# ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS

## <sup>for</sup> M.Tech Two Year Degree Course (A-19)

# COMPUTER NETWORKS AND INFORMATION SECURITY (IT)

(Applicable for the batches admitted from 2019-2020)



SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY (An Autonomous Institution approved by UGC and affiliated to JNTUH) (Accredited by NAAC with 'A' Grade and Accredited by NBA of AICTE) Yamnampet, Ghatkesar, Malkajigiri Medchal District -501 301.

## January, 2019

#### SNIST Dept of IT-MTech CNIS Syllabus 2019 VISION OF THE DEPARTMENT

To emerge as a leading department in Technical Education and Research in Information Technology related areas with focus to produce professionally competent and socially sensitive engineers capable of working in global environment.

## **MISSION OF THE DEPARTMENT**

1. To prepare Information Technology graduates to be a lifelong learner with Information Technology and professional core, multidisciplinary areas, with continuous update of the syllabus, so that they can succeed in industry as an individual and as a team or to pursue higher studies or to become an entrepreneur.

2. To enable the graduates to use modern tools, design and create novelty based products required for the society and communicate effectively with professional ethics.

3. To continuously engage in research and projects development with financial management to promote scientific temper in the graduates and attain sustainability.

# **Program Educational Objectives** of M. TECH (Computer Networks and Information Security)

PEO-I: To empower the students by providing necessary knowledge base, critical thinking and problem solving capabilities in the field of Computer Network and Information Security and allied fields so that they can excel in their profession, in industry, higher studies and Research & Development.

**PEO-II**: To develop core competencies in the field of Computer Network and Information Security, so as to conduct experiments, comprehend, analyze, design and use appropriate techniques and tools to provide optimal solutions for the industry related problems.

PEO-III: To inculcate the responsibility to the society at large by sensitizing regulatory and Intellectual Property related issues along with communication skills and to promote entrepreneurship with sufficient knowledge of project/ finance management techniques for ensuring their career success.

PEO-IV: To motivate the students not only to be excellent in academics, professional ethics ,team work , leadership skills but also to be life-long learners in upcoming technologies for a successful professional career.

PROGRAM OUTCOMES (POs) OF M. TECH (Computer Networks and Information Security)

After completion of the M. Tech Computer Networks and Information Security

- a) Postgraduates will demonstrate their abilities to acquire state of art of knowledge and to expand the frontiers of knowledge in the field of Computer Networks and Information Security Engineering.
- b) Postgraduate will demonstrate the ability to analyze and evaluate complex engineering problems to make intellectual to create advances in the field of Computer Networks and Information Security Engineering.
- c) Postgraduate will demonstrate their abilities of problem solving skills to find optimal solution including considerations of public issues, cultural, societal and environmental factors in core areas of expertise.
- d) Postgraduate will demonstrate ability to carry out literature survey, design and conduct experiments and analyze results using appropriate research methodologies. They should also demonstrate to contribute scientific / technical knowledge in their domain areas either individually or in groups.
- e) Postgraduate will demonstrate ability to develop appropriate techniques and tools for prediction and modelling of various engineering systems.
- f) Postgraduate will demonstrate ability to collaborate and engage in multidisciplinary group tasks in scientific research.
- g) Postgraduate will demonstrate ability manage projects efficiently including consideration of economical and financial factors.
- h) Postgraduate will demonstrate ability in both oral and written technical communications.
- i) Postgraduate will demonstrate ability to learn latest developments independent and continuously in his/her field.
- j) Postgraduate shall acquire professional ethics and intellectual integrality in the consideration of impact of research outcomes for sustainable development of society.
- k) Postgraduate shall learn from mistakes and make corrective measures on his own.

## **ACADEMIC REGULATIONS FOR M. Tech / MBA COURSES**

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution)

## Under

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

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

The following changes are made in the M.Tech / MBA program from the Academic Year 2019-20

#### **Courses**

SI. No.	Dept.	Existing M.Tech / MBA 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
8	MBA	Master of Business Administration

#### Existing pattern of internal evaluation and modifications proposed

Internal Test

- a. Part A Short answer questions 5 (10 questions instead of 3)
- b. Part B -
- (CIE) : 25 marks = (15 + 2 + 3 + 3 + 2)

It is observed that the students are not taking interest in writing the assignments and they are not concentrating in the subject. Hence, it is decided to conduct assignment test as Part-C in the examination question paper, so that the students will concentrate in the assignments.

The following procedure is proposed by the College Academic Committee in its meeting held on 25-7-2018.

Mid Examinations					
ltem	Pattern	Existing Marks	Proposed Marks		
Mid Test	a) Part – A – Short	3 questions compulsory -	10 Questions compulsory		
	answer questions	5 marks	- 5 marks		
	b) Part – B – Long	3 questions out of 4 to be	2 questions out of 3 to be		
	answer questions	answered (at least one	answered (at least one question		
		question from each unit) -	from each unit) -		
		10 marks	10 marks		

SNIST Dept of IT-MTech CNIS Syllabus 2019

		511151	Dept of the interest of the by habas 2019
Assignment	a. Written	Average of two assignments-	Three questions from each unit –
	assignment	5 marks	total of 9 questions in the
			assignment. This has to be
			submitted before the first mid test
			and before second mid. The
			average two assignments.
			– 2 marks
	b. Assignment test	Not existing	Question Paper will have 3
	along with mid		questions – One from each unit
	test (Part-C).		taken from assignment questions.
			Student has to answer 2 questions
			out of 3 - <b>3 marks</b>
Class room	Attendance and	4 marks	3 marks
participation	attention in the		
	class		
Class notes	Verification of the	2 marks	2 marks
	class notes		
-	Total	25 marks	25 arks

SI.No	Particulars	Existing	Revised – As per model curriculum of AICTE
1	Total Credits	96	68
2	Common subject for all branches	Research Methodology	Research Methodology and IPR
3	Labs	2 ( 1 in each semester i.e I & II semesters )	4 ( 2 each in 1 <sup>st</sup> and 2 <sup>nd</sup> semesters)
4	Seminars	Literature review and Seminar – 1 (in semester – I )	Technical Seminar
		Comprehensive Viva voce – 1 (in semester – I)	-
		Literature review and Seminar – II (in semester – II ) Project Seminar (in semester – II )	Mini Project with Seminars
		Comprehensive Viva Voce – II (in semester – II )	Comprehensive Viva Voce in Semester - II
		Project work and Review – I	Project Phase – I with Seminars
		Project work and Review – II	Project Phase – II with Seminars

## ACADEMIC REGULATIONS FOR M. Tech/MBA (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)** Jawaharlal Nehru Technological University Hyderabad (JNTUH) offers **Two** Years (**Four** Semesters) full-time Master of Technology (M. Tech.) Degree programmes, under Choice Based Credit System (CBCS) at its affiliated colleges in different branches of Engineering and Technology with different specializations.

## 2.0 ELIGIBILITY FOR ADMISSIONS

- **2.1** Admission to the PGPs shall be made subject to eligibility, qualification and specializations prescribed by the University from time to time, for each specialization under each M.Tech programme.
- **2.2** Admission to the post graduate programme 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. programmes / an entrance test conducted by JNTUH/ on the basis of any other exams approved by the University, subject to reservations as laid down by the Govt. from time to time.
- **2.3** The medium of instructions for all PG Programmes will be **ENGLISH** only.

## 3.0 M.Tech. Programme (PGP in E & T) Structure

- 3.1 The M.Tech Programmes in E & T of JNTUH 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. programme.
- **3.3 UGC/AICTE** specified definitions/descriptions are adopted appropriately for various terms and abbreviations used in these PG academic regulations, as listed below:

#### 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' and 'COURSE' imply the same meaning here and refer to 'Theory Subject', or 'Lab Course', or 'Design/Drawing Subject', or 'Seminar', or 'Comprehensive Viva', or 'Group Project', or "Industry oriented mini project " or "Project" or 'Technical Paper Writing' as the case may be.

## 3.3.2 Credit Courses

All subjects/courses are to be registered by the student 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 one hour/week/semester for theory/lecture/ tutorials (T) (L) courses

• One credit for two hours/ week/semester for laboratory/ practical (P) courses Other student activities like study tour, guest lecture, conference/workshop participations, technical paper presentations, and identified mandatory courses, if any, will not carry credits but they will be evaluated internally if they get grades accordingly as per the table below. If a candidate dosent pass the mandatory courses, he will not be awarded with degree.

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

**3.3.3** The student shall register for all 68 credits and secure all the 68 credits. In case a student who passed in all subjects, but the SGPA in any semester is less than 6.0 he/she can be permitted to write the end semester examinations in the subjects of his/her choice in the corresponding semester in the following academic year for improving the grade in the subjects concerned so that the SGPA of 6.0 can be attained. Thus, a student will not be permitted to write the end semester examinations once again for the purpose of improving the grade in the subject and hence the SGPA, in the event the student has already secured SGPA of 6.0 and above.

## 3.3.4 Subject Course Classification

All subjects/courses offered for the Post-Graduate Programme in E & T (M.Tech Degree Programme) are broadly classified as follows. The University has followed in general the guidelines issued by AICTE/UGC.

SNIST Dept of IT-MTech CNIS Syllabus 2019

	Broad Course	Course Group/			
S.No.	Classification	Category	Course Description		
		PC-	Includes subjects related to the parent		
		Professional	discipline/department/ branch of		
		Project Work	M.Tech Project or PG Project or Major		
		Seminar,	Seminar/Colloquium based on core contents		
	Core Courses	Technical	related to parent discipline/department/branch of		
	(CoC)	Comprehensive	Viva-voce covering all the PG subjects		
		Viva-Voce	studied during the course work and related		
		PE -	Includes elective subjects related to the		
	Elective Courses	Professional	parent discipline/department/branch of		
	(E <b>L</b> E)		Elective subjects which include inter- disciplinary subjects or subjects in an area		
		Electives	outside the percent discipling (department)		
า			outside the parent discipline/department/		
	Total number of Credits – 69				

## 4. <u>COURSES OF STUDY</u>

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

SI. 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

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

**5.1** Attendance in all classes (Lectures/Tutorials /Laboratories/Seminar/ Mandatory courses) is compulsory. The minimum required attendance in each theory

Two periods of attendance for each theory subject shall be considered, if the student appears for the mid-term examination of that subject. A student shall not be permitted to appear for the Semester End Examinations (SEE), if his attendance is less than 75%.

- **5.2** A student's seminar report and seminar presentation will be eligible for evaluation, only if he ensures a minimum of 75% of his attendance in seminar presentation classes during that semester.
- **5.3 Condoning of shortage of attendance** (between 65% and 75%) up to a maximum of 10% (considering the days of attendance in sports, games, NCC, NSS activities and Medical grounds) in each subject of a semester shall be granted by the College Academic Committee.
- **JNTUH 5.4** Shortage of Attendance below 65% in any subject shall in **no case be condoned.**
- **SNIST 5.4** Shortage of Attendance below 65% in the semester, shall <u>IN NO CASE</u> be condoned and he/she cannot register for end examinations.
- **JNTUH 5.5** A Student, whose shortage of attendance **is not condoned** in any subject(s) in any semester, is considered detained in that subject(s) and is not eligible to write Semester End Examination(s) of such subject(s) in that semester, and he has to seek re-registration for those subject(s) in subsequent semesters, and attend the same as and when offered.
- **SNIST** 5.5 A candidate who is detained due to shortage of attendance may seek reregistration in to the same semester as and when that is offered. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for re-registration for the same semester. However, he will be permitted to appear for consecutive examinations.
  - **5.6** A student fulfills the attendance requirement in the present semester, shall not be eligible for readmission into the same class.
  - **5.7** A prescribed fee per subject shall be payable for condoning shortage of attendance.
  - **5.8** A student shall put in a minimum required attendance in at least three theory subjects in I Year I semester for promotion to I Year II 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 / course (theory / practical), on the basis of 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/course, 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/ course, 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 Paper Writing as required. In such a case, he 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 for total of 68 credits as specified and listed in the course structure for the chosen specialization, put in required the attendance and fulfill the academic requirements for securing 68 credits obtaining a minimum of 'B' Grade or above in each subject, and all 68 credits securing Semester Grade Point Average (SGPA) ≥6.0 (in each semester) and final Cumulative Grade Point Average (CGPA) (i.e., CGPA at the end of PGP) ≥ 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
- **6.4** Marks and Letter Grades obtained in all those subjects covering the above specified 66 credits alone shall be considered for the calculation of final CGPA, which will be indicated in the Grade Card /Marks Memo of second year second semester.
- 6.5 If a student registers for extra subject(s) (in the parent department or other departments/ branches of Engineering) other than those listed subjects totaling to 66 credits 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 66 credits) will not be taken into account while calculating the SGPA and CGPA. 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 completion of 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 subject(s) in any semester, no Grade allotment will be made for such subject(s). However, the student is eligible for re-registration of such subject(s) in the subsequent semester(s), as and when next offered, with the academic regulations of the batch into which the student is re-registered, by paying the prescribed fees per subject as per the norms of Institution. In all these re-registration cases, the student shall have to secure a fresh set of internal marks and Semester End Examination marks for performance evaluation in such subject(s), 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.
- **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 courses of II year I semester and student can concentrate on Project work in the entire II semester either in the institution or in the industry to complete quality work.
- 6.9 A Student who fails to earn 68 credits as per the specified course structure, and as indicated above, within **four** academic years from the date of commencement of his first year first semester, shall forfeit his seat in M. Tech. programme and his 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 marks.

- 7.1 There shall be two midterm examinations in every theory course. 18 marks are earmarked for each midterm examination. The marks shall be awarded considering the average of two midterm examination marks in each course. If any candidate is absent from any subject for mid-term examination and he/she wishes to improve the performance, a Third Mid test will be conducted for the Student by the College in the entire syllabus on the same day of the main examinations. The result will be treated equal to a mid test and average of better two 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 third mid for each subject can be done by the student by paying an amount as decided by the Finance Committee time to time, for each subject.
  - 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	10 questions –	5 marks

<ul> <li>b) Part – B of Mid Test will have 3 questions (1 from each unit) and student has to answer 2 questions</li> </ul>	2 Questions out of 3 questions – <b>10 marks</b>
c) Part – C Mid test	Questions Paper will have 3 questions – One from each unit taken from assignment questions. Student has to answer 1 question out of 3 questions – <b>3 marks</b>
d) Assignment	Three questions from each unit- total of 9 questions to be submitted before first mid test – <b>2 marks</b> Similarly assignment – II will be given to be submitted before II Mid test and average of two assignments will be considered
e) Attendance	3 marks
f) Class notes	2 marks

The duration of examination Mid test I and Mid test II will be for two hours and for Mid test – III for a duration of  $2\frac{1}{2}$  hours

- Each Midterm examination in theory subjects will be restricted to three units, out of the total of 6 units of syllabus, i.e. Mid test– I will be on Units 1 to 3, Mid test II will be on Units 4 to 6. Mid test III will be from entire syllabus and conducted on the same day of main examination for a period of 2 ½ hours.
- Two assignments shall be given for a total weightage of 2 marks. Assignment-I for 2 Marks is to be submitted before the first mid examinations and 2 marks for assignment-II which is to be submitted before the second mid test and average of 2 assignments will be taken for 2 marks. Students will be given back the assignment before mid term examinations. Two marks are allotted for class notes which are to be signed by concerned teacher every fortnight.

Three marks for each theory course shall be given for those students who put in attendance in a graded manner as given below:

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

2.	75% and above and up to 85%	2
3.	More than 85 %	3

- Marks for attendance shall be added to each subject based on average of attendance of all subjects put together.
- Award of final sessional marks: Attendance, average marks of two assignments, marks for class notes and mid-examination marks shall be added and the total marks are awarded as final sessional marks.
- 7.1.1 The external examination question paper shall be of two parts, Part 'A' and Part 'B'.

## Pattern for External Examinations (75 marks)

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

Part-A shall have 25 marks, which is compulsory, it will have 10 short questions

Out of which 5 questions are to be set for 3 marks each and other five questions are to be set for 2 marks each.

Part-B of the question paper shall have subjective type questions for 50 marks and shall have 7 questions out of which 5 are to be answered. At least one question must appear from each Unit. And not more then 2 questions from each unit All the questions carry equal marks.

#### Pattern of Evaluation for Lab Subjects (100 marks)

It is decided to offer two labs in the I semester and two labs in the II semester of I year. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 75 marks for end examination. Out of the 25 marks for internal, the distribution is as follows :

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

The end examination 75 marks shall be conducted by 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 to experiment and calculation	- 15 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	- 75 marks

## In case computer based examinations (internal) :

1.	Flowchart and algorithms	- 05 marks
2.	Program writing and execution	- 10 marks
3.	Result and conclusions	- 05 marks
4.	Viva voce and record	- 05 marks
	Total	- 25 marks

- 7.2 Laboratory marks and the sessional marks awarded by the Department are not final. They are subject to scrutiny and scaling by the college wherever necessary. In such cases, the sessional and laboratory marks awarded by the department will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective departments as per the college norms and shall be produced to the Committee of the college as and when the same is asked for.
- 7.3 A candidate shall be deemed to have secured the minimum academic requirement in a subject/practical, if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.
- 7.4 In case the candidate does not secure the minimum academic requirement in any subject/practical (as specified in 7.3) he/she has to reappear for the End Examination in that subject/practical. The candidate can re-register, when the college is subsequently offering the subject/practical. In case the college is no longer offering the subject/practical, alternate subject/practical will be suggested by the Department Academic Council consisting of Head of Department and three other senior faculty members of the Department. However, approval has to be taken from the college Academic Committee this regard. In the event of taking another chance, the internal marks and end examination marks obtained in the previous attempt are nullified. The candidate getting re-registered shall pay tuition / other fees which will be calculated based upon the credits and the fee.

## 7.5 Technical Paper writing and seminar :

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

Semester	Subject	Credits	Internal marks	External marks
l year I sem	Technical seminar and CVV	1	50	50
l year II sem	Mini project with seminar	2	25	75
II year I sem	Project Phase – I and Seminar	10	25	75
II year II Sem	Project Phase – II and Seminar	6	50	50

There shall be technical seminar and comprehensive viva (CVV) during I year I semester and Mini Project and seminar during 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 50 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 will be conducted by the External examiner and it will be valid for 50 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 Mini project with seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

Selection of topic, literature survey	5 marks
Final report and viva	5 marks
Level of content	8 marks
Presentation	10 marks
Discussion & Involvement	8 marks
Class notes	7 marks
Attendance	7 marks
Total	50 Marks

## The evaluation format for seminar is as follows:

## 7.6 Comprehensive Viva-Voce:

There shall be a Comprehensive Viva-Voce Examination. 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. The Comprehensive Viva-Voce is valued for 50 marks. There are no internal marks for comprehensive viva voce. A candidate has to secure a minimum of 50 % of marks to be declared successful.

## 7.7 Project Seminars

In II year I semester and II semester there will be Project Phase – I and seminar, Project phase – II and seminar shall be conducted for 25 marks internal and 75 marks external. The evaluation for the project reviews shall be done in 2 stages (not less than 4 weeks between two consecutive stages) including end semester evaluation. A candidate shall secure a minimum 50% of marks 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 Departments offering the M. Tech. programme.
- 8.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.
- 8.3 After satisfying 7.2, 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.
- 8.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after successful completion of all theory and practical courses (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. After approval from the PRC, a soft copy of the thesis should be submitted for ANTI-PLAGIARISM check and the plagiarism report should be submitted to the University and be included in the final thesis. The Thesis will be accepted for submission, if the similarity index is less than 30%. If the similarity index has more than the required percentage, the student is advised to modify accordingly and re-submit the soft copy of the thesis after one month. The maximum number of re-submissions of thesis after plagiarism check is limited to TWO. The candidate has to register for the Project work and work for two semesters. After three attempts, the admission is liable to be cancelled. The college authorities are advised to make plagiarism check of every soft copy of theses before submissions.

- 8.9 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College.
- 8.10 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 favourable, the head of the department must organize for viva-voce examination.
- 8.11. If the report of the examiner is not favourable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavourable again, the thesis shall be summarily rejected. Then the candidate has to work on the thesis once again and shall be submitted to the PRC for its evaluation and further action on the matter.
- 8.12 For Project Evaluation (Viva Voce) in II Year II Sem. there are external marks of 150 for 6 credits. HoD shall submit a panel of 5 examiners, eminent in that field. Principal will appoint one of them as examiner.
- 8.13 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.
- 8.14 If the report of the examiner is favourable, Project Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who adjudicated the Thesis. Candidate has to secure minimum of 50% marks in Project Evaluation (Viva-Voce) examination.
- 8.15 If he fails to fulfill as specified in 8.12, 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.
- 8.16 The Head of the Department shall coordinate and make arrangements for the conduct of Project Viva- Voce examination.
- 9.0 Re-Admission/Re-Registration
- 9.1 Re-Admission for Discontinued Student

A student, who has discontinued the M.Tech. degree programme due to any reason whatsoever, may be considered for 'readmission' into the same degree programme (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/Practicals, or Seminar, or Technical Paper Writing or Project, etc., based on the % 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:

% of Marks Secured in a subject/Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
90% and above ( $\geq 90\%$ , $\leq 100\%$ )	O (Outstanding)	10
Below 90% but not less than 80% ( $\geq$ 80% , <90% )	A <sup>+</sup> (Excellent)	9
Below 80% but not less than 70% ( $\geq$ 70% , <80% )	A (Very Good)	8
Below 70% but not less than 60% ( $\geq$ 60% , <70% )	B <sup>+</sup> (Good)	7
Below 60% but not less than 50% ( $\geq$ 50% , <60% )	B (above Average)	6
Below 50% ( <  50% )	F (FAIL)	0
Absent	Ab	0

- 9.3 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.
- 9.4 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.
- 9.5 A Letter Grade does not imply any specific marks percentage; it is only the range of percentage of marks.
- 9.6 In general, a student shall not be permitted to repeat any Subject/ Course (s) only for the sake of 'Grade Improvement' or 'SGPA/ CGPA Improvement'.
- 9.7 A student earns Grade Point (GP) in each Subject/ Course, on the basis of the Letter Grade obtained by him in that Subject/ Course. The corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Subject/ Course.

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

- 9.8 The student passes the Subject/ Course only when he gets GP 26 (B Grade or above).
- 9.9 The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (IPCP) 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** = {  $\sum_{i=1}^{N} C_i G_i$  } / {  $\sum_{i=1}^{N} C_i$  } .... 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),  $C\Box$  is the no. of Credits allotted to the i<sup>th</sup> Subject, and  $G\Box$  represents the Grade Points (GP) corresponding to the Letter Grade awarded for that ith Subject.

9.10 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 = { $\sum_{i=1}^{M} C_i G_i$ } / { $\sum_{j=1}^{M} C_j$ } ... for all S Semesters registered

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

where 'M' is the TOTAL no. of Subjects (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' for from the 1st 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 is the no. of Credits allotted to the jth Subject, and G represents the Grade Points (GP) corresponding to the Letter Grade awarded for that jth Subject. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

		Letter	Grade	Credit
Course/Subject	Credits			
Course 1	4	А	8	4*8 = 32
Course 2	4	0	10	4*10 = 40
Course 3	4	В	6	4*6 = 24
Course 4	3	В	6	3*6 = 18
Course 5	3	A+	9	3*9 = 27
Course 6	3	В	6	3*6 = 18
	21			159
SGPA = 159/21 = 7.57				

#### Illustration of calculation of SGPA

20

#### 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

## 10.0 Award of Degree and Class

10.1 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 **88** Credits (with CGPA

 $\geq$ 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.

## *10.2 Award of Class*

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

Class Awarded	CGPA
First Class with Distinction	≥ 7.75
First Class	6.75≤ CGPA < 7.75
Second Class	6.00≤ CGPA < 6.75

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

## 11.0 Withholding of Results

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

## **12.0.** Transitory Regulations

12.1 A student who has been detained in any semester of I Year of R13/R15 Regulations due to lack of attendance, shall be permitted to join the same semester of I Year of R17 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 R17 Academic Regulations under which a student has been readmitted shall be applicable to that student from that semester.

- 12.2 Candidate detained due to shortage of attendance in one or more subjects is eligible for reregistration of maximum of two earlier or equivalent subjects at a time as and when offered.
- 12.3 The candidate who fails in any subject under R13/R15 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 R17 Academic Regulations.
- 12.4 For student readmitted to R17 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 R13/R15 regulations of his/her study including R17 Regulations.
- 12.5 If a student readmitted to R17 Regulations, has any subject with 80% of syllabus common with his/her previous regulations, that particular subject in R17 regulations will be substituted by another subject to be suggested by the university.

#### 13.0 General

- 13.1 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.
- 13.2 Credit Point: It is the product of grade point and number of credits for a course.
- 13.3 Wherever the words "he", "him", "his", occur in the regulations, they s h a l l include "she", "her".
- 13.4 The academic regulation should be read as a whole for the purpose of any interpretation.
- 13.5 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the University is final.
- 13.6 The University 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.

## 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 and sent to the University.

		SNIST Dept of IT-MTech CNIS Syllabus 2019
3.	Impersonates any other candidate in	The candidate who has impersonated shall
	connection with the examination.	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
		outsider he will be hended over to the police
		and a case is registered against him
4	Smuggles in the Answer book or	Expulsion from the examination hall and
4.	additional sheet or takes out or arranges	cancellation of performance in that subject
	to send out the question paper during the	and all the other subjects the candidate has
	examination or answer book or	already appeared including practical
	additional sheet, during or after the	examinations and project work and shall not
	examination.	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.
E	Uses chiestionship, shusing a ffree '	Concellation of the norferman in that
Э.	Uses objectionable, abusive or offensive	Cancellation of the performance in that
	to the examiners or writes to the	subject.
	avaminer requesting him to award reas	
	marks	
	Шатку.	

6.	Refuses to obey the orders of the Chief	SNIST Dept of IT-MTech CNIS Syllabus 2019 Incase of students of the college, they shall
	Superintendent/Assistant –	be expelled from examination halls and
	Superintendent/ any officer on duty or	cancellation of their performance in that
	misbehaves or creates disturbance of any	subject and all other subjects the
	kind in and around the examination hall	candidate(s) has (have) already appeared
	or organizes a walk out or instigates	and shall not be permitted to appear for the
	others to walk out, or threatens the	remaining examinations of the subjects of
	officer-in charge or any person on duty	that semester/year. The candidates also are
	in or outside the examination hall of any	departed and forfell their seals. In case of
	relations whether by words either	police and a police case is registered
	spoken or written or by signs or by	against them
	visible representation assaults the	against them.
	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	
7	examination.	
1.	Leaves the exam half taking away	expulsion from the examination half and
	script or any par there of inside or	and all the other subjects the candidate has
	outside the examination hall	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	Expulsion from the examination hall and
	the examination hall.	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
		avanamentance of the contracte of the t
		examinations of the subjects of that
		examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat

		SNIST Dept of IT-MTech CNIS Syllabus 2019
9.	If student of the college, who is not a	Student of the colleges expulsion from the
	candidate for the particular examination	examination hall and cancellation of the
	or any person not connected with the	performance in that subject and all other
	college indulges in any malpractice or	subjects the candidate has already appeared
	improper conduct mentioned in clause6	including practical examinations and project
	to 8.	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	Expulsion from the examination hall and
	examination hall.	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	Cancellation of the performance in that
	evidence, such as, during valuation or	subject and all other subjects the candidate
	during special scrutiny.	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

## Department of Information Technology SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY M. Tech (Computer Networks and Information Security) Course Structure and Syllabus-2019

I Year	I Year - I Semester												
Sno				T	n		Max.	Marks	<b>T</b> ( )				
	Code	Subject	L	Т	Р	C	Internal	External	1 otai				
1	7R101	Advanced Data Structures – PC1	2	1	-	3	25	75	100				
2	7R102	Advanced JAVA Programming- <b>PC2</b>		1	-	3	25	75	100				
3	7R103	Advanced Computer Networks – <b>PC3</b>	3	1	-	4	25	75	100				
4	7R104	Principles of Information Technology- <b>PC4</b>	3	-	-	3	25	75	100				
5		Professional Elective – I	3	-	-	3	25	75	100				
6	7R110	Research Methodologies and Intellectual Property Rights	2	-	-	2	25	75	100				
7	7HC19	Ethics, Morals, Gender Sensatisation and Yoga*(Grade Evaluation) Audit Course-1	2	-	-	0	25	75	100				
8	7R111	Lab 1-JAVA Programming	-	-	4	2	25	75	100				
9	7R112	Technical Seminar and Comprehensive Viva Voce	-	-	2	1	100	-	100				
		<b>Total Credits</b>	17	3	6	21	300	600	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

Codo	Subject		Т	Р	C	Max.	Marks	Total
Code	Subject	L	L	r	C	Internal	External	Totai
7R201	Information Security, Management and Standards <b>PC-5</b>	3	1	-	4	25	75	100
7R202	Wireless Networks and Mobile Computing- <b>PC6</b>	2	1	-	3	25	75	100
7R203	Network Security-PC7	3		-	3	25	75	100
7HC18	English For Research Paper Writing- AuditCourse-2	2	-	-	0	25	75	100
	Professional Elective – II	3	-	_	3	25	75	100
	Professional Elective – III	3	-	-	3	25	75	100
7R214	Technical Seminar - II	-	-	2	1	100	-	100
7R215	Comprehensive Viva Voce	-	-	2	1	25 75 10		100
7R216	Mini Project with Seminar	-	-	*Evaluation in II year I sem				
7R217	Lab2-Information Security through Java	-	-	4	2	25	75	100
	Total Credits	14	2	8	20	300	600	900

] ]	Professional Elective – II	Professional 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

Codo	Subject	т	D	Cuadita	Max.	Total	
Code	Subject	L	r	Creans	Internal	External	
7R301	Data Base Security and Access Control <b>PC8</b>	3	-	3	25	75	100
	Open Elective		-	3	25	75	100
7R302	Mini Project with Seminars (Project Conducted in summer)	-	6	3	25	75	100
7R303	Project Phase -1 And Seminar	-	10	5	25	75	100
	Total Credits	6	16	14	100	300	400

Code	OPEN ELECTIVE
	Cost Management of Engineering Projects
7ZC03	Banking, Operations, Insurance and Risk Management
7WC30	Operation Research
7T217	Embedded Systems
7QC47	BioInformatics

## II Year – II Semester

Code	Code Subject		Р	C	Max.	Marks	Total
Couc			L	C	CIE	SEE	
7R401	Main Project Phase-2 and Seminar	-	12	6	25	75	100
7R402	Dissertation	-	-	7	50	150	200
	Total Credits	-	12	13	75	225	300

a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X			X		

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

CODE: 7R101	L	ТР	С
	2	1 -	3

## **Course Objectives:**

To impart the basic concepts of data structures and algorithms and understand concepts about searching and sorting techniques, basic concepts about stacks, queues, lists, trees and graphs. To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

#### **Course Outcomes:**

- 1. Choose the data structures that effectively model the information in a problem and be able to Judge efficiency trade-offs among alternative data structure implementations or combinations.
- 2. Apply algorithm analysis techniques to evaluate the performance of an algorithm and to compare data structures and be able Implement and know when to apply standard algorithms for searching and sorting.
- 3. Recognize and apply design patterns, and make judgments about when a particular pattern will improve a design.
- Design, implement, test, and debug programs using a variety of data structures including buffer pools, hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and Btrees.
- 5. Select appropriate methods for organizing data files and implement file-based data structures.
- 6. Apply object-oriented design principles to data structures in medium-scale software systems. Apply design guidelines to evaluate alternative software designs.

#### 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 methodapplications- 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, 2<sup>nd</sup> edition, S. Sahani, Universities Press.
- 2. Data Structures and algorithms in Java, 3<sup>rd</sup> edition, Adam Drozdek, Cengage Learning.
- 3. Data structures and algorithms in Java,3<sup>rd</sup> 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, 3<sup>rd</sup> 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.

SNIS	SNIST Dept of IT-MTech CNIS Syllabus 2019											
a	b	с	d	e	f	g	h	i	j	k		
X			X	X								

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

CODE: 7R102	L	Т	Р	С
	2	1	-	3

**Course Objective:** To provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications.

#### **Course Outcomes:**

- 1. Write programs based upon java concepts. And Generate an application based upon the concepts of java & advance java.
- 2. Understand, analyze and apply the role languages like HTML, CSS, XML, JavaScript and protocols in the workings of web and web applications.
- 3. Understand about network and security programming using Java . And To understand the application of dynamic page functionality in web pages using CGI, Servlets, JSP, ASP.
- 4. Create and communicate between client and server using Java and create a good, effective and dynamic website.
- 5. Create a static website using HTML and add dynamic functionality to it by using java Script.
- 6. Implement the advanced concepts of java such as servelets & jsp to create dynamic web pages & add functionality to the WebPages by using XML.

## 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 3<sup>rd</sup> edition, WILEY Dreamtech .
- 2. Java Server Pages, Hans Bergsten, SPD, O'Reilly.

#### **REFERENCE BOOKS**:

- 1. Programming the world wide web,4<sup>th</sup> 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 others Apress (dreamtech).
- 6. Java Server Programming , Ivan Bayross and others, The X Team, SPD
- 7. Web Warrior Guide to Web Programming-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 7<sup>th</sup> Edition, Herbert Schildt., TMH.
- 12. Professional Jakarta Struts James Goodwill, Richard Hightower, Wrox Publishers.

a	b	С	d	e	f	g	h	i	ij	k
X	X							X		

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

L	Т	Р	C
3	1	-	4

## **CODE: 7R103**

**Course Objective**: This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

#### **Course Outcomes:**

- 1. To master networking and Internet concepts and be familiar with OSI Model and TCP/IP model.
- 2. To be able to detect networking errors, learn correction techniques
- 3. To explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
- 4. To understand Internet addressing IPv4 and IPv6 and Internet protocols
- 5. To understand wireless networking and to Develop new protocols in networking.
- 6. Will be able to build new virtual private networks. select appropriate quality of service mechanisms for a give computer network

## 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

SNIST Dept of IT-MTech CNIS Syllabus 2019										
X	X							X		

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

#### **CODE: 7R104**

L	Т	Р	С
3	-	-	3

**Course Objective:** This course is aimed at giving basic understanding about system security which covers a broad spectrum of security topics and is based on real-life examples to create system security interest in the students. A balanced mix of technical and managerial issues makes this course appealing to attendees who need to understand the salient facets of information security basics and the basics of risk management.

#### **Course Outcomes:**

- 1. At the end of the course, the students have firm understanding on basic terminology and concepts related to network and system level security,
- 2. basics of computers and networking including Internet Protocol, routing, Domain Name Service, and network devices.
- 3. They are also exposed to basic cryptography, security management, and network security techniques.
- 4. They also look at policies as a tool to effectively change an organization's culture towards a better secure environment.
- 5. Students will be able to understand the importance of security at different layers of SSL, TLS,SET and PGP
- 6. In the end, the students put it all together in the form of a case study for designing and auditing a security system at conceptual level.

#### 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

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

**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

### $\mathbf{UNIT} - \mathbf{VI}$

**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, 2<sup>nd</sup> Edition
- 2. Cryptography and Network Security : William Stallings, Pearson Education,4<sup>th</sup> Edition

### **REFERENCE BOOKS:**

- 1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
- 2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2<sup>nd</sup> 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, 1<sup>st</sup> Edition.

SNIST Dept of IT-MTech CNIS Syllabus 2019										
a	b	c	d	e	f	g	h	i	j	k
X	X							X		

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

## **CODE: 7R105**

L	Т	Р	С
3	-	-	3

**Course Objective:** The course aims to train students how to use hacking tools and techniques to assess the security posture of a given IT network or system. Upon completing the course, students will be able to scan, test, hack and secure IT systems. They will be given hands-on training in penetration testing and other testing methodologies to ensure the security of an organization's information systems.

## **Course Objectives:**

- 1. Understand the students how to scan, test, hack and secure their own systems.and practical experience with the current essential security systems.
- 2. Students will begin by understanding how perimeter defenses work and then be lead into scanning and attacking their own networks, no real network is harmed.
- 3. Students then learn how intruders escalate privileges and what steps can be taken to secure a system.
- 4. Students will also learn about Intrusion Detection, Policy Creation, Social Engineering, DDoS Attacks, Buffer Overflows and Virus Creation.
- 5. Understand Ethical hacking and Leality in depth
- 6. Student will be able to understand Scanning, types of Scanning in depth

# 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

SNIST Dept of IT-MTech CNIS Syllabus 2019

 CEH official Certfied Ethical Hacking Review Guide, Wiley India Edition
 Certified Ethical Hacker: Michael Gregg, Pearson a c d e f g h i j k b Education

SNIST	Dep	t of I	Γ-MT	ech C	NIS	Sylla	bus 2	019		
		x	x		x	x			x	

Р

С

3

L

3

Т

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

### **CODE: 7R106**

**Course Objective**: This course is designed to expand students' knowledge and skills gained in database management courses and look in depth at data warehousing and data mining methods. The course examines the database architecture and technologies required for solving complex problems of data and information management, information retrieval, and knowledge discovery facing modern organizations.

### **Course Outcomes:**

- 1. To introduce students to the basic concepts and techniques of Data Mining
- 2. To develop skills of using recent data mining software for solving practical problems.
- 3. To gain experience of doing independent study and research by learning Data Cube Computation.
- 4. To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems
- 5. Develop and apply critical thinking, problem-solving, and decision-making skills.
- 6. Develop and apply enthusiasm for learning. Class participation is encouraged in this course. Enriching

### 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, kmeans 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, 2<sup>nd</sup> 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, 2<sup>nd</sup> 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.

a	b	c	d	e	f	g	h	i	j	k
X	X			X		X				X

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

#### **Professional Elective I**

L	Т	Р	С
3	-	-	3

#### **CODE:7R107**

**Course Objective**: compare alternative tools and approaches for Intrusion Detection through quantitative analysis to determine best tool to approach to reduce risk from intrusion. Identify and describe the parts of all intrusion detection system and characterize new and emerging IDS technologies according to the basic capabilities all intrusion detection system share.

Course Outcomes:

- 1. Determine which networks are alive and Discover which operating systems are in use on a network.
- 2. Determine which patches have not been updated
- 3. Identify TCP and UDP services running or listening on a network
- 4. Detect, identify, resolve and document network intrusions and Detect privilege escalation, remote control and root kits.
- 5. Discover rouge wireless access points, rouge sniffers and rouge VPNs on a network
- 6. Implement procedures to secure network systems, to monitor and evaluate audit logs and to set administrative alerts

#### 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," 1<sup>st</sup> Edition, Prentice Hall, 2003.

### **REFERENCES:**

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

a	b	c	d	e	f	g	h	i	j	k
X	х			Х		Х				Х

# M.Tech I YEAR I SEMESTER Computer Networks and Information Security Information Theory and Coding Professional Elective-I

L	Т	Р	C
3	-	-	3

### **CODE:7R108**

### **Course Objective:**

The objective of this course is to provide an insight to information coding techniques, error correction mechanism. Various compression techniques for text, video and image are covered for thorough knowledge of efficient information conveying systems.

### **Course Outcomes:**

- 1. Design the channel performance using Information theory.
- 2. Comprehend various error control code properties
- 3. Apply linear block codes for error detection and correction
- 4. Apply convolution codes for performance analysis & cyclic codes for error detection and correction.
- 5. Design BCH & RS codes for Channel performance improvement against burst errors.
- 6. Finding the most likely sequence of hidden states & sequence of observed events, especially in the context of Markov information sources and hidden Markov model

# 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**

 R Bose, "Information Theory, Coding and Crptography", TMH 2007
 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: <u>http://www.annaunivedu.in/2012/06/it2302-information-theory-and-coding.html#ixzz5b2to60MB</u>

a	b	c	d	e	f	g	h	i	j	k
х	X							X		

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

CODE: 70100	L	Т	Р	С
	3	-	-	3

**Course Objectives:** The objective of this course is to elaborate on the fundamentals of information retrieval (IR), study of indexing, search, relevance, classification, organisation, storage, browsing, visualization, etc. Focus on prominent computer algorithms and methods used in the field from a computer scientist's perspectives.

### **Course Outcomes:**

- 1. Understanding the basics of Information retrieval like what is a corpus, what is precision and recall of an IR system
- 2. Understanding the data structures like Inverted Indices used in Information retrieval systems
- 3. Understanding the basics of web search
- 4. Understanding the different techniques for compression of an index including the dictionary and its posting list
- 5. Understanding the different components of an Information retrieval system
- 6. Developing the ability of develop a complete IR system from scratch

# 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, 2<sup>nd</sup> Edition, Springer, 2004.

a	b	с	d	e	f	g	h	i	j	k
X				X	X	X	X	Х	X	X

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

L	Т	Р	С
2	-	-	2

## **CODE: 7R110**

### **Course Objectives:**

The course has been developed with orientation towards research related activities and recognizing the ensuing knowledge as property. It will create consciousness for Intellectual Property Rights and its constituents. Learners will be able to perform documentation and administrative procedures relating to IPR in India as well as abroad.

### **Course Outcomes:**

At the end of the course, students will demonstrate their ability to:

1. Understanding and formulation of research problem.

- 2. Analyze research related information.
- 3. Understand plagiarism and follow research ethics

4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

5. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

### 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.

### 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 **a b c d i** 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, 3<sup>rd</sup> 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

SNIST	Dep	t of I	Γ-MT	ech C	NIS :	Syllal	bus 2	019		
					X			X		

## M.Tech I year I semester Computer Networks and Information Security Audit Course: Ethics, Morals, Gender Sensitization and Yoga (Common to all Branches)

Course Code: 7HC19	L	Т	P/D	С
	2	-	-	0

## **COURSE OBJECTIVES**

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.

## **Course Outcomes:**

- 1. Provide a critical perspective on the socialization of men, women and transgender and to have a wider understanding of Ethics.
- 2. Acknowledge women's role at home and at work.
- 3. help students reflect critically on gender violence, understand engineering ethics and an engineer's responsibility for safety.
- 4. Perceive gender literacy and understand the importance of gender perspective.
- 5. Understand Rules and principles set by the society in a customary way.
- 6. 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

#### SNIST Dept of IT-MTech CNIS Syllabus 2019 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 Tamilnadu* by Anandi S and Swamynathan P
- 6. Feminism is for Everybody; Passionate Politics by Bell Hooks
- 7. Gender by Geetha V
- 8. "Growing up Male" in what is worth teaching by K Kumar

SNIST Dept of IT-MTech CNIS Syllabus 2019

- 9. The Lenses of Gender: Transforming the Debate on Sexual Inequality Sandra Lipsitz Bem
  10. The Lenses Of Gender by ANNE MURPHY

a	b	с	d	e	f	g	h	i	j	k

SNIST	SNIST Dept of IT-MTech CNIS Syllabus 2019											
	X X X X X											

С

2

4

### M.Tech I year I semester Computer Networks and Information Security JAVA PROGRAMMING LAB L T P

-

-

## CODE: 7R111

**Course Objectives:** To build software development skills using java programming for real world applications and to implement frontend and backend of an application and implement classical problems using java programming.

### **Course Outcomes:**

- 1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- 2. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- 3. Be aware of the important topics and principles of software development.
- 4. Have the ability to write a computer program to solve specified problems.
- 5. Be able to use the Java SDK environment to create,
- 6. Debug and run simple Java programs.

## 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: <u>www.amazon.com</u> 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.

a	b	c	d	e	f	g	h	i	j	k
Х	X		X	X	X		X	X		X

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

L	Т	Р	С
-	-	4	2

### **CODE: 7R112**

## 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
- **5.** Habituated to read pervasively
- 6. Develop appropriate techniques for problem solving.

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.

a	b	c	d	e	f	g	h	i	j	k
		X		X		X		X	X	

#### M.Tech I year II semester Computer Networks and Information Security INFORMATION SECURITY MANAGEMENT AND STANDARDS-PC5 L T P C 3 1 - 4

### CODE:7R201

**Course Objective:** Emphasis on the management of information security efforts as well as progression in adopting this field within IT organization. This course also discusses various administrative, technical, governance, regularity and policy aspects of Information Security Management.

### **Course Objectives:**

- 1. Ability to conduct research and to utilize analytical skills in articulating information technology investment strategies that align with business strategies.
- 2. Understanding elements of organizational function processes, work practices and human resource capital as integrated components to address technical, logistical and business challenges and to provide paradigm shift in IT service delivery and to explore alternative opportunities to contain cost without impacting organizational mission.
- 3. Students will demonstrate effective oral and writing communication skills necessary to be effective and to compete at global business environment.
- 4. Students will demonstrate an ability to understand sourcing issues involving global IT providers and terms.
- 5. Students will apply this knowledge for selecting and evaluating information technology vendors, partners and service providers to augment in-house skills.
- 6. Students will develop the necessary skills to examine security management progression within an organization including training, policy development, governance, organizational model, risk assessment and mitigation, security management models as well as integration of project management techniques. And Understands Legal, Ethical, and professional Issues in Information Security

### 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

1

2

a	b	c	d	e	f	g	h	i	j	k
X	X	X						X		

С

3

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

## **CODE : 7R202**

**Course Objective :** Acquire solid knowledge on mobile networks and mobile computing and acquire experience and capability to team work and become familiar with mobile game development

### **Course Outcomes :**

- 1. Able to apply advanced data communicating methods and networking protocols for wireless and mobile environments
- 2. Able to utilize and employ application frameworks for developing mobile applications including under disconnected and weakly connected environment
- 3. To create web sites suitable for mobile environments
- 4. Able to select components and networks for particular application
- 5. Able to creatively analyze mobile and wireless networks
- 6. Able to critically analyze security issues of mobile and wireless computing systems. To design and implement simple mobile games

# 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 tuning 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, 2<sup>nd</sup> 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.

	a	b	c	d	e	f	g	h	i	j	k
I		X	X		X	X			X		

Т

-

3

Р

С

3

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

**CODE :7R203** 

**Course Objective :** Students are expected to demonstrate the ability to: Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.

Course Outcomes: Students are expected to demonstrate the ability to:

- 1. Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
- 2. Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.
- 3. Analyze existing authentication and key agreement protocols, identify the weaknesses of these protocols.
- 4. Download and install an e-mail and file security software, PGP, and efficiently use the code to encrypt and sign messages
- 5. Develop SSL or Firewall based solutions against security threats, employ access control techniques to the existing computer platforms such as Unix and Windows NT.
- 6. Write an extensive analysis report on any existing security product or code, investigate the strong and weak points of the product or code.

### 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 Vulnerabilities **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

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

**Web Services Security:** Motivation, Technologies for Web Services: XML, SOAP, WSDL and UDDI, SSI, 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, 2<sup>nd</sup> 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, 2<sup>nd</sup> Edition, Wiley India
- 5. Computer Evidence: Collection & Preservation, Christopher L.T.Brown, Firewall Media

a	b	С	d	e	f	b	h	i	·j	k

### M.Tech I year II semester Computer Networks and Information Security AUDIT COURSE - 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.
- Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

a	b	c	d	e	f	g	h	i	j	k
	X	X		X				X		

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

## **Professional Elective II**

	L	Т	Р	С
CODE :7R204	3	-	-	3

## **Course Objective:**

This course will cover the concept of security, types of attack experienced, encryption and authentication for deal with attacks, what is data compression, need and techniques of data compression

Course Outcomes:

- 1. Will be able to understand the concept of security, types of attack experienced.
- 2. Will be able to develop encryption and authentication techniques to deal with attacks,
- 3. Ability to understand and develop techniques of data compression .
- 4. Will have the knowledge of Plaintext, cipher text, RSA and other cryptographic algorithm
- 5. Develop Key Distribution, Communication Models,
- 6. Ablity to understand and develop Various models for data compression .

# Unit 1:

### **Intrduction to Security:**

Need for security, security approaches, Principles of Security, Types of Attachs, Encryption Techniques-Plain Text, Cypher Text, Substitution & Transposition techniques, Encryption & Decryption, Types of attacks, Key range & Size.

# Unit II:

Symmetric & Asymmetric Key Cryptography: Algorithm types & Modes, RSA, Symmetric DES IDEA, Differential & Linear Cryptanalysis, & Asymmetric Key, Digital Signature, Knapsack Algorithm. **User Authentication Mechanism:** Authentication basics, Passwords Authentication tokens, Certificate based & Biometric authentication, Firewall.

# Unit III:

**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 IV:

**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 V:

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 VI:

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.

a	b	c	d	e	f	g	h	i	j	k
	X			X			X	X		X

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

### **Professional Elective II**

	L	Т	Р	С
CODE : 7R205	3	-	-	3
Course Obiective:				

Learn the basic theory behind machine learning. Understand a range of machine learning algorithms along with their strengths and weaknesses; formulate machine learning techniques corresponding to various applications. Analyze the appropriate machine learning technique for a given problem

### **Course Outcomes:**

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

- 1. Formulate machine learning techniques corresponding to various applications.
- 2. Understand the concepts of Classification and regression models and their applicability
- 3. Learn the popular clustering algorithms and their parameters
- 4. Understand basic computational Learning Theory using PAC lLearnability and Instance Based Learning
- 5. Apply machine learning algorithms for solving problems of moderate complexity using Gradient Descent Algorithm, Random Forest Algorithm for Predictive Analytics
- 6. Understand the Explanation based Learning and Inductive analytical approach to learning.

### 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

## **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

SNIST Dept of IT-MTech CNIS Syllabus 2019

a	b	с	d	e	f	g	h	i	j	k
X	X			X	X			X		X

## M.Tech I year II semester Computer Networks and Information Security INTRODUCTION TO DATA SCIENCE

## **Professional Elective II**

	L	Т	Р	С
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.
- 6. Students will demonstrate skill in Data Management and Apply Data Science concepts and Methods to solve problems in real world contexts and will communicate these solutions effectively.

# 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, Relational Operators, Logical Operators, Logical Operators, 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.
|   | a | b | c | d | e | f | g | h | i | j | k |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I |   | X | X |   | X |   |   |   |   |   |   |

# M.Tech I year II semester Computer Networks and Information Security DATABASE SECURITY (Professional Elective-II)

	L	Т	Р	С
CODE :7R207	3	-	-	3

### **Course Objective:**

Ensuring that the data doesn't get into the hands of unauthorized employees and understanding the threat from the attacker's perspective, you can develop effective assessment methodologies and ultimately secure what really matters from ever increasing threat.

#### **Course Outcomes:**

### The Students will be able to understand and Develop:

- 1. The fundamental concepts behind database systems
- 2. Key components within a database deployment
- 3. The integration of databases into business solutions
- 4. The process of thorough database assessment, including tools and methodologies
- 5. Techniques used by hackers to exploit database flaws and vulnerabilities
- 6. Practical assessment and attack vector considerations, through hands-on experience

# 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
- Michael Gertz, Sushil Jajodia, Handbook of Database Security : Applications and Trends, Springer, 2008

a	b	c	d	e	f	g	h	i	j	k
	X			X	X					

# M.Tech I year II semester Computer Networks and Information Security Steganography and Water Marking (Professional Elective-II)

L	Т	Р	С
3	-	-	3

### **CODE: 7R208**

# **Course Objective:**

The objective of course is to provide a insight to steganography techniques. Watermarking techniques along with attacks on data hiding and integrity of data is included in this course.

### **Course Outcomes:**

By the end of the course, the students are able to:

- 1. Realize fundamentals of data hiding and watermarking.
- 2. Analyze and design data hiding algorithms.
- 3. Hide data embedding into multimedia.
- 4. Design and assess watermarking algorithms.
- 5. understand how Digital Watermarking and Steganography works
- 6. Develop Applications for making it more secure.

# UNIT I

# **Introduction :**

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

# UNIT II

# Properties of Watermarking and Steganography

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

# UNIT III

#### Models of Watermarking:

Notation, Communications, Components of Communications Systems, Classes of Transmission Channels, Secure Transmission, Communication-Based Models 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 IV

# Steganography:

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 V

# **Steganalysis :**

Steganalysis Scenarios, Detection, Forensic Steganalysis, The Influence of the 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 VI

### **Applications :**

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. 2 nd Edition, Morgan

Kaufmann Publishers, 2008.

a	b	c	d	e	f	g	h	i	j	k
	X		X	X			X			X

# M.Tech I year II semester Computer Networks and Information Security Internet Of Things (Professional Elective-III)

L	Т	Р	С
3	-	-	3

Code: 7R209

### **Course Objectives:**

Learn Terminology, technology and applications, IoT system management using M2M (machine to machine) with necessary protocols, Python Scripting Language preferred for many IoT applications Raspberry PI as a hardware platform for IoT sensor interfacing

### Course Outcomes: After completing this course, student shall be able to

- 1. Identify the implementation layers of an IoT application system
- 2. Describe the management of an IoT system using necessary protocols
- 3. Design, Develop and Illustrate IoT applications using Raspberry PI platform and Python Scripting
- 4. Implement web based services on IoT devices
- 5. Raspberry PI as a hardware platform for IoT sensor interfacing
- 6. Implementation of web based services for IoT with case studies

# 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
- Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

a	b	c	d	e	f	g	h	i	j	k
	X		X			X		X		

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

L T P C 3 - - 3

# Code:7R210

### **Course Objectives:-**

After taking this course, you should be able to:

Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, ...), understand the difference between expressions and statements, understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries, understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.

# **Course Outcomes:**

- Gains exposure towards Python versions and their specifications.
- Build programs using primitive data types.
- Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
- Writes applications using OO features of Python
- Write applications using Files.
- Hands on exposure on NumPy/Tkinter/Plotpy modules.

# 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 ExceptionHandling :Exception,Exception Handling,Except clause ,Try ? finally clause User DefinedExceptionsException

**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.

a	b	c	d	e	f	g	h	i	j	k
X	X							х		

LTPC

3

3 - -

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

CODE:7R211

#### **Course Objectives:**

To provide an overview of Wireless Communication networks area and its applications in communication engineering. Appreciate the contribution of Wireless Communication networks to overall technological growth and explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks. To enable students to compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.

# **Course Outcomes:**

- 1. Provide students with a high-level understanding of how information security functions in an organization.
- 2. To master information security governance, and related legal and regulatory issues,
- 3. To master understanding external and internal threats to an organization,
- 4. To be familiarity with information security awareness and a clear understanding of its importance,
- 5. To be familiar with how threats to an organization are discovered, analyzed, and dealt with,
- 6. To master fundamentals of secret and public cryptography, To master protocols for security services

# 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.

a	b	c	d	e	f	g	h	i	j	k
	X		X	X					X	

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

**CODE:7R212** 

ARNING	L	Т	Р	C
	3	-	-	3

### **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

**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, 3<sup>rd</sup> 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.

a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X			X		

LTPC

3

3 - -

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

**CODE:7R213** 

**Course Objectives:** To provides a detailed treatment of proactive, reactive, and hybrid routing protocols in mobile wireless networks.

#### **Course Outcomes:**

- 1. Will be able to understand of the principles of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks.
- 2. understand the principles and characteristics of wireless sensor networks (WSNs).
- 3. Learn how proactive protocols function and their implications on data transmission delay and bandwidth consumption.
- 4. Learn how reactive routing protocols function and their implications on data transmission delay and bandwidth consumption.
- 5. Uunderstands how proactive routing protocols function and their implications on data transmission delay and bandwidth consumption
- 6. Learn how reactive routing protocols function and their implications on data transmission delay and bandwidth consumption. And become familiar with the mechanisms for implementing security and trust mechanisms in MANETs and WSNs. 8. Student have acquired skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations or programming of PDAs.

# 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

 Ad Hoc and Sensor Networks – Theory and Applications, *Carlos Corderio Dharma P.Aggarwal*, World Scientific Publications / Cambridge University Press, March 2006
Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010

# **REFERENCE BOOKS:**

Wireless Sensor Networks: An Information Processing Approach, *Feng Zhao, Leonidas Guibas*, Elsevier Science imprint, Morgan Kauffman Publishers, 2006, rp2009
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

a	b	c	d	e	f	g	h	i	j	k
Х	X		X				X	X		

### M. Tech I Year II semester

# Computer Networks and Information Security Technical Seminar –II

# LTPC

**CODE:7R214** 

- - 2 1

# 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
- 5. Habituated to read pervasively
- 6. Develop appropriate techniques for problem solving.

There shall be three seminar presentations during 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

#### SNIST Dept of IT-MTech CNIS Syllabus 2019

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:**

- 4. http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm
- 5. <u>http://www.cse.psu.edu/~yuanxie/advice.htm</u>
- 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

a	b	С	d	e	f	50	h	i	·j	k
X	X						X	X		X

# M.Tech I year II semester Computer Networks and Information Security COMPHREHENSIVE VIVA VOCE

Code: 7R215

L	Т	Р	С
-	-	2	1

There shall be a Comprehensive Viva-Voce in I year I Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the M.Tech course of study. The Comprehensive Viva-Voce is valued for 50 marks by the Internal Committee and for 50 marks by the External Committee.

. A candidate has to secure a minimum of 50% to be declared successful.

a	b	c	d	e	f	g	h	i	j	k
X	X	X	X				X	X		X

Syllabus for M. Tech I Year II semester

### **Computer Networks and Information Security**

#### MINI PROJECT WITH SEMINAR

**CODE : 7R216** 

L	Т	Р	С
-	-	4	2

In I year II semester, a project seminar shall be conducted for 75 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 10 marks and the end semester seminar evaluation shall carry 15 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 5 marks and the remaining marks shall be for presentation and discussion and discussion. A candidate shall secure a minimum of 75% to be declared successful.

a	b	c	d	e	f	g	h	i	j	k
	X	X		X				X	X	

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

L	Т	Р	С
-	-	4	2

### **CODE: 7R217**

#### **Course Objective**

To impart advanced knowledge in the field of information security in general and the following particular topics: computer and network security, security management, incident response, security of critical information infrastructure and legal aspects of information security. The candidate possesses special insight and expertise in information security technology, digital forensics or security management, depending on the chosen program track.

#### **Course Outcomes:**

After competing the syllabus the student will:

- 1. Possesses thorough knowledge of academic theory and methods in the field of information security.
- 2. Be capable of applying knowledge in new areas within the field of information security.
- 3. Be familiar with current state-of-the-art in the field of information security.
- 4. possesses thorough knowledge of scientific methodology, needed to plan and carry out research and development projects in the field of information security.
- 5. Appreciate the difficulties that arise when valuable information needs to be shared
- 6. identify the five leading-edge resources that have up-to-date information on information security.

# 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.

### 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: Solar Winds 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.

SNIST Dept of IT-MTech CNIS Syllabus 2019

a	b	с	d	e	f	g	h	i	j	k
	X			X		X			X	

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

### **CODE:7R301**

L-T-P-C 3 - - 3

#### **Course Objective:**

The objective of the course is to provide fundamentals of database security. Various access control techniques mechanisms were introduced along with application areas of access control techniques

#### **Course Outcomes**:

1. Carry out a risk analysis for a large database.Implement identification and authentication procedures, fine-grained access control and data encryption techniques.

2. . design and implement access control rules to assign privileges and protect data in databases

3. Set up accounts with privileges and roles and Audit accounts and the database system

4. Integrating RBAC with enterprise IT infrastructures: and develop applications for Java and Unix..

5. practice various access control theories and techniques including mandatory access control, discretionary access control,

6. Practice role-based access control.

# 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 systemfundamentals, 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.

a	b	c	d	e	f	g	h	i	j	k
X	X			X				Х	X	

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

L	Т	Р	С
3	-		3

# CODE:

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

# **Course Outcomes:**

- 1. The ability to assess Incremental cost and Opportunity cost
- 2. The ability to diagnose a project team in terms of its human dimensions and consider interventions;
- 3. The ability to use a team's creative resources to solve complex problems.
- 4. The ability to reflect on one's own role as a manager and a leader;
- 5. The ability to evaluate the project
- 6. The ability to implement quantitative techniques to estimate project cost.

# 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.

a	b	c	d	e	f	g	h	i	j	k
						X		X		

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

<b>Open Elective – I</b>	L	Т	Р	С

# 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.

### **Course Outcomes:**

- 1. Describe the new dimensions and products served by the banking system in INDIA.
- 2. Explain the credit control system and create awareness on NPA's
- 3. Apply the knowledge of Insurance concepts in real life scenarios
- 4. Recognize the importance of regulatory and legal frame work of IRDA
- 5. Identify the risk management process and methods.
- 6. Calculate the diversity of risk and return

# 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.

a	b	c	d	e	f	g	h	i	j	k
X	X			X					X	

# M.Tech IIyearI 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:

- 1. understand the application & techniques of OR & Formulate & Obtain solution problems using linear programming (LP) by different methods
- 2. understand the transportation problem their formulation and solution, understand the job sequencing under different condition
- 3. understand the significance of replacement and the techniques of replacement of various types of items
- 4. understand the Game theory concept & solutions and its industrial significance
- 5. understand the importance of queue system and various possible configuration of queues, concept of inventory system, various inventory models
- 6. 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 –  $2 \times 2$  games , m X 2 & 2 X n games -Graphical method.

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

**WAITING LINES:** Introduction, Terminology, Structure of a queue, Calling population characteristicssize, 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.

# $\mathbf{UNIT} - \mathbf{VI}$

**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

a	b	c	d	e	f	g	h	i	j	k
	X				X					

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

### **EMBEDDED SYSTEMS**

# **Open Elective – I**

Code: 7T217

L T P C 3 - -- 3

#### **Course objective :**

Undersstand embedded system concepts and architecture and programming of 8051 micro controller.

### **Course Outcomes:**

On completion of this course the student will be able to:

- 1. Understand the basics of Embedded design process
- 2. Explore the architecture of 8051 microcontrolle.
- 3. Understand assembly language programming concepts of 8051 microcontroller.
- 4. Explore interfacing of 8051
- 5. Understand the concepts of RTOS .
- 6. Explore the basic design of Real-Time Operating System.

# 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).

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

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).

# $\mathbf{UNIT} - \mathbf{VI}$

**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.

a	b	c	d	e	f	g	h	i	j	k
X	X	X							X	X

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

#### **Professional Elective – III**

Code: 7QC47

L T P C 3 - -- 3

# **Course Objective:**

To impart knowledge on basic techniques of Bioinformatics and to provide a practical description of the tools and current trends in the field including its impact on biology, computer science engineering and information technology

# **Course Outcomes:**

- **1.** Demonstrate knowledge and understanding of interdisciplinary nature of computer science, Information technology and biotechnology
- **2.** Analyze and interpret homology by using basic bioinformatics problems and their solutions
- **3.** Demonstrate the ability to solve biological problems using basic computer science Programming tools and software
- **4.** Develop the ability to identify computational problems within the living systems at molecular level
- 5. Develop the ability to evaluate the evolutionary relationships among various organisms using Computational methods.
- **6.** Gain an understanding of working in interdisciplinary teams of biologists, biochemists, medical researchers, geneticists, and allied engineering branches

# 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	Т	Р	С
-	-	6	3

In II year I semester, a project seminar shall be conducted for 75 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 10 marks and the end semester seminar evaluation shall carry 15 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 5 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 75% to be declared successful.

a	b	С	d	e	f	b	h	i	·j	k
X	X	X	X				X	X		X

# Syllabus for M. Tech II Year I semester

#### **Computer Networks and Information Security**

### **PROJECT PHASE-1 AND SEMINAR**

	L	Т	Р	С
Code: 7R303				
	-	-	10	5

In II year I semester, a project work review shall be done by PRC for 75marks 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 25 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

#### **PROJECT PHASE- II AND SEMINAR**

Code: 7R401

.

L	Т	Р	С	
-	-	12	6	

In II year II semester, a project work review shall be done by PRC for 75 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 25 marks and the end semester review shall carry 50 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.
SNIST Dept of IT-MTech CNIS Syllabus 2019

a	b	c	d	e	f	g	h	i	j	k
X	X	X	X	X	X	X	X	X	X	X

### Syllabus for M. Tech II Year II semester

#### Computer Networks and Information Security DISSERATION

Code: 7R402

# L T P C - - - 7

#### By the end of this course, students will be able to

1. The candidate possesses thorough knowledge of scientific methodology, needed to plan and carry out research and development projects in the field of information security. 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. The candidate is familiar with current state-of-the-art in the field of information security.

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. The candidate possesses advanced knowledge in the field of information security in general and the following particular topics: computer and network security, security management, incident response, security of critical information infrastructure and legal aspects of information security. The candidate possesses special insight and expertise in information security technology, digital forensics or security management, depending on the chosen program track.

A candidate is permitted to submit Project Dissertation only after successful completion of PG subjects (theory and practical), seminars, Comprehensive viva-voce, PG Project Part–I, and after 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 shall make an oral presentation before the PRC. Along with the draft thesis the candidate shall submit draft copy of a paper in standard format fit for publication in Journal / Conference, based on the project thesis, to the Head of the Department with due recommendation of the supervisor.

- Four copies of the Project Dissertation certified by the Supervisor and Head of the Department shall be submitted to the College.
- The dissertation shall be adjudicated by one examiner selected by the College. For this, Head of Department shall submit a panel of 3 examiners, who are eminent in that field, with the help of the PRC. The Chief Superintendent of the college in consultation with the college academic committee shall nominate the examiner.
- If the report of the examiner is not favorable, the candidate shall revise and resubmit the Dissertation, in the time frame as prescribed by PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected. The candidate can re-register only once for conduct of project and evaluation of Dissertation, and will go through the entire process as mentioned above. The total duration for the M.Tech program is limited to four years.

If the report of the examiner is favorable, viva-voce examination shall be conducted by a Board consisting of the Head of the Department, Supervisor and the Examiner who adjudicated the Dissertation. The Board shall jointly report the student's performance in the project work as – (a) Excellent, or (b) Good, or (c) Satisfactory, or (d) Unsatisfactory, as the case may be. In case, the student fails in the viva-voce examination, or gets the Unsatisfactory grade, he can re-appear only once for the viva-voce examination, as per the recommendations of the Board. If he fails at the second viva-voce examination, the candidate can re-register only once for conduct of project and evaluation of Dissertation, and will go through the entire process as mentioned above. The total duration for the M.Tech program is limited to four years.

## **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. Programme.

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.

#### SNIST Dept of IT-MTech CNIS Syllabus 2019

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.

#### SNIST Dept of IT-MTech CNIS Syllabus 2019

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.