Unit V

Greedy method-Applications-Prim's Algorithm for Minimum cost spanning trees, Kruskal's Algorithm for Minimum cost Spanning trees, Job Sequencing with dead lines, Single Source Shortest path problem.

Unit VI

Dynamic Programming-General method, Applications-Multi stage Graphs, Optimal Binary Search trees,0/1 Knapsack Problem, All Pairs Shortest Path Problem, Traveling Sales Person Problem.

Backtracking-General method, Applications-n-queens problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

Branch and Bound-General method, Applications-Traveling sales person problem,0/1 Knapsack problem,FIFO and LC Branch and Bound solutions.

TEXT BOOKS :

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Satraj Sahni and S.Rajasekharan, Universities Press,2008.
2. Design and Analysis of Algorithms, P.H.Dave, H.B.Dave, Pearson Education,2008.

REFERENCE BOOKS:

1. Data Structures , Algorithms and Applications in Java,2nd edition,S.Sahani, Universities Press.
2. Data Structures and algorithms in Java, 3rd edition, Adam Drozdek, Cengage Learning.
3. Data structures and algorithms in Java,3rd edition,M.T.Goodrich,R.Tamassia,Wiley-India.
4. Data Structures using Java, D.S. Malik and P.S.Nair, Cengage Learning.
5. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education,2004.
6. Introduction to Algorithms,3rd Edition,T.H.Cormen,C.E.Leiserson,R.L.Rivest,C.Stein,PHI.
7. Data Structures with Java,W.H.Ford and W.R.Topp,Pearson Education.
8. A Practical Guide to Data Structures and Algorithms using Java, S.Goldman & K.Goldman,Chapman & Hall/CRC, Taylor & Francis Group.

M.Tech I year I semester
Computer Networks and Information Security
Advanced JAVA Programming-PC2

7R102	L	T	P	C
	2	1	-	3

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Unit I: **Review of Java Language:**
Java Language basics, Exception Handling, basics of multi-threaded programs, Packages, Java IO package (Input and Output streams, Buffered reader and writer), Util Package (Hashtable, Vector, Arrays, Calendar, Gregorian Calendar, Date)
Introduction to simple Swing components (JLabel, JButton, JTextField, JTextArea, JPasswordField, JcomboBox, JFrame, JPanel, JScrollPane), Layout Managers (Flow, Grid, Border and Box Layout),

Unit II: Java Applets
Applet life cycle, Simple Applet Programming with JApplet, Applet vs console programming in Java Event Handling, Event Listeners (Mouse, Action, Change and Focus listeners), Event Adapters,
Introduction to XML, XML Schema validation for simple and complex data types, XML Parsing with DOM and SAX Parsers in Java

Unit III: Introduction to Web Programming:
HTML Common tags for text formatting, Lists, Tables, Images, Forms, Frames, Image Maps, Tag Attributes, Cascading Style sheets, Linking to HTML Pages, Classes in CSS, General CSS statements for Text, Table, List and Page formatting
Introduction to Java Scripts, variables, arrays, methods and string manipulation, Document Object Model, accessing elements by ID, Objects in Java Script, Dynamic HTML with Java Script (innerHTML and Layers), and with CSS, form validation with Javascript

Unit IV: Introduction to Java Servlets:
Introduction to Servlets: Lifecycle of a Servlet, javax.servlet Package, Reading request and initialization parameters, Writing output to response, MIME types in response.
Session Tracking: Using Cookies, Using Sessions, Security Issues, Simple Session tracking examples
Web servers: Tomcat Server installation, File Structure, Deployment Descriptor (web.xml), Steps involved in Deploying an application. Database Access with JDBC, Simple Examples

Unit V: Introduction to JSP:
JSP Application Development: Types of JSP Constructs (Directives, Declarations, Expressions, Code Snippets), Generating Dynamic Content, Exception Handling, Debugging Using Scripting Elements, Implicit JSP Objects, Conditional Processing, Sharing Data Between JSP pages, Sharing Session and Application Data, Memory requirements considerations, Using user defined classes with jsp:useBean tag, Accessing a Database from a JSP Page Application
Introduction to Ajax programming with JSP/Servlets, creating XML Http Object for various browsers, simple applications that use GET method

Unit VI: Introduction to Struts Framework:
Introduction to MVC architecture, Anatomy of a simple struts application, struts-config.xml file, Presentation layer with JSP, Struts Controller class, JSP bean, html and logic tag libraries, ActionForms, DynaActionForm, Actions, Forwarding, Error Handling, Database Connection Pooling, validation frame work and examples for simple data types, Internationalization

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 3rd edition, WILEY Dreamtech .
2. Java Server Pages,Hans Bergsten, SPD, O'Reilly.

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES , Marty Hall and Larry Brown Pearson
3. Internet and World Wide Web – How to program , Dietel and Nieto PHI/Pearson.
4. Jakarta Struts Cookbook , Bill Siggelkow, S P D O'Reilly.
5. Professional Java Server Programming,S.Allamaraju and othersApress(dreamtech).
6. Java Server Programming ,Ivan Bayross and others,The X Team,SPD
7. Web Warrior Guide to Web Programmming-Bai/Ekedaw-Cengage Learning.
8. Beginning Web Programming-Jon Duckett ,WROX.
9. Java Server Pages, Pekowsky, Pearson.
10. Java Script,D.Flanagan,O'Reilly,SPD.
11. The complete Reference Java 7th Edition , Herbert Schildt., TMH.
12. Professional Jakarta Struts - James Goodwill, Richard Hightower, Wrox Publishers.

M.Tech I year I semester
Computer Networks and Information Security
ADVANCED COMPUTER NETWORKS -PC3

L	T	P	C
3	1	-	4

CODE:7R103

UNIT I

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet – **(Chapter 1) of T1.**

Foundation of Networking Models: 6-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **(Chapter 2) of T2**.

UNIT II

The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet – **(Chapter 6) of T1**

Unit - III

Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer – **(Chapter 7) of T2**

UNIT IV

Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **(Chapter 19, 20) of T3**

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **(Chapter 8) of T2**

Application Layer: Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing – **(Chapter 2) of T1**

UNIT V

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Mobile Ad-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks – **Wireless Sensor Networks** and Protocol Structures - **(Chapter 6, 19, 20) of T2**

UNIT VI

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony – **(Chapters 16, 18) of T2**

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W.Ross,* Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir,* Pearson Education, 2007

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networking , *S.Keshav,* Pearson Education, 1997
2. Computer Networks: Principles,Technologies And Protocols For Network Design, *Natalia Olifer, Victor Olifer,* Wiley India, 2006.
3. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.
4. Fundamentals of Business Data Communications, Jerry FitzGerald and Alan Dennis, Tenth Edition, Wiley, 2009.
5. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet,* Pearson Education (CISCO Press)
6. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill, 2007

M.Tech I year I semester
Computer Networks and Information Security
PRINCIPLES OF INFORMATION SECURITY -PC4

	L	T	P	C
CODE:7R104	**3**	**-**	**-**	**3**

UNIT – I

Information Security: Introduction, The need for security, Security approaches and goals, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

UNIT – II

Cryptography: Concepts and Techniques, Differential and Linear Cryptanalysis, symmetric and asymmetric key cryptography, steganography, **Mathematics of Cryptography:** integer and modular arithmetic, matrices, linear congruence, Euclids algorithm, Primality testing, Factorization, Chinese remainder theorem

UNIT – III

Symmetric key Ciphers: Block and Stream Cipher principles, 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 – IV

Cryptographic Hash: Introduction, Properties, Generic cryptographic hash, MD6, SHA -612, **Key Management:** Introduction, Digital certificates and types, X.609, PKI, **Authentication:** One-way authentication, Mutual authentication, Centralized authentication, Kerberos, Biometrics

UNIT – V

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 – VI

Inruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

TEXT BOOKS:

1. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
2. Cryptography and Network Security : William Stallings, Pearson Education,4th Edition

REFERENCE BOOKS:

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2nd Edition
3. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
4. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
5. Discrete Mathematics for Computer Scientists: cliff Stein, Robert Drysdale, Keneth Bogart, Pearson Education, 1st Edition.

M.Tech I year I semester
Computer Networks and Information Security
WEB SECURITY AND ETHICAL HACKING
(Program Elective--I)

CODE:7R105	**L**	**T**	**P**	**C**
	3	**-**	**-**	**3**

UNIT I

Introduction – A web security forensic lesson, Web languages, Introduction to different web attacks. Overview of N-tier web applications, Web Servers:Apache, IIS, Database Servers

UNIT II

Review of computer security, Public Key cryptography, RSA, Review of Cryptography basics, On-line shipping, Payment Gateways.

UNIT III

Web Hacking basics HTTP & HTTPS URL, Web Under the Cover Overview of Java security, Reading the HTML source, Applet security, Servlets security

UNIT IV

Introduction to Ethical Hacking, Ethics, and Legality

Ethical Hacking Terminology,Different Types of Hacking Technologies, Different Phases Involved in Ethical Hacking and Stages of Ethical Hacking: Passive and Active Reconnaissance, Scanning, Gaining Access, Maintaining Access,Covering Tracks,Hacktivism, Types of Hacker Classes, Skills Required to Become an Ethical Hacker, Vulnerability Research, Ways to Conduct Ethical Hacking, Creating a Security Evaluation Plan ,Types of Ethical Hacks, Testing Types, Ethical Hacking Report

Symmetric and Asymmetric encryptions, Network Security basics, Firewalls & IDS, Digital certificates, Hashing, Message digest, Digital Signatures

Footprinting and Social Engineering

Footprinting , Information Gathering Methodology,Competitive Intelligence ,DNS Enumeration Whois and ARIN Lookups, Types of DNS Records,Traceroute,E-Mail Tracking ,Web Spiders , Social Engineering, Common Types Of Attacks, Insider Attacks, Identity Theft,Phishing Attacks, Online Scams, URL Obfuscation, Social-Engineering Countermeasures.

UNIT V

Scanning and Enumeration

Scanning, types of Scanning , CEH Scanning Methodology ,Ping Sweep Techniques, Nmap Command Switches, SYN, Stealth, XMAS, NULL, IDLE,and FIN Scans, TCP Communication Flag Types, War-Dialing Techniques,Banner Grabbing and OS Fingerprinting Techniques,Proxy Servers, Anonymizers , HTTP Tunneling Techniques,IP Spoofing Techniques , Enumeration, Null Sessions, SNMP Enumeration,Windows 2000 DNS Zone Transfer, Steps Involved in Performing 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 VI

Trojans, Backdoors, Viruses, and Worms

Trojans and Backdoors, Overt and Covert Channels, Types of Trojans, Reverse-Connecting Trojans, Netcat Trojan ,Indications of a Trojan Attack,Wrapping, Trojan Construction Kit and Trojan Makers , Countermeasure Techniques in Preventing Trojans, Trojan-Evading Techniques, System File Verification Subobjective to Trojan Countermeasures Viruses and Worms, Difference between a Virus and a Worm ,Types of Viruses,,Understand Antivirus Evasion Techniques,Understand Virus Detection Methods

Sniffers

Protocols Susceptible to Sniffing, Active and Passive Sniffing,ARP Poisoning, Ethereal Capture and Display Filters,MAC Flooding, DNS Spoofing Techniques,Sniffing Countermeasures

Denial of Service and Session Hijacking

Denial of Service, Types of DoS Attacks, DDoS Attacks ,BOTs/BOTNETs, "Smurf" Attack, "SYN" Flooding ,DoS/DDoS Countermeasures, Session Hijacking, Spoofing vs. Hijacking, Types of Session Hijacking, Sequence Prediction,Steps in Performing Session Hijacking, Prevention of Session Hijacking

TEXT BOOKS:

1. Web Hacking: Attacks and Defense, Stuart McClure, Saumil,Shreeraj Shah, Pearson Education, 2003, rp2007.
2. Web Security, Privacy & Commerce, Simson Garfinkel, SPD, O`Reilly, 2002.

REFERENCE BOOKS:

1. The World Wide Web Security FAQ: http://www.w3.org/Security/faq/
2. The OpenSSL project (SDKs for free download): hhtp://www.openssl.org/
3. Top 10 Web Vulnerability Scanners http://sectools.org/web-scanners.html
4. CEH official Certfied Ethical Hacking Review Guide, Wiley India Edition
5. Certified Ethical Hacker: Michael Gregg, Pearson Education

M.Tech I year I semester
Computer Networks and Information Security
DATA WAREHOUSING AND DATA MINING
(Program Elective-I)

	L	T	P	C
CODE:7R106	**3**			**3**

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

UNIT III
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 IV
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 V
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 Backpropagation
Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor

UNIT VI
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, Morgan Kaufmann Publishers, 2nd Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

REFERENCE BOOKS:
Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
1. Insight into Data Mining,K.P.Soman,S.Diwakar,V.Ajay,PHI,2008.
2. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
3. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition
4. Building the Data Warehouse By William H Inmon, John Wiley & Sons Inc, 2006.
5. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson education
7. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
8. Data Mining,V.Pudi and P.Radha Krishna,Oxford University Press.
9. Data Mining:Methods and Techniques,A.B.M Shawkat Ali and S.A.Wasimi,Cengage Learning.
10. Data Warehouse 2.0,The Architecture for the next generation of Data

Warehousing,W.H.Inmon,D.Strauss,G.Neushloss,Elsevier,Distributed by SPD.

M.Tech I YEAR I SEMESTER
Computer Networks and Information Security
INTRUSION DETECTION

Program Elective I

L	T	P	C
3	-	-	3

CODE:7R107

UNIT-I

History of Intrusion detection, Audit, Concept and definition , Internal and external threats to data, attacks, Need and types of IDS, Information sources Host based information sources, Network based information sources.

UNIT-II

Intrusion Prevention Systems, Network IDs protocol based IDs ,Hybrid IDs, Analysis schemes,

thinking about intrusion. A model for intrusion analysis , techniques Responses requirement of responses, types of responses mapping responses to policy Vulnerability analysis, credential analysis non credential analysis.

UNIT-III

Introduction to Snort, Snort Installation Scenarios, Installing Snort, Running Snort on Multiple

Network Interfaces, Snort Command Line Options.

UNIT-IV

Step-By-Step Procedure to Compile and
Install Snort Location of Snort Files, Snort Modes Snort Alert Modes

UNIT-V

Working with Snort Rules, Rule Headers, Rule Options, The Snort Configuration File etc. Plugins, Preprocessors and Output Modules, Using Snort with MySQL

UNIT-VI

Using ACID and Snort Snarf with Snort, Agent development for intrusion detection, Architecture models of IDs and IPs.

TEXT BOOKS:

1. Rafeeq Rehman : " Intrusion Detection with SNORT, Apache, MySQL, PHP and ACID," 1st Edition, Prentice Hall , 2003.

REFERENCES:

1. Christopher Kruegel,Fredrik Valeur, Giovanni Vigna: "Intrusion Detection and Correlation Challenges and Solutions", 1st Edition, Springer, 2005.
2. Carl Endorf, Eugene Schultz and Jim Mellander " Intrusion Detection & Prevention", 1st Edition, Tata McGraw-Hill, 2004.
3. Stephen Northcutt, Judy Novak : "Network Intrusion Detection", 3rd Edition, New Riders Publishing, 2002.
4.T. Fahringer, R. Prodan, "A Text book on Grid Application Development and Computing Environment". 6th Edition, KhannaPublihsers

M.Tech I YEAR I SEMESTER
Computer Networks and Information Security

Information Theory and Coding

Program Elective-I

L	T	P	C
3	-	-	3

CODE:7R108

UNIT I
INFORMATION THEORY
Information – Entropy, Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon-Fano coding, Huffman coding, Extended Huffman coding - Joint and conditional entropies, Mutual information - Discrete memoryless channels – BSC, BEC – Channel capacity, Shannon limit.

UNIT II
SOURCE CODING: TEXT, AUDIO AND SPEECH
Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 - Speech: Channel Vocoder, Linear Predictive Coding

UNIT III
SOURCE CODING: IMAGE AND VIDEO
Image and Video Formats – GIF, TIFF, SIF, CIF, QCIF – Image compression: READ, JPEG – Video Compression: Principles-I,B,P frames, Motion estimation, Motion compensation, H.261, MPEG standard

UNIT IV
ERROR CONTROL CODING: BLOCK CODES
Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes - Linear block codes,

UNIT V
ERROR CONTROL CODING: CONVOLUTIONAL CODES
Cyclic codes - Syndrome calculation, Encoder and decoder - CRC
Convolutional codes – code tree, trellis, state diagram –

UNIT VI
Encoding – Decoding:
Sequential search and Viterbi algorithm – Principle of Turbo coding

TEXT BOOKS
1. R Bose, “Information Theory, Coding and Crptography”, TMH 2007
2. Fred Halsall, “Multidedia Communications: Applications, Networks, Protocols and Standards”, Perason Education Asia, 2002

REFERENCES
1. K Sayood, “Introduction to Data Compression” 3/e, Elsevier 2006
2. S Gravano, “Introduction to Error Control Codes”, Oxford University Press 2007
3. Amitabha Bhattacharya, “Digital Communication”, TMH 2006

click here to read more: http://www.annaunivedu.in/2012/06/it2302-information-theory-and-coding.html#ixzz5b2to60MB

M.Tech I YEAR I SEMESTER
Computer Networks and Information Security
INFORMATION RETRIEVAL SYSTEMS
(Program Elective-I)

	L	T	P	C
CODE:7R109	**3**	**-**	**-**	**3**

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

UNIT II
Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, **Data Structures:** Introduction, Stemming Algorithms, Inverted file structures, N-gram Data Structure, PAT data structure, Signature file structure, Hypertext data structure

UNIT III
Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural language, Concept Indexing, Hypertext linkages **Document and Term Clustering:** Introduction, Thesaurus generation, Item Clustering, Hierarchy of Clusters -

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

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

TEXT BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.

REFERENCE BOOKS:

1. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza-Yates, Pearson Education, 1992.
2. Information Storage & Retrieval, Robert Korfhage, John Wiley & Sons.
3. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar Raghavan, Cambridge University Press, 2008.
4. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.

M.Tech I year I semester
Computer Networks and Information Security
RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS

L	T	P	C
2	-	-	2

CODE:7R110

UNIT-I
1. Research Methodology: An Introduction
Meaning of Research, Objectives of Research Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method. Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India,

UNIT-II
2. Research Problem and Research Design
What is a Research Problem?, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration, Conclusion . Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Developing a Research Plan, Conclusion.
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UNIT-III
Sampling Design and Methods of Data Collection
Implications, Steps in Sample Design, Criteria Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, How to Select a Random Sample, Random Sample from an Infinite Universe, Complex Random Sampling Designs, **Methods of Data Collection**
UNIT-IV
Concept of Hypothesis and Testing
What is a Hypothesis? Basic Concepts Concerning Testing of Hypotheses, Procedure for Hypothesis Testing, Flow Diagram for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Tests of Hypotheses. Important Parametric Tests, Hypothesis Testing of Correlation Coefficients, Limitations of the Tests of Hypotheses, Chi-square as a Test for Comparing Variance, Chi-square as a Non-parametric Test, Conditions for the Application of $\chi 2$ Test, Steps Involved in Applying Chi-square Test.

UNIT-V
Introduction: Discovery, Creativity, Innovation, Invention, Need for IPR, Types of IPR, Genesis & development of IPR in India, **Patents**: Definition, Scope, Protection, Patentability Criteria, Types of Patents (Process, Product & Utility Models), Case studies on Patents (Basmati Rice, Turmeric, Neem), Software Patenting.

UNIT-VI
Types of IPR-I: Copyrights – Definition, granting, infringement, searching & filing, distinction between copy rights and related rights;
Types of IPR-II: Trade Secrets, Unfair competition; Industrial Designs – Scope, protection, filing, infringement; Semiconductors, Integrated Circuits & Layout design; Geographical Indications & Appellations of Origin; Case Studies. **International and National Conventions & Treaties:** Overview.

Text Book:

1 C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006
2. Donald H.McBurney, Research Methods, 6th Edition, Thomson Learning, ISBN:81- 16-0047-0,2006
3 Deborah E. Bouchoux, Intellectual Property for Paralegals – The law of Trademarks, Copyrights, Patents & Trade secrets, 3rd Edition, Cengage learning, 2012
4 N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property, Eastern Book Company, Lucknow, 2009.

References:

1. M. M. S. Karki , Intellectual Property Rights: Basic Concepts, Atlantic Publishers, 2009
2. Neeraj Pandey & Khushdeep Dharni, Intellectual Property Rights, Phi Learning Pvt. Ltd
3. Ajit Parulekar and Sarita D' Souza, Indian Patents Law – Legal & Business Implications; Macmillan India ltd, 2006.
4. B. L. Wadehra. Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000.
5. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010

M.Tech I year I semester
Computer Networks and Information Security

Audit Course2 : Ethics, Morals, Gender Sensitization and Yoga (Common to all Branches)

Course Code: 7HC19	L	T	P/D	C
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COURSE OBJECTIVES

Students will be able to

- develop students' sensibility with regards to issues of gender in contemporary India and to help the students appreciate between 'values and 'skills' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- provide a critical perspective on the socialization of men, women and transgender and to have a wider understanding of Ethics.
- acknowledge women's role at home and at work.
- help students reflect critically on gender violence, understand engineering ethics and an engineer's responsibility for safety.
- perceive gender literacy and understand the importance of gender perspective.
- understand rules and principles set by the society in a customary way.
- understand and appreciate the importance of personality development through yoga for a holistic life.

UNIT I: UNDERSTANDING GENDER AND VALUES

Importance of gender sensitization
Socialization: Being modern in thought, yet rooted in one's culture
Just Relationships: Healthy relationship between men and women
Importance of Value Education, Understanding Social Factors, Morals, Values ,Family Values-Harmony, Respect, Caring; Sharing; Integrity; Honesty; Courage; Cooperation; Commitment; Empathy; Self Confidence; Character; Accountability; Loyalty; Confidentiality; and Attitude

UNIT II: GENDER SPECTRUM, LABOUR AND ETHICS

Beyond the Binary, Gender Imbalance and its Consequences
Decline in Women population (Medico-legal concerns- PC and PNDT Act 1994)
Social consequences of skewed gender ratio, Demographic Consequences
Housework: the invisible Labour
Women's Work: Its Politics and Economic
Unrecognized and Unaccounted Work. Wages and Conditions of Work

Ethics and Ethical Principles, Ethical Theories, and their uses

UNIT III: ISSUES OF VIOLENCE AND ENGINEERING ETHICS

Domestic Violence: Physical abuse, Mental abuse and Emotional disturbance
Consequences of domestic violence and legal Implications (Domestic Violence Act 2005-498A)
Professional Ethics, Engineering Ethics, Code of Ethics, Moral Autonomy of Engineers, Engineer's Responsibility for safety and Risk

UNIT IV: GENDER STUDIES

Knowledge: Through the Lens of Gender
Unacknowledged Women and Men in Indian History- Women Scientist (Rupabai Furdoonji), Early Aviators (Babur Mirza and Pingle Madhusudhan Reddy), and Women Leader
(T N Sadalakshmi)

Life Sketches: Mary Kom, Chanda Kochar, Mother Tesera, and Durga Bai Deshmukh

UNIT V: GLOBAL PERSPECTIVE

Distinguish between Bribes and Gifts; Occupational Crimes; Globalization- Cross-Cultural Issues; Environmental Ethics; Internet and Computer Codes of Ethics

Case Study:
Ethics in Military and Weapons Development-Ethics in Research work

UNIT VI: PERSONALITY DEVELOPMENT

Spirituality, Personality and Our Identity, Understanding Self, Happiness, Positive Thinking, Understanding responsibility towards Society.

Introduction to Yoga in India; Origin and Development; Theoretical understanding of yoga; Stress Management : Modern and Yogic perspectives; Tackling ill-effects of Frustration, Anxiety and Conflict through modern and Yogic methods; Meditation Techniques; Suryanamaskar; Pranayama.

TEXT BOOKS:

1. *Indian Culture Values And Professional Ethics(For Professional Students) by Prof.P.S.R.Murthy ; B.S.Publications.*
2. *Professional Ethics and Human Values* by M. Jayakumar, Published by University Science Press,
3. Telugu Academy, Hyderabad, 2015, *Towards A World of Equals,* A Bilingual Text Book on Gender.

REFERENCE BOOKS:

1. ***The Yoga Sutras of Patanjali*** by Swami Satchitananda
2. ***The Secret Power of Yoga*** by Nischala Joy Devi
3. ***Light on Pranayama*** by B.K.S. Iyengar
4. ***Books on the Art of Living*** *by Poojya Sri Sri Ravi Shanker*
5. ***Making It Relevant: Mapping the meaning of women's studies in***
6. ***Tamilnadu*** by Anandi S and Swamynathan P
7. ***Feminism is for Everybody; Passionate Politics*** by Bell Hooks
8. ***Gender*** by Geetha V
9. **"*Growing up Male" in what is worth teaching*** by K Kumar
10. ***The Lenses of Gender: Transforming the Debate on Sexual Inequality*** - Sandra Lipsitz Bem
11. ***The Lenses Of Gender*** - by ANNE MURPHY

M.Tech I year I semester
Computer Networks and Information Security
JAVA PROGRAMMING LAB

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CODE: 7R111

LIST OF JAVA PROGRAMS (JSE)

1. a) Write a java program to print hello world message.
   b) Write a java program to print palindrome program
   c) Write a java program to print Fibonacci series
   d) Write a java program to print Armstrong numbers
   e) Write a java to print Reverse of given number
   f) Write a java to print factorial of given number using recursion.
   e) Write a java to print by using String Tokenizes, String Buffer, BufferReader, InputStream…..etc.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result.

3. a) Develop an applet in Java that displays a simple message.

   b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

5. Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle. (Use java.net)

6. a) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time.No light is on when the program starts.

   b) Write a Java program that allows the user to draw lines, rectangles and ovals.

7. a) Write a Java program to create an abstract class named Shape that contains an empty method named numberOfSides ( ).Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides ( ) that shows the number of sides in the given geometrical figures.

   b) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Jtable component.

8. Write a Java program for handling Key events.

9. Write a Java program for handling mouse events. (Use Adapter classes).

Advanced Concepts(servelets,JSP)

1. Develop static pages (using Only HTML) of an online Book store. The pages should resemble: www.amazon.com The website should consist the following pages.

   Home page, Registration and user Login

   User Profile Page, Books catalog

   Shopping Cart, Payment By credit card

   Order Conformation

2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

3. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.

4. Bean Assignments

   a. Create a JavaBean which gives the exchange value of INR(Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
   b. Create a simple Bean with a label - which is the count of number of clicks. Than create a BeanInfo class such that only the "count" property is visible in the Property Window.
   c. Create two Beans-a)KeyPad .b)DisplayPad .After that integrate the two Beans to make it work as a Calculator.
   d. Create two Beans Traffic Light(Implemented as a Label with only three background colours-Red,Green,Yellow) and Automobile(Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.

Light Transition	Automobile State
Red ---> Yellow	Ready
Yellow ---> Green	Move
Green --> Red	Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using Servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Red the previous task using JSP by converting the static web pages of assignments into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

7. Implement the "Hello World!" program using JSP Struts Framework.

Reference Books:

1. Java Server Programming for Professionals, 2nd Edition, Bayross and others, O'reilly,SPD, 2007.
2. JDBC, Servlets, and JSP ,Black Book, K. Santosh Kumar, dreamtech.
3. Core Web Programming, 2nd Edition, Volume 1, M.Hall and L.Brown, PHPTR.
4. Core Web Programming, 2nd Edition, Volume 2, M.Hall and L.Brown, PHPTR.
5. Core Java, Volume 1, Horstman and Cornell, 8th Edition, Pearson Education, 2008.
6. Core Java, Volume 2, Horstman and Cornell, 8th Edition, Pearson Education, 2008.
7. Java Programming: Advanced Topics, 3rd Edition, J.Wiggles worth and P.McMillan,Cengage Learning, 2007.

M.Tech I year I semester
Computer Networks and Information Security
Technical Seminar and Comprehensive Viva Voce

L	T	P	C
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CODE: 7R112

There shall be three seminar presentations during I year I semester and I year 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 Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 25 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE /ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 5marks
- Final Report : 5 marks
- Presentation : 15 marks

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents:

- Identification of specific topic, Analysis
- Organization of modules, Naming Conventions
- Writing style, Figures
- Feedback, Writing style
- Rejection & Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

1. http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm
2. http://www.cse.psu.edu/~yuanxie/advice.htm
3. http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf

NOTE: A student can use any references for this process, but must be shared in classroom.

M.Tech I year II semester
Computer Networks and Information Security
INFORMATION SECURITY MANAGEMENT AND STANDARDS-PC5

L	T	P	C
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CODE:7R201

UNIT I

Information Security Management in Organizations

Security Policy, Standards, Guidelines and Procedures, Information Security Management System (ISMS), Organizational responsibility for 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

Overview of ISO 17799/ISO 27001 Standards, System Security Engineering Capability Maturity Model (SSE-CMM). NIST Model, VISA International Security Model, Baselining and Best Business practitioners, Design of Security Architecture.

UNIT VI

Legal, Ethical, and professional Issues in Information Security – Law and Ethics in Information Security, Types of Law, Relevant US Laws, International Laws and Legal Bodies, Policy versus Law, Ethics and Information Security, Codes of Ethics and Professional Organizations.

TEXT BOOKS:

1. Information Systems Security, *Nina Godbole*, Wiley India, 2009
2. Principles and Practices of Information Security. *Michael E. Whitman, Herbert J. Mattord*, Cengage Learning,

REFERENCE BOOKS:

1. Microsoft Security Risk Management Guide
2. Risk Management Guide for Information Technology Systems
   http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf
3. OCTAVE approach
   http://www.cert.org/octave/
4. COBIT
   http://www.isaca.org/
5. Guide to Firewalls and Policies (Unit 3)
   http://csrc.nist.gov/publications/nistpubs/800-41/sp800-41.pdf
6. Firewalls and Network Security, Micheal E.Whitman, et al. Cengage Learning, 2008
7. Audit Trails (Unit 7)
   http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter18.html

M.Tech I year II semester
Computer Networks and Information Security
WIRELESS NETWORKS AND MOBILE COMPUTING-PC6

	L	T	P	C
CODE :7R202	**2**	**1**	**-**	**3**

UNIT I

INTRODUCTION TO MOBILE & WIRELESS COMMUNICATION: Mobile communication, Mobile computing, Architecture, Mobile Devices, Mobile System Networks, Components of Wireless Environment, Overview & Challenges of Wireless Networks, Categories of Wireless Networks Wireless LAN : Infra red Vs radio transmission, Infrastructure and Ad-hoc Network

UNIT II

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS (GSM): GSM Architecture, GSM Entities, Call Routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security **GENERAL PACKET RADIO SERVICE (GPRS):** Introduction, GPRS and packet data network, GPRS network architecture, GPRS network operations, Data services in GPRS, Applications and limitations of GPRS, Billing and charging in GPRS

UNIT III:

MOBILE NETWORK LAYER: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP), Mobile Ad-hoc networks : Routing, destination Sequence Distance Vector, Dynamic Source Routing.

UNIT IV:

MOBILE TRANSPORT LAYER: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT V:

DATABASES: Database Hoarding Techniques, Data Caching, Client-server computing Adaptation, Transaction models, Query and Data recovery process**, DATA DISSEMINATION AND BROADCASTING SYSTEMS:** Communication Asymmetry, Classification of data delivery mechanisms, Broadcast models, Selective tunning and indexing techniques, Digital audio and video broadcasting

UNIT VI:

PROTOCOLS AND TOOLS: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT BOOKS:

1. Raj Kamal, "Mobile Computing", Oxford Univ. Press.
2. Asoke K Talukder, et al, "Mobile Computing", Tata McGraw Hill, 2008.

REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Communications", Pearson Education, Second Edition, 2008.
2. William Stallings, " Wireless Communications & Networks", Person, 2nd Edition, 2007.
3. Ivan Stojmenovic , "Handbook of Wireless Networks and Mobile Computing", Wiley, 2007.
4. Dr. Sunilkumar, et al "Wireless and Mobile Networks: Concepts and Protocols", Wiley India
5. Kumkum Garg, "Mobile Computing", Pearson.

M.Tech I year II semester
Computer Networks and Information Security
NETWORK SECURITY-PC7

	L	T	P	C
CODE :7R203	**3**	**-**	**-**	**3**

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

CellPhone 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 Vulnerabilites **Software Vulnerabilities:** Phishing, Buffer Overflow, Format String Attacks, Cross-Site Scripting (XSS), SQL Injection **Access Control in the Operating System:** Preliminaries, Discretionary Access Control – Case Studies: Windows/ Unix , Mandatory Access Control, Role-Based Access Control, SELinux and Recent Trends

UNIT –IV

Intrusion Prevention and Detection: Introduction, Prevention versus Detection, Types of Intrusion Detection systems, DdoS Attack Prevention/Detection, Malware Defense

UNIT – V

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

UNIT – VI

Computer and Network Forensics: Definition, Computer Forensics: History of Computer Forensics, Elements of Computer Forensics, Investigative Procedures, Analysis of Evidence, Network Forensics: Intrusion Analysis, Damage Assessment, Forensic Tools: Computer Forensic tools, Network Forensic Tools

TEXT BOOKS

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
2. Computer Network Security: Joseph Migga Kizza, Springerlink

REFERENCES:

1. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
2. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White, TMH
3. Wireless Security-Models, Threats, and Solutions: Randall K.Nichols, Panos C.Lekkas, TMH
4. Computer Security: Dieter Gollman, 2nd Edition, Wiley India
5. Computer Evidence: Collection & Preservation, Christopher L.T.Brown, Firewall Media

M.Tech I year II semester
Computer Networks and Information Security
AUDIT COURSE1 - ENGLISH FOR RESEARCH PAPER WRITING SYLLABUS

Code: 7HC18 **L-T- P- C**
2 -0 -0- 0

Course objectives: Students will be able to:
1. Understand how to improve writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission Syllabus

CONTENTS
Unit 1: Planning and Preparation
a. Word Order and Breaking up long sentences
b. Structuring Paragraphs and Sentences
c. Being Concise and Removing Redundancy
d. Avoiding Ambiguity and Vaguencess

Unit 2: Clarifying Who did What
a. Highlighting your Findings
b. Hedging and Criticizing
c. Paraphrasing and Plagiarism
d. Sections of a Paper
e. Abstracts Introduction

Unit 3: Review of Literature
a. Methods
b. Results
c. Discussion
d. Conclusions
e. The Final Check

Unit 4: Key skills needed when writing a Title
a. Key skills needed when writing an Abstract
b. Key skills needed when writing an Introduction
c. Skills needed when writing a Review of Literature

Unit 5: Skills needed when writing the Methods
a. Skills needed when writing the Results
b. Skills needed when writing the Discussion
c. Skills needed when writing the Conclusion

Unit 6: Useful phrases
a. How to ensure paper as good as it could possibly be for the first – time submission

Suggested Studies:
1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Writeand Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

M.Tech I year II semester
Computer Networks and Information Security
Data Encryption and Compression
Program Elective II

	L	T	P	C
CODE :7R204	**3**	**-**	**-**	**3**

Unit 1:
Introduction to Security: Need for security, Security approaches, Principles of security, Types of attacks. Encryption Techniques: Plaintext, Cipher text, Substitution & Transposition techniques, Encryption & Decryption, Types of attacks, Key range & Size.

Unit 2:
Symmetric & Asymmetric Key Cryptography: Algorithm types & Modes, DES, IDEA, Differential & LinearCryptanalysis, RSA, Symmetric & Asymmetric key together, Digital signature, Knapsack algorithm.

User Authentication Mechanism: Authentication basics, Passwords, Authentication tokens, Certificate based & Biometric authentication, Firewall.

Unit 3:
Case Studies Of Cryptography: Denial of service attacks, IP spoofing attacks, Secure inter branch payment transactions, Conventional Encryption and Message Confidentiality, Conventional Encryption Principles, Conventional Encryption Algorithms, Location of Encryption Devices, Key Distribution. Public Key Cryptography and Message Authentication: Approaches to Message Authentication, SHA-1, MD5, Public-Key Cryptography Principles, RSA, Digital, Signatures, Key Management.

Unit 4:
Introduction: Need for data compression, Fundamental concept of data compression & coding, Communication model, Compression ratio, Requirements of data compression, Classification. Methods of Data Compression: Data compression-- Loss less &Lossy

Unit 5:
Entropy encoding-- Repetitive character encoding, Run length encoding, Zero/Blank encoding; Statistical encoding-- Huffman, Arithmetic & Lempel-Ziv coding; Source encoding-- Vector quantization (Simple vector quantization &
with error term); Differential encoding—Predictive coding, Differential pulse code modulation, Delta modulation, Adaptive differential pulse code modulation; Transform based coding : Discrete cosine transform & JPEG
standards; Fractal compression

Unit 6:
Recent trends in encryption and data compression techniques.

Text Books:

1. Cryptography and Network Security by B. Forouzan, McGraw-Hill.
2. The Data Compression Book by Nelson, BPB.
3. Cryptography & Network Security by AtulKahate, TMH.

M.Tech I year II semester
Computer Networks and Information Security
Machine learning
Program Elective II

	L	T	P	C
CODE :7R205	**3**	**-**	**-**	**3**

Unit – I
Introduction : Designing a Learning system – Perspectives and Issues in Machine Learning
Concept Learning: Version spaces - Inductive Bias - Active queries - Mistake bound/ PAC model.

Unit – II
Supervised Learning, Decision Tree Learning – Representation – Hypothesis Space Search in Decision Trees – Issues in Decision tree learning, Linear Models for Regression – Linear Basis Function Models – The Bias – Variance Decomposition – Bayesian, Linear Regression – Bayesian Model Comparison - Linear Models for Classification

Unit – III
Unsupervised Learning
PCA – VC Dimension - K-means – Mixtures of Gaussians –EM Algorithm – Mixtures of Latent Variable Models – Supervised Learning after clustering – Spectral – Hierarchical clustering –
Non parametric methods – Density estimation – kernel estimator – k-nearest neighbor estimator – Condensed Nearest neighbor – Smoothing models

Unit – IV
Evaluation
Evaluating Machine Learning algorithms and Model Selection - Introduction to Statistical Learning Theory, Ensemble Methods - Boosting – Ada Boost - Bagging - Random Forests

Unit – V
Genetic Algorithms
Motivation – Operators – Illustrative examples – Genetic Programming – Lamarckian and Baldwinian models of Evolution – Parallelising Genetic Algorithms – Hidden Markov Models

Unit – VI
Analytical Learning
Analysis with Perfect Domain Theories – Inductive Analytical approaches to learning – KBANN algorithm – TangentProp Algorithm – FOCL algorithm, Application of machine Learning techniques for IoT applications.

Text Books:
1. Machine Learning, Tom M. Mitchell, McGraw Hill, first edition, 1997.

Information Theory, Inference, and Learning Algorithms, David J.C. MacKay, first edition, 2005

References :

- Tom Michel, Machine Learning. Mc Graw Hill. 1997
- Chris Bishop, Neural Network for, Pattern Recognition, Oxford University Press. 1995
- Ethem Alpaydin, Introduction to Machine Learning", MIT Press, Prentice Hall of India, 2005.
- Trevor Hustie, Robert Tibshirani & Jerome Friedman, The Elements of Statically Learning, Springer Verilag 2009

M.Tech I year II semester
Computer Networks and Information Security

INTRODUCTION TO DATA SCIENCE

Program Elective II

	L	T	P	C
CODE :7R206	**3**	**-**	**-**	**3**

Course Objective:

To know the fundamental concepts of Data Science. To explore tools and practices for working with Data Science. To learn about Principle component analysis. and understand about Predictive Analytics.

Course Outcomes:

At the end of this course, the student will be able to

1. Implement Data analysis techniques for solving practical problems.
2. Perform Data analysis on variety of data.
3. Perform appropriate statistical tests using R and Python to visualize the outcome.
4. Apply of data pre-processing, extraction, cleaning, annotation, integration on data.
5. Apply the suitable visualization techniques to output analytical results.

UNIT-I

DATA TYPES & COLLECTION

Types of Data: Attributes and Measurement, What is an Attribute?, The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute (Pg.No:22-29, Text Book-1), Nominal Attributes, Binary Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes (Pg. No. 39-44, Text-2), Types of Data Sets, General Characteristics of Data Sets, Record Data, Transaction or Market Basket Data, The Data Matrix, The Sparse Data Matrix, Graph Based Data, Graph- Based Data, Ordered Data. Handling Non-Record Data, Data Quality, Measurement and Data Collection Issues, Precision, Bias and Accuracy. (Pg. No. 29-39, Text-1)

UNIT-II

Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types, Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector Subsetting, Matrices: Creating and Naming Matrices, Matrix Subsetting, Arrays, Class.
Factors and Data Frames: Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Subsetting of Data Frames, Extending Data Frames, Sorting Data Frames. (Text Book-3)

UNIT-III
Lists: Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors, Conditionals and **Control Flow:** Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements.
Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List.
Functions in R: Introduction, Writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R.(Text Book -4)

UNIT-IV:

DATA VISUALIZATION

Data Visualization
Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations. (Pg. No. 56-64, Text-2)
Charts and Graphs : Introduction, Pie Chart: Chart Legend, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot.(Text Book-4)

UNIT-V:

DIMENSIONALITY REDUCTION
Eigen values and Eigenvectors of Symmetric Matrices, Definitions, Computing Eigen values and Eigenvectors, The Matrix of Eigenvectors, Principal-Component Analysis, An Illustrative Example, Using Eigenvectors for Dimensionality Reduction, Singular-Value Decomposition, Definition of SVD, Interpretation of SVD, Dimensionality Reduction Using SVD (Pg. No.405-422, Text Book-3)

UNIT VI

PREDICTIVE ANALYTICS

Data Interfaces: Introduction, CSV Files: Syntax, Importing a CSV File

Statistical Applications: Introduction, Basic Statistical Operations, Linear Regression Analysis, Chi-Squared Goodness of Fit Test, Chi-Squared Test of Independence, Multiple Regression. (Text Book-4)

TEXT BOOKS:

1.Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education Inc.
2. Han, Jiawei, Jian Pei, and Micheline Kamber, “Data mining: concepts and techniques”, 3 rd Edition, Elsevier, 2011.
3. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, Mining of Massive Datasets, Cambridge University Press
4. K G Srinivas ,G M Siddesh “Statistical programming in R”, Oxford Publications.

REFERENCE BOOKS:

1. Brain S. Everitt, “A Handbook of Statistical Analysis Using R”, Second Edition, 4 LLC, 2014.
2. Dalgaard, Peter, “Introductory statistics with R”, Springer Science & Business Media, 2008.
3. Samir Madhavan, “Mastering Python for Data Science”, Packt, 2015.
4. Paul Teetor, “R Cookbook, O’Reilly, 2011.

M.Tech I year II semester
Computer Networks and Information Security
DATABASE SECURITY
Program Elective-II

	L	T	P	C
CODE :7R207	**3**	**-**	**-**	**3**

UNIT - I
Introduction: Introduction to Databases, Security Problems in Databases, Security Controls Conclusions.

UNIT - II
Security Models: 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, Bell and LaPadula's Model, Biba's Model, Dion's Model, Sea View Model, Jajodia and Sandhu's Model, The Lattice Model for the Flow Control.

UNIT - III
Security Mechanisms: Introduction User Identification/Authentication, Memory Protection, Resource Protection, Control Flow Mechanisms, Isolation Security Functionalities in Some Operating Systems, Trusted Computer, System Evaluation Criteria.

UNIT - IV
Security Software Design: Introduction, A Methodological Approach to Security.
Software Design, Secure Operating System, Design Secure DBMS Design, Security Packages, Database Security Design.

UNIT - V
Statistical Database Protection & Intrusion Detection Systems: Introduction Statistics Concepts and Definitions, Types of Attacks, Inference Controls evaluation Criteria for Control Comparison, Introduction IDES System, RETISS System, ASES System, Discovery.

UNIT - VI
Models for the Protection of New Generation Database Systems: Introduction, A Model for the Protection of Frame Based Systems, A Model for the Protection of Object-Oriented Systems , SORION Model for the Protection of Object-Oriented Databases, A Model for the Protection of New Generation Database Systems, The Orion Model Jajodia and Kogan's Model, A Model for the Protection of Active Databases.

Suggested Reading:
1) S. Castano, M. Fugini, G. Martella, P. Samarati (eds.), Database Security, Addison-Wesley, 1994.
2) RonBen Natan, Implementing Database Security and Auditing, Elsevier, Indian reprint 2006
3) Michael Gertz, Sushil Jajodia, Handbook of Database Security : Applications and Trends, Springer, 2008

M.Tech I year II semester
Computer Networks and Information Security
Steganography and Water Marking
Program Elective-II

CODE:7R208

UNIT I Introduction :

Information Hiding, Steganography, and Watermarking. History ofWatermarking. History of Steganography, Importance of Digital Watermarking. Importanceof Steganography .

UNIT II Properties of Watermarking and Steganography

Properties of Watermarking Systems, Embedding Effectiveness, Fidelity,Data Payload, Blindor Informed Detection, False Positive Rate, Robustness, Security,Cipher and WatermarkKeys, Modification and Multiple Watermarks, Cost, Evaluating Watermarking Systems, The
Notion of "Best"
, Benchmarking, Scope of Testing.Properties of Steganographic and Steganalysis Systems : Embedding , SteganographicCapacity, Embedding Capacity, Embedding Efficiency, and Data Payload, Blind or InformedExtraction, Blind or Targeted Steganalysis, Statistical Undetectability, False Alarm Rate,Robustness, Security, Stego Key, Evaluating and Testing Steganographic Systems, Summary.

UNIT IIIModels of Watermarking :

Notation, Communications, Components of CommunicationsSystems, Classes of Transmission Channels, Secure Transmission, Communication-BasedModels of Watermarking, Basic Model, Watermarking as Communications with SideInformation at the Transmitter, Watermarking as Multiplexed Communications, GeometricModels of Watermarking, Distributions and Regions in Media Space, Marking Spaces,Modeling Watermark Detection by Correlation, Linear Correlation, Normalized Correlation,Correlation Coefficient, Summary.

UNIT IVSteganography :

Steganographic Communication, The Channel, The Building Blocks, Notation and Terminology, Information-Theoretic Foundations of Steganography,
Cachin's
Definition of Steganographic Security, Practical Steganographic Methods, StatisticsPreserving Steganography, Model-Based Steganography, Masking Embedding as NaturalProcessing, Minimizing the Embedding Impact, Matrix Embedding, Nonshared SelectionRule, Summary.

UNIT VSteganalysis :

Steganalysis Scenarios, Detection, Forensic Steganalysis, The Influence ofthe Cover Work on Steganalysis, Some Significant Steganalysis Algorithms, LSB Embeddingand the Histogram Attack, Sample Pairs Analysis, Blind Steganalysis of JPEG Images UsingCalibration, Blind Steganalysis in the Spatial Domain, Summary.

UNIT VIApplications :

Applications of Watermarking, Broadcast Monitoring, Owner Identification,Proof of Ownership, Transaction Tracking, Content Authentication, Copy Control, DeviceControl, Legacy Enhancement.Applications of Steganography, Steganography for Dissidents,Steganography for Criminals,

TEXT BOOKS:

1. Digital Watermarking and Steganography, Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, JessicaFridrich, and Ton Kalker. 2nd Edition, Morgan Kaufmann Publishers, 2008.

M.Tech I year II semester
Computer Networks and Information Security
Internet Of Thimgs
(Program Elective-III)

L	T	P/D	C
3	-	-	3

Code: 7R209

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

Unit II:
IoT and M2M: Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics; IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER.

Unit III:
Developing IoT: IoT Design Methodology - Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

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

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

Unit VI:
Case Studies Illustrating IoT Design: Home Automation – Smart Lighting, Home intrusion detection, **Cities** – Smart parking, **Environment** – Weather monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, **Agriculture** – Smart irrigation, **Productivity applications** – IoT printer.

TEXT BOOKS:

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

M.Tech I year II semester
Computer Networks and Information Security
Python Programming
(Program Elective-III)

L	T	P/D	C
3	-	-	3

Code:7R210

Unit -I :

Introduction to Python: History, Features ,Setting up path ,Working with Python Basic Syntax , Variable and Data Types ,Operator. Conditional Statements(If ,If- else ,Nested if-else) Looping (for,While Nested loops) Control Statements(Break , Continue ,Pass)

Unit-II:

Functions: Defining a function ,Calling a function ,Types of functions ,Function Arguments ,Anonymous functions ,Global and local variables

String Manipulation: Accessing Strings, Basic Operations, String slices , Function and Methods

Lists : Accessing list ,Operations ,Working with lists Function and Methods

Tuple: Accessing tuples, Operations, Working .

Dictionaries: Accessing values in dictionaries, Working with dictionaries, Properties Functions and Methods.

Unit-III:

Modules :Importing module , Math module , Random module ,Packages , Composition

Input-Output : Printing on screen ,Reading data from keyboard ,Opening and closing file Exception Handling : Exception,Exception Handling,Except clause ,Try ? finally clause User Defined Exceptions

Unit-IV: Advance Python- OOPs concept: Class and object ,Attributes ,Inheritance,Overloading Overriding ,Data hiding .

Regular expressions---Match function ,Search function ,Matching VS Searching,Modifiers Patterns.

Unit -V: CGI : Introduction , Architecture ,CGI environment variable, GET and POST methods Cookies ,File upload.

Python for Database: Introduction , Connections , Executing queries ,Transactions Handling error

Unit -VI: Working with NumPy/PlotPy/SciPy/GUI Programming, Introduction ,Tkinter programming ,Tkinter widgets

Text books:

1.Think Python: How to Think Like a Computer Scientist Allen B. Downey, O'Relly publications.

2. Learning with Python by Jeffrey Elkner, Chris Meyers Allen Downey, Dreamtech Press.

Reference books:

1.Introduction to Computation and Programming using Python, Revised and Expanded Edition,John V. Guttag, The MIT Press.

2. Programming Python,Fourth Edition by Mark Lutz, O'Relly

3. Python Programming using problem solving approach, Reema Thareja, Oxford Higher Education.

M.Tech I year II semester
Computer Networks and Information Security
Wireless Security
(Program Elective-III)

CODE:7R211

UNIT – I

Traditional Security Issues: Integrity, Confidentiality, Nonrepudiation, Availability, Mobile and Wireless Security Issues: detectability, Resource Depletion/Exhaustion, physical Intercept Problems, Theft of Service, War Driving/Walking/Chalking, Mobility, Problems in Adhoc Networks: Routing, Prekeying, Reconfiguring, Hostile Environment

Additional Issues: Commerce – liability, Fear, Uncertainty, Doubt, Fraud, Big Bucks at Stake

UNIT – II

Approaches to Security; Limit the Signal, Wire Integrity and Tapping, Physical Limitation, Encryption, Public and Private key Encryption, Computational and Data Overhead, Integrity Codes, Checksum, Hash, MAC, Payload vs Header, Traffic Analysis

IPSec, Authentication Header(AH), Encapsulating Security Payload(ESP), Other Security-Related Mechanisms, Authentication Protocols, AAA, Special Hardware

UNIT – III

Security in Wireless Personal Area Networks, Basic Idea, Bluetooth (Specifications, Network Terms, Security Mechanisms) , Bluetooth Security Modes, Bluetooth Security Mechanisms, Initialization Key, Unit Key, Combination Key, Master Key, Encryption, Authentication, Limitations and Problems

UNIT – IV

Security in Wireless Local Area Networks, Wireless Alphabet Soup, Wired Equivalent Privacy(WEP) – goals, data frame, encryption, decryption, authentication, flaws, fixes

Wi-Fi Protected Access(WPA), IEEE 802.11i, Encryption Protocols, Access Control via 802.1x, Fixes and "Best Practices", Anything is Better than Nothing, Know Thine Enemy, Use Whatever Wireless Security Mechanisms are Present, End – To – End VPN, Firewall Protection

UNIT – V

Broadband Wireless Access, IEEE 802.16, IEEE 802.16 Security, Key Management, Security Associations, Keying Material Lifetime, Subscriber Station(SS) Authorization, Encryption, problems and limitations

UNIT – VI

Security in Wide Area Networks, basic idea, CDMA, GSM, GSM Authentication, GSM Encryption, Problems with GSM Security, Session Life, Weak Encryption Algorithm, Encryption Between Mobile Host and Base Station Only, Limits to the Secret Key

TEXT BOOKS:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, K.S.Gupta et al, TMH 2006.

REFERENCES:

1. Wireless Security Models, Threats and Solutions, Randall k. Nichols, Panos C. Lekkas, TMH, 2006.
2. 802.11 Security, Bruce Potter & Bob Fleck, SPD O'REILLY 2006.
3. Guide to Wireless Network Security, Springer.

M.Tech I year II semester
Computer Networks and Information Security
(Program Elective-III)
ARTIFICIAL INTELLIGENCE AND DEEP LEARNING

CODE:7R212

Course Objective:

Understand the different types of AI agents. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information. Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems.

Course Outcomes:

At the end of this course, the student is able to

1. Understand the different types of AI agents
2. Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)
3. To understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving
4. Know how to build simple knowledge-based systems
5. Ability to apply concepts of convolutional networks in day to day applications.
6. Understand Reinforcement Learning-Markov Decision Processes (MDP) and the related concepts

UNIT I

Introduction: AI problems, Intelligent agents: Agents and Environments, Rationality, Nature of environments, Structure of agents, Problem solving agents, Problem formulation – Planning Application – Classical Planning problem

UNIT II

Searching and Game Theory: Searching for solutions, Searching with partial information (Heuristic search), Greedy best first search, A* search Constraint Satisfaction problem - Game Playing: Adversarial search : Games, Minimax algorithm, Optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions.
Case studies: Tic-tac-toe game

UNIT III

Knowledge Representation and Reasoning : Logical Agents, Knowledge Based Agents, Wumpus world, Propositional logic, Resolution patterns in propositional Logic, First order logic, Inference in first order logic, propositional vs. First order inference, Unification and Lifting, Forward chaining, Backward chaining, Resolution

UNIT IV

Uncertain Knowledge and Reasoning : Bayes Rule, Concepts of Time and Uncertainty, Utility Functions, Value of Information, Value iteration, Policy iteration, Partially Observable MDP

UNIT – V

BASICS OF DEEP LEARNING
Deep learning architectures: Convolutional Neural Networks : Neurons in Human Vision-The Shortcomings of Feature Selection - Full Description of the Convolutional Layer - Max Pooling-Full Architectural Description of Convolution Networks - Closing the Loop on MNIST with Convolutional Networks- -Building a Convolutional Network for CIFAR-10 - Visualizing Learning in Convolutional Networks- Leveraging Convolutional Filters to Replicate Artistic Styles-Learning Convolutional Filters for Other Problem Domains-Training algorithms.

UNIT VI

DEEP REINFORCEMENT LEARNING:

Deep Reinforcement Learning Masters Atari Games - Reinforcement Learning-Markov Decision Processes (MDP)-Explore Versus Exploit - Pole-Cart with Policy Gradients-Q-Learning and Deep Q-Networks-Improving and Moving Beyond DQN.

TEXT BOOKS

1 S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, Third Edition, 2009.
2. Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education, 1992.
3. Nikhil Buduma, Nicholas Locascio, "Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms", O'Reilly Media, 2017.
4. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning (Adaptive Computation and Machine Learning series", MIT Press, 2017.

REFERENCE BOOKS

1. M. Tim Jones, ―Artificial Intelligence: A Systems Approach(Computer Science), Jones and Bartlett Publishers, Inc.; First Edition, 2008
2. Nils J. Nilsson, ―The Quest for Artificial Intelligence, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish, Programming in Prolog: Using the ISO Standard, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, ―Multi Agent Systems, Second Edition, MIT Press, 2013.
5. David L. Poole and Alan K. Mackworth, ―Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.
6. I. Bratko, ―Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational Publishers Inc., 2011.

M.Tech I year II semester
Computer Networks and Information Security
AD HOC AND SENSOR NETWORKS
Program Elective III

CODE:7R213

3 - - 3

UNIT I

Ad Hoc Wireless Networks: Introduction, Issues in Ad hoc wireless networks, Ad hoc wireless Internet
MAC protocols for Ad hoc Wireless Networks Issues in Designing a MAC Protocol for Ad hoc Wireless Networks, Design Goals for a MAC Protocol for Ad hoc Wireless Networks, Classifications of the MAC Protocols, Other MAC Protocols.

UNIT II

Routing Protocols for Ad Hoc Wireless Networks Issues in Designing a Routing Protocol for Adhoc 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

Security protocols for Ad hoc Wireless Networks Security in Ad hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad hoc Wireless Networks

UNIT IV

Basics of Wireless, Sensors and Applications: The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

UNIT V

Sensor Network Hardware: Components of Sensor Mote,
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 VI

Operating System in Sensors– TinyOS, LA-TinyOS, SOS, RETOS
Imperative Language: nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM

TEXT BOOKS:

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal*, World Scientific Publications / Cambridge University Press, March 2006
3. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010

REFERENCE BOOKS:

1. Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kauffman Publishers, 2006, rp2009
2. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
3. Ad hoc Networking, *Charles E.Perkins*, Pearson Education, 2001.
4. Wireless Ad hoc Networking, *Shih-Lin Wu, Yu-Chee Tseng*, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan

Syllabus for M. Tech I Year II semester

Computer Networks and Information Security
Technical Seminar II

C	L	T	P
-	-	2	1

CODE:7R214

Max. Marks: 100

Course outcomes
After studying this course, the students will be able to

1. Identify a research topic
2. Collect literature
3. Present seminar
4. Discuss the queries

There shall be three seminar presentations during I year I semester and I year II Semester and a final seminar for 60 marks. 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 Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 40 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 20 marks
- Final Report : 20 marks
- Presentation : 60 marks (20 Abstract seminar +40 Final Presentation)

The presentation includes content (5) + Participation (5) + Presentation (10) for a total of 20 marks and double for 40 marks for final presentation.

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents

- Identification of specific topic
- Analysis
- Organization of modules
- Naming Conventions
- Writing style
- Figures
- Feedback
- Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

4. http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm
5. http://www.cse.psu.edu/~yuanxie/advice.htm
6. http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf

NOTE: A student can use any references for this process, but must be shared in classroom.

Syllabus for M. Tech I Year II semester
Computer Networks and Information Security
Comprehensive Viva Voce

CODE:7R215

L	T	P	C
-	-	2	1

Max. Marks: 100

Course Objective :
Evaluate, comprehend and assess of the concepts and the knowledge gained in the core courses of the first and the second year.

Course Outcomes :
At the end of this course, the student will be able to
1. Comprehend the concepts in the core and elective courses.
2. Exhibit technical knowlegde to face interviews.
3. Exhibit life long Learning skills for higher education and to persue Professional practice.

There will be 100 marks in total with30 marks of internal evaluation and 70marks of external evaluation.

Internal:
Comprehensive Viva Voce is Conducted once in a semester and evaluated for 30 marks.
End examination : 70 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor. A candidate shall secure a minimum of 50% to be declared successful.

Syllabus for M. Tech I Year II semester
Computer Networks and Information Security

MINI PROJECT WITH SEMINAR

CODE :7R216

L	T	P	C
-	-	4	2

Max. Marks: 100

In I year II semester, a project seminar shall be conducted for 70 marks and for 3 credits. The evaluation for the project seminar shall be done in two stages. The mid-semester seminar evaluation shall carry 15 marks and the end semester seminar evaluation shall carry 15 marks. In I year II semester, student will do project during summer vacation and shall evaluated in II year –I semester.

M.Tech I year II semester
Computer Networks and Information Security
INFORMATION SECURITY THROUGH JAVA LAB

L	T	P	C
-	-	4	2

CODE:7R217

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. Ceaser 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. Write a C/JAVA program to implement the Rijndael algorithm logic.
9. Write the RC4 logic in Java
10. Using Java cryptography, encrypt the text "Hello world" using Blowfish. Create your own key using Java keytool.
11. Implement DES-2 and DES-3 using Java cryptography package.
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 MD6 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

a. SNMP Enumeration: SolarWinds IP Network Browser, www.solarwinds.com/downloads
b. Enumerating Routing Protocols: Cain & Abel tool, www.oxid.it

4. Automated Attack and Penetration Tools
a. Exploring N-Stalker, a Vulnerability Assessment Tool, www.nstalker.com

5. Defeating Malware
a. Building Trojans, Rootkit Hunter: www.rootkit.nl/projects/rootkit_hunter.html
b. Finding malware

6. Securing Wireless Systems
a. Scan WAPs: NetStumbler, www.netstumbler.com/downloads
b. Capture Wireless Traffic: Wireshark, www.wireshark.org

TEXT BOOK:

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

M.Tech IIyear I semester
Computer Networks and Information Security
Database Security and Access Control –PC8

CODE:7R301 **L-T-P-C**
3 - - 3

Unit 1:

Introduction to Access Control, Purpose and fundamentals of access control, brief history,

Unit 2:

Policies of Access Control, Models of Access Control, and Mechanisms, Discretionary Access Control (DAC), Non- Discretionary Access Control ,

Mandatory Access Control (MAC). Capabilities and Limitations of Access Control Mechanisms: Access Control List (ACL) and Limitations, Capability List and Limitations,

Unit 3:

Role-Based Access Control (RBAC) and Limitations, Core RBAC, Hierarchical

RBAC, Statically Constrained RBAC, Dynamically Constrained RBAC, Limitations of RBAC. Comparing RBAC to DAC and MAC Access control policy,

Unit 4:

Biba'sintrigity model, Clark-Wilson model, Domain type enforcement model , mapping the enterprise view to the system view, Role hierarchies- inheritance schemes, hierarchy structures and inheritance forms, using SoD in real system, Temporal Constraints in RBAC, MAC AND DAC.

Integrating RBAC with enterprise IT infrastructures: RBAC for WFMSs, RBAC for UNIX and JAVA environments Case study: Multi line Insurance Company.

Unit 5:

Smart Card based Information Security, Smart card operating system-fundamentals, design and implantation principles, memory organization, smart

card files, file management, atomic operation, smart card data transmission ATR,PPS Security techniques- user identification , smart card security, quality assurance and testing , smart card life cycle-5 phases, smart card terminals.

Unit 6:

Recent trends in Database security and access control mechanisms. Case study of Role-Based Access Control (RBAC) systems.

References:

1. Role Based Access Control: David F. Ferraiolo, D. Richard Kuhn, RamaswamyChandramouli.
2. http://www.smartcard.co.uk/tutorials/sct-itsc.pdf : Smart Card Tutorial.

M.Tech II year I semester
Computer Networks and Information Security
COST MANAGEMENT OF ENGINEERING PROJECTS

L	T	P	C
3	-	--	3

CODE: 7ZC28 **Open Elective – I**

Course objective: To provide the insights of various project management and cost control techniques for successful implementation and completion of the project.

UNIT I
INTRODUCTION AND OVERVIEW OF THE STRATEGIC COST MANAGEMENT PROCESS: Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

UNIT II
COST BEHAVIOR AND PROFIT PLANNING MARGINAL COSTING; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis (Theory). Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector.

UNIT III
BUDGETARY CONTROL: Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing

UNIT IV
PROJECT MANAGEMENT TECHNIQUES: Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis.

UNIT V
PROJECT EVALUATION:. Meaning of Project, Detailed Engineering activities. Pre project execution main clearances and documents Project team : Role of Project Manager. Importance Project site. Project execution Project cost control. Bar charts and Network diagram.

UNIT VI
QUANTITATIVE TECHNIQUES: For cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

Books Recommended:

- Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
- Charles T. Horngren and George Foster, Advanced Management Accounting

References:

- Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
- Ashish K. Bhattacharya, Principles & Practices of CostAccounting A. H. Wheeler publisher
- N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

M.Tech I year II semester
Computer Networks and Information Security
BANKING OPERATIONS, INSURANCE & RISK MANAGEMENT

Open Elective – I	**L**	**T**	**P**	**C**
	3	**-**	**--**	**3**

CODE:7ZC03

Course Objective: The objective of the course is to provide students an understanding of Banking Operations, Insurance Market, and Risk Management Principles and techniques to control the risk, & the major Institutions involved and the Services offered within this framework.

UNIT I

INTRODUCTION TO BANKING BUSINESS: Introduction to Banking sectors-History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank New Dimensions and products- E-Banking, Mobile-Banking, Net Banking, CRM, cheque system and KYC system.

UNIT II

BANKING REFORMS AND REGULATIONS: Banking regulation Act-1949, Reserve Bank of India Act-1934, Establishment of RBI, Functions and credit control system; Role of commercial banks and its functions. Banking sector reforms in India and deficiencies in Indian banking including problems accounts and Non-Performing Assets.

UNITIII

INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance; life insurance and its products: Role of Agents and brokers.

UNIT IV

INSURANCE BUSINESS ENVIRONMENT: Regulatory and legal frame work governing the insurance sector, history of IRDA and its functions: Business and economics of insurance, need for changing mindset and latest trends.

UNIT V

INTRODUCTION TO RISK MANAGEMENT: Introduction to Risk, meaning and types of risk in business and individual, Risk management process, methods: Risk identification and measurement, Risk management techniques; Non insurance methods.

UNIT VI

FINANCIAL RISK MANAGEMENT: Introduction to Financial markets. Financial risk management techniques –Derivatives, Hedging and Portfolio management techniques: Derivatives and types of Derivatives-Futures, options and swaps: Shares, Commodity and Currency trading in India.

Books Recommended:

- Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
- General Principles of Insurance Harding and Evantly
- Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
- Reddy K S and Rao R N: Banking and Insurance, Paramount publishers, 2013

References:

- Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
- Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
- G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.
- Gulati: Principles of Insurance Management, Excel, 2009.
- James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 2009.
- Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
- P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
- Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.

- Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e,PHI, 2012.

M.Tech I year II semester
Computer Networks and Information Security
OPERATIONS RESEARCH
(OPEN ELECTIVE-I)

Code: 7WC30	**L**	**T**	**P**	**C**
	3	**-**	**--**	**3**

Course Objective:

Identify and develop operational research models from the verbal description of the real system. Understand the mathematical tools that are needed to solve optimization problems.

Course Outcomes:
After completing the subject, students will be able to:

- understand the application & techniques of OR & Formulate & Obtain solution problems using linear programming (LP) by different methods
- understand the transportation problem their formulation and solution, understand the job sequencing under different condition
- understand the significance of replacement and the techniques of replacement of various types of items
- understand the Game theory concept & solutions and its industrial significance
- understand the importance of queue system and various possible configuration of queues, concept of inventory system, various inventory models
- concept of stage wise optimization and its implications, concept of simulation and its uses

UNIT – I
INTRODUCTION: Definition, Characteristics and Phases (or steps) of OR method, Types of models, applications.
LINEAR PROGRAMMING PROBLEM- Formulation – Graphical solution, Simplex method-Types of variables, Unbounded solution Artificial variables techniques -Two–phase method, Big-M method -Degeneracy, Duality Principle-examples

UNIT – II
TRANSPORTATION PROBLEM – Formulation – methods of finding initial solution, Optimal solution-MODI method, Special cases in TP: unbalanced, maximization case, Degeneracy.
ASSIGNMENT PROBLEM – Formulation – Optimal solution - Variants of Assignment Problem-Unbalanced, Maximization, Traveling Salesman problem.

UNIT – III
SEQUENCING – Introduction – Terminology, Assumptions, Johnson's procedure- Processing n jobs through two machines – Processing n jobs through three machines – Processing two jobs through 'm' machines.
REPLACEMENT: Introduction – Types of failure, Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, Group replacement.

UNIT – IV
THEORY OF GAMES: Introduction, Definitions, Pure strategies-Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Mixed Strategies-Rectangular games without saddle points-Dominance principle – 2 X 2 games , m X 2 & 2 X n games -Graphical method.

UNIT – V
WAITING LINES: Introduction, Terminology, Structure of a queue, Calling population characteristics-size, behavior, pattern of arrivals, Kendall-Lee notation, Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

INVENTORY : Introduction, Inventory costs, Concept of EOQ, Single item Deterministic models without shortages and with shortages, Single item inventory models with one price break and multiple price breaks, Stochastic models – Instantaneous demand and no set up cost.

UNIT – VI

SIMULATION: Definition – Types of simulation – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages

DYNAMIC PROGRAMMING: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- shortest path problem -capital budgeting problem — linear programming problem.

TEXT BOOKS:

1. Operations research / Hira & Gupta
2. Operation Research /J.K.Sharma/MacMilan publishers.

REFERENCES:

- Operations research/V.K.Kapoor

M.Tech I year II semester - CNIS
EMBEDDED SYSTEMS
Open Elective

Code: 7T217

L	T	P	C
3	-	--	3

UNIT-1
Introduction to Embedded Systems : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design. (Chapter I from Text Book 1, Wolf).

Unit – II
8061 Micro controller : Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. (Chapter 3 from Text Book 2, Ayala).

UNIT-III
Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8061. Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instruction.
(Chapters 4,6,6,7 and 8 from Text Book 2, Ayala).

UNIT –IV
8061 Interfacing : Interfacing with Keyboards, Displays, D/A and A/D Converters, Programming multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

UNIT – V
Introduction to Real – Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management.
(Chapter 6 and 7 from Text Book 3, Simon).

UNIT – VI
Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS uC-OS / Vx-Works / RT Linux; Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

TEXT BOOKS:
1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8061 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
3. An Embedded Software Primer, David E. Simon, Pearson Education.

REFERENCES :
1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.

M.Tech I year II semester
Computer Networks and Information Security
BIO INFORMATICS
Open Elective

Code: 7QC47

L	T	P	C
3	-	--	3

UNIT I : SCOPE OF BIOINFORMATICS and BIOLOGICAL DATABASES
History, definition,, importance and applications of bioinformatics, Introduction to biological data, Organization and management of databases, Nucleotide databases (Genbank,), Protein Databases(SWISS PROT)

UNIT II: SEQUENCE ALIGNMENT
Basic concepts of sequence homology Dynamic Programming, Dot Matrix analysis, Smith-Waterman Algorithm , Needleman-Wunsch Algorithm ,Scoring matrices: PAM and BLOSUM matrices

UNIT III: **SEQUENCE-BASED DATABASE SEARCHES**
BLAST and FASTA algorithms, various versions of basic BLAST and FASTA, Use of these methods for sequence analysis including the on-line use of the tools and interpretation of results.

UNIT IV: MULTIPLE SEQUENCE ALIGNMENT
Basic concepts of various approaches for MSA (e,g. progressive, hierarchical etc.). Algorithm of CLUSTALW and its application

UNIT V: PHYLOGENETIC ANALYSIS
Definition and description of phylogenetic trees. Distance based and character based methods of phylogenetic analysis.

UNIT VI: PROTEIN STRUCTURE PREDICTION
Secondary structure prediction methods, Algorithms of Chou Fasman, GOR methods. Protein homology modeling.

TEXT BOOKS:
1. Bioinformatics. David Mount, 2000. CSH Publications

REFERENCES:
1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.
2. Genomics and Proteomics-Functional and Computational aspects. Springer Publications. Editior-Sandor Suhai.
3. Bioinformatics- Methods and Protocols-Human Press. Stephen Misener, Stephen A. Krawetz.
4. Bioinformatics – A Practical guide to the Analysis of Genes and Proteins – Andreas D.Baxevanis, B.F. Francis Ouellette.

Syllabus for M. Tech II Year I semester
Computer Networks and Information Security
Mini Project with Seminars (Project Conducted in summer)

CODE :7R302

L	T	P	C
-	-	6	3

Max Marks=100

In II year I semester, a project work review shall be done by Internal and External for 100 marks and for 3 credits . The evaluation for the project reviews shall be done in 2 stages (not less than 4 weeks between two consecutive stages) evaluated for 30 marks.

External end semester project review shall carry 70 marks (50% by PRC and 50% by supervisor). The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey and design in Project Review- I. A candidate shall secure a minimum of 50% to be declared successful in Project Review- I. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.

Syllabus for M. Tech II Year I semester
Computer Networks and Information Security

MAIN PROJECT PHASE-1 AND SEMINAR

	L	T	P	C
Code: 7R303				
			10	**5**

Max Marks:100

In II year I semester, a project work review shall be done by PRC for 70marks and for 3 credits (there is no external evaluation) in each of the semester. The evaluation for the project reviews shall be done in 4 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation.

Each stage project review shall carry 30 marks and the end semester review shall carry 50marks (50% by PRC and 50% by supervisor). The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey and design in Project Review- I. A candidate shall secure a minimum of 50% to be declared successful in Project Review- I. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.

Syllabus for M. Tech II Year II semester
Computer Networks and Information Security

MAIN PROJECT PHASE- II AND SEMINAR

Code: 7R401

L	T	P	C
-	-	12	6

Max. Marks: 100

In II year II semester, a project work review shall be done by PRC for 100 marks and for 6credits (there is no external evaluation) in each of the semester. The evaluation for the project reviews shall be done in 4 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation.

Each stage project review shall carry 30 marks and the end semester review shall carry 70 marks (50% by PRC and 50% by supervisor). In the case of Project Review II, the Supervisor and PRC will examine implementation, testing and final execution of the project. A candidate shall secure a minimum of 50% to be declared successful in Project review II. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.

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Syllabus for M. Tech II Year II semester
Computer Networks and Information Security

DISSERATION AND DEFENCE VIVA **MARKS :100**

Code: 7R402

L	T	P	C
-	-	-	7

Course Outcome: By the end of this course, students will be able to

1. Critically and theoretically analyze the systems/products they are going to design or develop.
2. Apply the theoretical knowledge gained to bring out innovative products.
3. Effectively communicate in a variety of forms including written, visual, verbal, online and technical literacy.
4. Work and participate as effective members in a group within a professional environment.
5. Develop an ongoing critical awareness of learning needs in the application of appropriate technologies.
6. Gain as much knowledge and experience in areas of the area of Digital Systems and Computer Electronics

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.

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. Program.

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.

3. After satisfying 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.

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.

5. A candidate shall submit his project status report in four stages at least with a gap of 4 weeks between two consecutive stages.

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 (no backlogs) 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.

7. After approval from the PRC, the soft copy of the thesis should be submitted to the College for ANTI-PLAGIARISM for the quality check and the plagiarism report should be included in the final thesis. If the copied information is less than 24%, then only thesis will be accepted for submission.

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

9 In II year I semester and II semester, a project work review I and II shall be done by PRC for 100 marks and for 12 credits (there is no external evaluation) in each of the semester. The evaluation for the project reviews shall be done in 4 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation. Each stage project review shall carry 20 marks and the end semester review shall carry 40 marks (50% by PRC and 50% by supervisor). The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey and design in Project Review I. In the case of Project Review II, the Supervisor and PRC will examine implementation, testing and final execution of the

project. A candidate shall secure a minimum of 50% to be declared successful in Project review I and II. If candidate fails to fulfill minimum marks, he has to reappear during the supplementary examination.

10. For Project Evaluation (Viva Voce) in II Year II Sem. there are external marks of 150 for 24 credits. HoD shall submit a panel of 3 examiners, eminent in that field. Principal will appoint one of them as examiner.

11. The thesis shall be adjudicated by examiner selected by the College. 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.

12. 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. Candidate has to secure minimum of 50% marks in Project Evaluation (Viva-Voce) examination.

13. If he fails to fulfill as specified in 12, 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.

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

Advanced Data Structures
Advanced JAVA Programming-
Advanced Computer Networks
Principles of Information Security
Data Warehousing and Data Mining
Information Security,Management and Standards
Wireless Networks and Mobile Computing
Network Security