M.TECH. COMPUTER SCIENCE AND ENGINEERING
(INFORMATION SECURITY)

(CBCS)

REGULATIONS, CURRICULUM AND SYLLABUS
(With effect from the Academic Year 2011 – 12)

PONDICHERY UNIVERSITY
PUDUCHERRY – 605 014.
1.0 ELIGIBILITY

Candidates for admission to the first semester of four semester M.Tech. (Computer Science and Engineering – Information Security) should have passed B.E / B.Tech in Computer Science and Engineering / Information Technology/ Electronics and Communication Engineering/ Electrical and Electronics Engineering/ Electronics and Instrumentation Engineering / Bioinformatics or MCA through regular course of study from an AICTE approved institution or an examination of any University or authority accepted by the Pondicherry University as equivalent thereto, with at least 55% marks in the degree examination or equivalent CGPA.

Note:

1. Candidates belonging to SC/ST who have a mere pass in the qualifying examination are eligible.
2. There is no age limit for M.Tech. programmes.

2.0 ADMISSION

The admission policy for various M.Tech. programmes shall be decided by the respective institutes offering M.Tech. programmes subject to conforming to the relevant regulations of the Pondicherry University.

3.0 STRUCTURE OF M.Tech. PROGRAMME

3.1 General

3.1.1. The M.Tech. Programmes are of semester pattern with 16 weeks of instruction in a semester.

3.1.2. The programme of instruction for each stream of specialization will consist of:

(i) Core courses (Compulsory)
(ii) Electives
(iii) Laboratory
(iv) Seminar
(v) Directed Study
(vi) Project work

3.1.3 The M.Tech. Programmes are of 4 semester duration.

3.1.4. Credits will be assigned to the courses based on the following general pattern:

(i) One credit for each lecture period
(ii) One credit for each tutorial period
(iii) Two credits for practical course
(iv) Two credits for seminar
(v) Twenty three credits for Project work divided into 9 credits for Phase-I and 14 credits for Phase – II

One teaching period shall be of 60 minutes duration including 10 minutes for discussion and movement.

3.1.5 Regulations, curriculum and syllabus of the M.Tech. programme shall have the approval of Board of Studies and other Boards/ Committees/ Councils, prescribed by the Pondicherry University. The curriculum should be so drawn up that the minimum number of credits and other requirements for the successful completion of the programme will be as given in Table – 1.

Table 1: Minimum credits and other requirements

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M.Tech (Full-Time)</td>
</tr>
<tr>
<td>1</td>
<td>Number of semesters</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Min. number of credits of the programme</td>
<td>72</td>
</tr>
<tr>
<td>3</td>
<td>Max. number of credits of the programme</td>
<td>75</td>
</tr>
<tr>
<td>4</td>
<td>Min. Cumulative Grade Point Average for pass</td>
<td>5</td>
</tr>
</tbody>
</table>
3.1.6 A core course is a course that a student admitted to the M.Tech. programme must successfully complete to receive the degree. A student shall register for all the core courses listed in the curriculum. Core courses in a particular specialization are offered by the department concerned.

3.1.7 Elective courses are required to be chosen from the courses offered by the department(s) in that particular semester from among the approved courses. A core course of one department may be chosen as an elective by a student from other department.

3.1.8 Each student is required to make a seminar presentation on any chosen topic connected with the field of specialization. Preparation and presentation of a seminar is intended to investigate an in-depth review of literature, prepare a critical review and
develop confidence to present the material by the student. The seminar shall be evaluated by a Department Committee constituted for this purpose, based on a report submitted by the candidate and a viva-voce conducted at the end of the semester.

3.1.9 Project work is envisaged to train a student to analyze independently any problem posed to him/her. The work may be analytical, experimental, design or a combination of both. The student can undertake the project work in the department concerned or in an industry/research laboratory approved by the Chairperson/Vice-Chairperson. The project report is expected to exhibit clarity of thought and expression. The evaluation of project work will be a continuous internal assessment based on two reviews, an internal viva-voce and an external viva-voce examination.

3.1.10 Directed study is a theory course required to be credited by each student under the close supervision of a faculty member of the department. The title of the course and syllabus are to be formulated by the designated faculty member and approved by the vice-chairperson, taking into account the broad area in which the student proposes to pursue his/her project work.

3.1.11 A student who has acquired the minimum number of total credits for the award of Degree will not be permitted to register for more courses for the purpose of improving his/her cumulative grade point average (see Table 1).

3.1.12 The medium of instruction, examination, seminar, directed study and project work will be in English.

3.2 Grading

3.2.1 Based on the performance of each student in a semester, letter grades will be awarded to each course at the end of the semester. The letter grades, the corresponding grade point and the description will be as shown in Table – 2.
TABLE 2: Letter Grade and the Corresponding Grade Point

<table>
<thead>
<tr>
<th>GRADE</th>
<th>POINTS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>10</td>
<td>EXCELLENT</td>
</tr>
<tr>
<td>A</td>
<td>9</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>GOOD</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>ABOVE AVERAGE</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>AVERAGE</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>SATISFACTORY</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>FAILURE</td>
</tr>
<tr>
<td>FA</td>
<td>-</td>
<td>FAILURE DUE TO LACK OF ATTENDANCE/Failure BY ABSENCE</td>
</tr>
</tbody>
</table>

3.2.2 A student is deemed to have completed a course successfully and earned the appropriate credit if and only if, he/she receive a grade of E and above. The student should obtain 40% of marks in end-semester examination in a subject to earn a successful grade. A subject successfully completed cannot be repeated at any time.

3.2.3 The letter grades do not correspond to any fixed absolute mark. Each student is awarded a grade depending on his/her performance in relation to the performance of other students taking or has taken the course. For example, S does not mean he/she has secured 100% or 95%, but, rather that he/she is in the top 5% of all the students who have taken / are taking the course, in the judgement of the teachers. Grades shall be awarded based on the absolute marks in a meeting of the M.Tech Programme Committee to be held not later than 10 days after the last day of semester examination. Normally, not more than 5% of the students in any written/laboratory course shall be awarded the grade S and not more than one-third awarded A grade. Average marks in the class shall normally be C grade excepting in the case of practical /project where it may be B grade.
4.0 REGISTRATION

4.1 Each student, on admission, shall be assigned a Faculty Advisor, who shall advise the student about the academic programme and counsel him/her on the choice of courses depending on his/her academic background and objective.

4.2 With the advice and consent of the Faculty Advisor, the student shall register for courses he/she plans to take for the semester before the commencement of classes. No student shall be permitted to register for courses exceeding 30 contact hours per week nor shall any student be permitted to register for any course without satisfactorily completing the prerequisites for the course, except with the permission of the teacher concerned in the prescribed format.

4.3 If the student feels that he/she has registered for more courses than he/she can handle, he/she shall have the option of dropping one or more of the courses he/she has registered for, with the consent of his/her Faculty Advisor, before the end of 3rd week of the semester. However, a student to retain his/her status should register for a minimum of 10 credits per semester.

4.4 Students, other than newly admitted, shall register for the courses of their choice in the preceding semester by filling in the prescribed forms.

4.5 The college shall prescribe the maximum number of students in each course taking into account the physical facilities available.

4.6 The college shall make available to all students a bulletin, listing all the courses offered in every semester specifying the credits, the prerequisites, a brief description or list of topics the course intends to cover, the faculty offering the course, the time and place of the classes for the course.

4.7 In any department, preference shall be given to those students for whom the course is a core-course, if, the demand for registration is beyond the maximum permitted number of students.

4.8 Normally, no course shall be offered unless a minimum of 3 students are registered.
5.0 EVALUATION

5.1 Evaluation of theory courses shall be based on 40% continuous internal assessment and 60% end-semester examination. Evaluation of laboratory course shall be based on 50% internal assessment and 50% end-semester examination. In each course, there shall be a 3 hour end-semester examination.

5.2 The seminar will be evaluated internally for 100 marks. The total marks for the project work will be 300 marks for phase-I and 400 marks for phase-II. The allotment of marks for external valuation and internal valuation shall be as detailed below:

**Seminar (Internal valuation only):** 100 Marks

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks</th>
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</thead>
<tbody>
<tr>
<td>First review</td>
<td>30</td>
</tr>
<tr>
<td>Second review</td>
<td>30</td>
</tr>
<tr>
<td>Report and Viva voce</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 marks</strong></td>
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</table>

**Project work – (Phase – I):** 300 Marks

**Internal valuation**

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks</th>
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</thead>
<tbody>
<tr>
<td>Guide</td>
<td>50</td>
</tr>
<tr>
<td>First Evaluation</td>
<td>50</td>
</tr>
<tr>
<td>Second Evaluation</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150 marks</strong></td>
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</table>

**External valuation**

<table>
<thead>
<tr>
<th>Description</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation (External Examiner Only)</td>
<td>50</td>
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<tr>
<td>Viva voce (50 for Ext. + 50 for Int.)</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150 marks</strong></td>
</tr>
</tbody>
</table>
5.2 Project work – (Phase – II): 400 Marks

<table>
<thead>
<tr>
<th>Internal valuation</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Guide</td>
<td>100 marks</td>
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<tr>
<td>First Evaluation</td>
<td>50 marks</td>
</tr>
<tr>
<td>Second Evaluation</td>
<td>50 marks</td>
</tr>
<tr>
<td></td>
<td><strong>Total 200 marks</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External valuation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Evaluation (External Examiner Only)</td>
<td>50 marks</td>
</tr>
<tr>
<td>Viva voce (75 for Ext. + 75 for Int.)</td>
<td>150 marks</td>
</tr>
<tr>
<td></td>
<td><strong>Total 200 marks</strong></td>
</tr>
</tbody>
</table>

Internal valuation should be done by a committee comprising of not less than 3 faculty members appointed by the Vice-Chairperson.

5.3 The directed study shall be evaluated internally and continuously as detailed below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Marks</th>
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</thead>
<tbody>
<tr>
<td>Test I</td>
<td>15 Marks</td>
</tr>
<tr>
<td>Test II</td>
<td>15 Marks</td>
</tr>
<tr>
<td>Assignment</td>
<td>10 Marks</td>
</tr>
<tr>
<td>Final test covering the whole syllabus</td>
<td>60 Marks</td>
</tr>
<tr>
<td>Total</td>
<td><strong>100 Marks</strong></td>
</tr>
</tbody>
</table>
5.4 The end-semester examination shall be conducted by the department for all the courses offered by the department. Each teacher shall, in the 4th week of the semester, submit to the Vice-Chairperson, a model question paper for the end-semester examination. The end-semester paper shall cover the entire course.

5.5 The department shall invite 2 or 3 external experts for evaluating the end-semester examinations and grading. Each expert will be asked to set the question paper(s) for the course(s) he/she is competent to examine for the end-semester examination based on the model question paper submitted by the teacher concerned. The teacher and the expert concerned shall evaluate the answer scripts together and award the marks to the student. If, for any reason, no external expert is available for any paper, then, the teacher concerned shall set the question paper(s) for the end-semester examination, and the teacher himself/herself shall evaluate the papers and award the marks.

5.6 In the department, after the evaluation of the end-semester examination papers, all the teachers who handled the courses and the external experts together shall meet with the M.Tech. Programme Committee (see 7.0) and decide the cut-offs for grades in each of the courses and award the final grades to the students.

5.7 Continuous internal assessment mark of 40 for a theory course shall be based on two tests (15 marks each) and one assignment (10 marks). A laboratory course carries an internal assessment mark of 50 distributed as follows: (i) Regular laboratory exercises and records – 20 marks (ii) Internal laboratory test – 20 marks and (iii) Internal viva-voce – 10 marks.

5.8 Every student shall have the right to scrutinize his/her answer scripts, assignments etc. and seek clarifications from the teacher regarding his/her evaluation of the scripts immediately after or within 3 days of receiving the evaluated scripts.

5.9 The department shall send all records of evaluation, including internal assessment for safe-keeping, to the college administration, as soon as all the formalities are completed.
5.10 At the end of the semester, each student shall be assigned a grade based on his/her performance in each subject, in relation to the performance of other students.

5.11 A student securing F grade in a core course must repeat that course in order to obtain the Degree. A student securing F grade in an elective course may be permitted to choose another elective against the failed elective course, as the case may be, in consultation with the Faculty Adviser.

5.12 A student shall not be permitted to repeat any course(s) only for the purpose of improving the grade in a particular course or the cumulative grade point average (CGPA).

5.13 In exceptional cases, with the approval of the Chairperson, PG Programme committee, make-up examination(s) can be conducted to a student who misses end-semester examination(s) due to extreme medical emergency, certified by the college Medical Officer, or due to time-table clash in the end-semester examination between two courses he/she has registered for, in that semester.

5.14 All eligible students shall appear for end-semester examinations.

5.15 No student who has less than 75% attendance in any course will be permitted to attend the end-semester examinations. However, a student who has put in 60-75% attendance in any course and has absented on medical grounds will have to pay a condonation fee of Rs.200/- for each course and produce a medical certificate from a Government Medical Officer not below the rank of R.M.O. or officer of equal grade to become eligible to appear for the examinations. A student with less than 60% attendance shall be given the grade of FA. He/She shall have to repeat that course if it is a core course, when it is offered the next time.

6.0 SUMMER TERM COURSE

6.1 A summer term course (STC) may be offered by the department concerned on the recommendations of M.Tech. Programme Committee. A summer term course is open only to those students who had registered for the course earlier and failed. No student
should register for more than two courses during a summer term. Those students who could not appear for examination due to lack of attendance will not be allowed to register for the same course offered in summer, unless, certified by the Vice-Chairperson concerned and the Principal.

6.2 Summer term course will be announced at the end of even semester. A student has to register within the stipulated time by paying the prescribed fees.

6.3 The number of contact hours per week for any summer term course will be twice that of a regular semester course. The assessment procedure in a summer term course will be similar to the procedure for a regular semester course.

6.4 Withdrawal from a summer term course is not permitted.

7.0 M.Tech. PROGRAMME COMMITTEE

7.1 Every M.Tech. Programme shall be monitored by a committee constituted for this purpose by the college. Each committee shall consist of all teachers offering the courses for the programme and two student members or 10% of students enrolled whichever is less. The HOD or a senior faculty in the rank of a Professor shall be the Vice-Chairperson, nominated by the Head of the Institution. There shall be a common Chairperson in the Rank of Professor nominated by the Head of the Institution for all the P.G. programmes offered by the institute. There can be a common coordinator in the rank of Professor nominated by the Head of the Institution.

7.2 It shall be the duty and responsibility of the committee to review periodically the progress of the courses in the programme, discuss the problems concerning the curriculum and syllabi and conduct of classes. The committee may frame relevant rules for the conduct of evaluation.

7.3 The committee shall have the right to make suggestions to individual teachers on the assessment procedure to be followed for his/her course. It shall be open to the
committee to bring to the notice of the Head of the Institution any difficulty encountered in the conduct of the classes or any other pertinent matter.

7.4 The committee shall meet at least twice a semester – first at the beginning of the semester, and second at the end of the semester. In the second meeting, the committee excluding student members but with the external experts invited by the Chairperson PG Programme Committee, shall finalize the grades of the students.

8.0 MINIMUM REQUIREMENTS

8.1 To be eligible towards continuing the Programme, a student must have earned a certain number of successful credits at the end of each semester as given in Table – 1. If he/she fails to satisfy this criterion in any semester, he/she shall be placed on scholastic probation in the succeeding semester. If he/she fails to earn the number of credits by the end of that year (including courses taken in summer), then, he/she shall be asked to discontinue the Programme.

8.2 Students are expected to abide by all the rules of the college and maintain a decorous conduct. Any deviation will be referred to the Head of the Institution for suitable action.

8.3 No student who has any outstanding dues to the college, hostel, library or laboratory or against whom any disciplinary action is contemplated/ pending, will be eligible to receive his/her degree.

9.0 DECLARATION OF RESULTS, RANK AND ISSUE OF GRADE CARD

9.1 The PG Programme (CBCS) office shall display the grades as soon as possible after the finalization of the grades. The student shall have the right, for a look at the evaluated examination scripts and represent to the M.Tech. Programme Committee for review if he/she feels aggrieved by the evaluation within a week from the commencement of succeeding semester classes.
9.2 The College shall issue at the beginning of each semester a grade card to the student, containing the grades obtained by the student in the previous semester(s) and his/her Grade Point Average (GPA) and his/her Cumulative Grade Point Average (CGPA).

9.3 The grade card shall list:

a) Title of the course(s) taken by the student.
b) Credits associated with each course.
c) Grade secured by the student.
d) Total credits earned by the student in that semester.
e) GPA of the student.
f) Total credits earned by the student till that semester and
g) CGPA of the student.

9.4 The GPA shall be calculated as the weighted average of the Grade Points weighted by the credit of the course as follows:

The product of the credit assigned to each course and the grade point associated with the grade obtained in the course is totaled over all the courses and the total is divided by the sum of credits of all the courses and rounded off to two decimal places.

For example, a student securing grade A in a 4 credit course, grade B in a 2 credit course, grade S in a 3 credit course and grade F in a 3 credit course, will have a GPA as:

\[
\frac{(9 \times 4 + 8 \times 2 + 10 \times 3 + 0 \times 3)}{(4+2+3+3)} = \frac{82}{12} = 6.83/10.0
\]

The sum will cover all the courses the student has taken in that semester, including those in which he/she has secured grade F. Grades FA are to be excluded for calculating GPA and CGPA.

9.5 For computing CGPA, the procedure described in 9.4 is followed, except, that the sum is taken over all the courses the student has studied in all the semesters till then. If
a student has repeated any course, the grade secured by him/her in the successful attempt only will be taken into account for calculating CGPA.

9.6 To convert CGPA into percentage marks, the following formula shall be used:

\[ \text{% Mark} = (\text{CGPA} - 0.5) \times 10 \]

9.7 A candidate who satisfies the course requirements for all semesters and passes all the examinations prescribed for all the four semesters within a maximum period of 10 semesters reckoned from the commencement of the first semester to which the candidate was admitted shall be declared to have qualified for the award of degree.

9.8 A candidate who qualifies for the award of the degree shall be declared to have passed the examination in **FIRST CLASS** with **DISTINCTION** upon fulfilling the following requirements:

(i) Should have passed all the subjects pertaining to semesters 1 to 4 in his/her first appearance in 4 consecutive semesters starting from first semester to which the candidate was admitted.

(ii) Should not have been prevented from writing examinations due to lack of attendance

(iii) Should have secured a CGPA of 8.50 and above for the semesters 1 to 4.

9.9 A candidate who qualifies for the award of the degree by passing all the subjects relating to semesters 1 to 4 within a maximum period of 6 consecutive semesters after his/her commencement of study in the first semester and in addition secures CGPA not less than 6.5 shall be declared to have passed the examination in **FIRST CLASS**.

9.10 All other candidates who qualify for the award of degree shall be declared to have passed the examination in **SECOND CLASS**.

9.11 A student with CGPA less than 5.0 is not eligible for the award of degree.

9.12 For the award of University rank and gold medal, the CGPA secured from 1\textsuperscript{st} to 4\textsuperscript{th} semester should be considered and it is mandatory that the candidate should have passed all the subjects from 1\textsuperscript{st} to 4\textsuperscript{th} semester in the first appearance and he/she should
not have been prevented from writing the examination due to lack of attendance and should not have withdrawn from writing the end-semester examinations.

10.0 PROVISION FOR WITHDRAWAL

A candidate may, for valid reasons, and on the recommendation of the vice-chairperson and chairperson be granted permission by the Head of the Institution to withdraw from writing the entire semester examination as one unit. The withdrawal application shall be valid only if it is made earlier than the commencement of the last theory examination pertaining to that semester. Withdrawal shall be permitted only once during the entire programme. Other conditions being satisfactory, candidates who withdraw are also eligible to be awarded DISTINCTION whereas they are not eligible to be awarded a rank/ gold medal.

11.0 TEMPORARY DISCONTINUATION FROM THE PROGRAMME

If a candidate wishes to temporarily discontinue the programme for valid reasons, he/she shall apply to the Chairperson, PG Programme committee, through the Head of the department in advance and secure a written permission to that effect. A candidate after temporary discontinuance may rejoin the programme only at the commencement of the semester at which he/she discontinued, provided he/she pays the prescribed fees. The total period of completion of the programme reckoned from the commencement of the first semester to which the candidate was admitted shall not in any case exceed 8 consecutive semesters including the period of discontinuance.

12.0 POWER TO MODIFY

12.1 Notwithstanding anything contained in the foregoing, the Pondicherry University shall have the power to issue directions/ orders to remove any difficulty.

12.2 Nothing in the foregoing may be construed as limiting the power of the Pondicherry University to amend, modify or repeal any or all of the above.

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M.TECH COMPUTER SCIENCE AND ENGINEERING

(Information Security)

CURRICULUM AND SCHEME OF EXAMINATION

(Total number of credits required for the completion of the programme: 72)

SEMMESTER – I

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credits</th>
<th>Evaluation (marks)</th>
</tr>
</thead>
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<td>L  T  P</td>
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<tr>
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<td>CORE – I</td>
<td>3 1 0 4</td>
<td>40 60 100</td>
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<tr>
<td>2.</td>
<td>CORE – II</td>
<td>3 1 0 4</td>
<td>40 60 100</td>
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<td>3.</td>
<td>CORE – III</td>
<td>3 1 0 4</td>
<td>40 60 100</td>
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<td>4.</td>
<td>Elective – I</td>
<td>3 0 0 3</td>
<td>40 60 100</td>
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<td>5.</td>
<td>Elective – II</td>
<td>3 0 0 3</td>
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<td>6.</td>
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<td>7.</td>
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<td>- - 3</td>
<td>2 100 - 100</td>
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23 340 360 700

SEMMESTER – II

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credits</th>
<th>Evaluation (marks)</th>
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<td>L  T  P</td>
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<td>CORE – IV</td>
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<td>2.</td>
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<td>CORE – VI</td>
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<td>4.</td>
<td>Elective – IV</td>
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<td>40 60 100</td>
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<td></td>
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<td>5.</td>
<td>Elective – V</td>
<td>3 0 0 3</td>
<td>40 60 100</td>
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### SEMESTER – III

<table>
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<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credits</th>
<th>Evaluation (marks)</th>
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<td>CS 993</td>
<td>Project Phase-I</td>
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<td>2.</td>
<td>CS 994</td>
<td>Directed Study</td>
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### SEMESTER – IV

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Credits</th>
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</table>

LIST OF CORE SUBJECTS:

- CS 951 MATHEMATICAL FOUNDATIONS OF INFORMATION SECURITY
- CS 952 ADVANCED DATA STRUCTURES AND ALGORITHMS
- CS 953 INTERNALS OF OPERATING SYSTEMS
- CS 954 NETWORK SECURITY
- CS 955 CYBER LAW AND SECURITY POLICIES
- CS 956 COMPUTER SECURITY, AUDIT ASSURANCE AND RISK MANAGEMENT
**LIST OF ELECTIVE SUBJECTS:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Name</th>
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<tbody>
<tr>
<td>CS961</td>
<td>ADVANCED DATABASE TECHNOLOGY</td>
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<tr>
<td>CS962</td>
<td>AGENT TECHNOLOGY</td>
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<tr>
<td>CS963</td>
<td>BIOMETRIC SECURITY</td>
</tr>
<tr>
<td>CS964</td>
<td>INFORMATION THEORY AND CODING</td>
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<tr>
<td>CS965</td>
<td>APPLIED CRYPTOGRAPHY</td>
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<tr>
<td>CS966</td>
<td>DEPENDABLE DISTRIBUTED SYSTEMS</td>
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<tr>
<td>CS967</td>
<td>DESIGN OF EMBEDDED SYSTEMS</td>
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<tr>
<td>CS968</td>
<td>FUNDAMENTALS OF FINANCIAL MANAGEMENT</td>
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<tr>
<td>CS969</td>
<td>ACCESS CONTROL AND IDENTITY MANAGEMENT SYSTEM</td>
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<tr>
<td>CS970</td>
<td>INFORMATION SECURITY POLICIES IN INDUSTRIES</td>
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<tr>
<td>CS971</td>
<td>MOBILE WIRELESS SECURITY</td>
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<tr>
<td>CS972</td>
<td>SECURITY ASSESSMENT AND VERIFICATION</td>
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<td>CS973</td>
<td>SECURE SOFTWARE ENGINEERING</td>
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<tr>
<td>CS974</td>
<td>SECURED NETWORK PROTOCOLS</td>
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<td>CS975</td>
<td>SECURITY THREATS</td>
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<td>CS976</td>
<td>STEGANOGRAPHY AND DIGITAL WATERMARKING</td>
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<td>CS977</td>
<td>TRUST MANAGEMENT IN E-COMMERCE</td>
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<tr>
<td>CS978</td>
<td>BANKING TECHNOLOGY MANAGEMENT</td>
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<tr>
<td>CS979</td>
<td>GAME THEORY</td>
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<tr>
<td>CS980</td>
<td>DESIGN OF SECURED ARCHITECTURES</td>
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<tr>
<td>CS981</td>
<td>MULTICORE ARCHITECTURE AND PARALLEL ALGORITHMS</td>
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<tr>
<td>CS982</td>
<td>ETHICAL HACKING</td>
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<tr>
<td>CS983</td>
<td>OBJECT ORIENTED SOFTWARE ENGINEERING</td>
</tr>
<tr>
<td>CS984</td>
<td>DISTRIBUTED SYSTEMS SECURITY</td>
</tr>
</tbody>
</table>
UNIT I

UNIT II

UNIT III

UNIT IV
Primality and Factoring: Pseudoprimes – the rho (\( \gamma \)) method – Format factorization and factor bases – the continued fraction method – the quadratic sieve method.

UNIT V

Note: Theorem Proofs are excluded for examination but the statements of the theorems and solving problems are included.

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES
UNIT I

Introduction to Kernel - Architecture of the UNIX operating system, System concepts, Data structures. Buffer Cache: Buffer header, Structure of Buffer pool, Reading and writing disk blocks. Files INODES, Structure of a regular file, Directories, Super block, Inode assignment.

UNIT II


UNIT III


UNIT IV


UNIT V


REFERENCES


UNIT I
Introduction to Security in Networks – Characteristics of Networks – Intrusion – Kinds of security breaches – Plan of attack - Points of vulnerability – Methods of defense – Control measures – Effectiveness of controls

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES


CS955 - CYBER LAW AND SECURITY POLICIES

UNIT I

UNIT II

UNIT III
Information security policies and procedures: Corporate policies- Tier 1, Tier 2 and Tier3 policies - process management-planning and preparation-developing policies-asset classification policy-developing standards.

UNIT IV
Information security: fundamentals-Employee responsibilities- information classification- Information handling- Tools of information security- Information processing-secure program administration.

UNIT V

REFERENCES

UNIT I

UNIT II

UNIT III

UNIT – IV

UNIT-V

REFERENCES
CS961 - ADVANCED DATABASE TECHNOLOGY

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES:

CS962 - AGENT TECHNOLOGY

UNIT I
Agent Definition - History - Intelligent Agents - Agent Programming Paradigms – Agent Vs Object - Aglet - Mobile Agents – Agent Frameworks - Agent Reasoning.

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES :
CS963 - BIOMETRIC SECURITY

UNIT I
Biometrics- Introduction- benefits of biometrics over traditional authentication systems -benefits of biometrics in identification systems-selecting a biometric for a system –Applications - Key biometric terms and processes - biometric matching methods -Accuracy in biometric systems.

UNIT II

UNIT III

UNIT IV
Multi biometrics: Multi biometrics and multi factor biometrics - two-factor authentication with passwords - tickets and tokens – executive decision - implementation plan.

UNIT V
Case studies on Physiological, Behavioral and multifactor biometrics in identification systems.

REFERENCES


CS964 - INFORMATION THEORY AND CODING

UNIT I
Source Coding - Introduction to information theory, uncertainty and information, average mutual information and entropy, source coding theorem, Shannon-fano coding, Huffman coding, Arithmetic coding, Lempel-Ziv algorithm, run-length encoding and rate distortion function.

UNIT II
Channel capacity and coding - channel models, channel capacity, channel coding, information capacity theorem, random selection of codes. Error control coding: linear block codes and their properties, decoding of linear block code, perfect codes, hamming codes, optimal linear codes and MDS codes.

UNIT III
Cyclic codes - polynomials, division algorithm for polynomials, a method for generating cyclic codes, matrix description of cyclic codes, burst error correction, fire codes, golay codes, CRC codes, circuit implementation of cyclic codes. BCH codes: minimal polynomials, generator polynomial for BCH codes, decoding of BCH codes, Reed-Solomon codes and nested codes.

UNIT IV
Convolutional codes - tree codes and trellis codes, polynomial description of convolutional codes, distance notions for convolutional codes, generation function, matrix description of convolutional codes, viterbi decoding of convolutional codes, distance bounds for convolutional codes, turbo codes and turbo decoding.

UNIT V
Trellis Coded Modulation - concept of coded modulation, mapping by set partitioning, ungerboeck’s TCM design rules, TCM decoder, Performance evaluation for Additive White Gaussian Noise (AWGN) channel, TCM for fading channels.

REFERENCES:

CS965 – APPLIED CRYPTOGRAPHY

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES
CS967 DESIGN OF EMBEDDED SYSTEMS

UNIT - I
Embedded Computing - Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets

UNIT - II

UNIT - III

UNIT - IV
Processes and Operating systems - Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Exception and interrupt handling - Performance issues.

UNIT - V

REFERENCES
CS968 - FUNDAMENTALS OF FINANCIAL MANAGEMENT

UNIT I

UNIT II

UNIT III

UNIT IV
Intermediate and Long-Term Financing - The Capital Market - Long-Term Debt, preferred Stock, and Common Stock - Term Loans and Leases

UNIT V
Special Areas of Financial Management - Convertibles, Exchangeables, and Warrants - Mergers and Other Forms of Corporate Restructuring - International Financial Management

REFERENCES

UNIT I

UNIT II

UNIT III
Mandatory access control - Comparing information flow in BLP and BIBA models – Combining the BLP and BIBA models – Chinese wall problem.

UNIT IV

UNIT V
Role based access control – Hierarchical Access Control - Mapping of a mandatory policy to RABC – Mapping discretionary control to RBAC – RBAC flow analysis – Separation of Duty in RBAC – RBAC consistency properties - The privileges perspective of separation of duties – Functional specification for RBAC.

REFERENCES


UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES


CS971 - MOBILE WIRELESS SECURITY

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems. Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. Server-side programming in Java, Pervasive web application architecture, Device independent example application

REFERENCES
CS972 SECURITY ASSESSMENT AND VERIFICATION

UNIT I
Evolution of information security, information assets, security standards, organizational impacts, security certifications, elements of information security program, need for security assessment, security assessment process.

UNIT II
Security assessment planning – Business drivers, scope definition, consultant’s perspective, Client’s perspective, Development of project plan.
Initial information gathering – Initial preparation, analysis of gathered information.

UNIT III
Business process evaluation, Technology evaluation, Risk analysis, Risk mitigation.

UNIT IV

UNIT V
Information security standards, information security Legislation, formal security verification, security verification with SSL.

REFERENCES
UNIT I

UNIT II
Engineering “Just Right” Reliability - Defining “failure” for the product - Choosing a common measure for all associated systems. - Setting system failure intensity objectives -Determining user needs for reliability and availability., overall reliability and availability objectives, common failure intensity objective., developed software failure intensity objectives. - Engineering software reliability strategies. Preparing for Test - Preparing test cases. - Planning number of new test cases for current release. -Allocating new test cases. - Distributing new test cases among new operations - Detailing test cases. - Preparing test procedures

UNIT III
Executing Test - Planning and allocating test time for the current release. - Invoking test-identifying identifying failures - Analyzing test output for deviations. – Determining which deviations are failures. Establishing when failures occurred. Guiding Test - Tracking reliability growth - Estimating failure intensity. - Using failure intensity patterns to guide test - Certifying reliability. Deploying SRE - Core material - Persuading your boss, your coworkers, and stakeholders. - Executing the deployment - Using a consultant.

UNIT IV

UNIT V
Applications - Secure channel - Developing Secure Java program- more case studies. Tool support for UML Sec - Extending UML CASE TOOLS with analysis tools - Automated tools for UML SEC. Formal Foundations - UML machines - Rely guarantee specifications- reasoning about security properties.

REFERENCES
CS974 - SECURED NETWORK PROTOCOLS

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES
CS 975 - SECURITY THREATS

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

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES

UNIT I

UNIT II

UNIT III

UNIT IV
Survey of current watermarking techniques – Cryptographic and psycho visual aspects – Choice of a workspace – Formatting the watermark bets - Merging the watermark and the cover – Optimization of the watermark receiver – Extension from still images to video – Robustness of copyright making systems

UNIT V

REFERENCES
UNIT I

UNIT II

UNIT III

UNIT IV
Introduction to trusted computing platform: Overview – Usage Scenarios – Key components of trusted platform – Trust mechanisms in a trusted platform

UNIT V
Trusted platforms for organizations and individuals – Trust models and the E-Commerce domain.

REFERENCES


CS 978: BANKING TECHNOLOGY MANAGEMENT

UNIT I


UNIT II

Delivery Channels - Overview of delivery channels – Automated Teller Machine (ATM) – Phone Banking – Call centers – Internet Banking – Mobile Banking – Payment Gateways – Card technologies – MICR electronic clearing

UNIT III


UNIT IV


UNIT V

Contemporary Issues in Banking Techniques – Analysis of Rangarajan Committee Reports – E Banking - Budgeting – Banking Software’s – Case study: Analysis of Recent Core Banking Software.

References:

UNIT I

UNIT II
Non Cooperative Equilibria in Normal Games: Dominant Strategies and Social Dilemmas, Nash Equilibrium, Classical Cases in Game theory, Three person games, Introduction to Probability and Game theory, N-Person games.

UNIT III

UNIT IV
Sequential Games: Strategic Investment to Deter Entry, The Spanish Rebellion, Again, Imbedded Games – Planning Doctoral Study, Centipede Solved, Repeated play- Campers Dilemma, Pressing the shirts, Indefinitely Repeated Play – A Repeated Effort Dilemma, The Discount Factor.

UNIT V
Applications: Voting Games, Games and Experiments, Auctions, Evolution and Boundary Rational Learning.

REFERENCES

CS980 - DESIGN OF SECURED ARCHITECTURES

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES
CS981 - MULTICORE ARCHITECTURE AND PARALLEL ALGORITHMS

UNIT I

UNIT II

UNIT III
Cell Broad band engine architecture, PPE (Power Processor Element), SPE (Synergistic processing element), Cell Software Development Kit, Programming for Multicore architecture.

UNIT IV

UNIT V

REFERENCES
CS 982 – ETHICAL HACKING

UNIT I
Casing the Establishment - What is footprinting- Internet Footprinting. -Scanning-Enumeration - basic banner grabbing, Enumerating Common Network services. Case study- Network Security Monitoring

UNIT II

UNIT III

UNIT IV

UNIT V

REFERENCES:
CS 983 - OBJECT ORIENTED SOFTWARE ENGINEERING

UNIT I

UNIT II
ANALYSIS: Requirements Elicitation – Concepts – Activities – Management – Arena Case Study - Analysis Object Model – Analysis – Concepts – activities - Managing analysis - Case Study

UNIT III

UNIT IV

UNIT V

REFERENCES:


CS 984 - DISTRIBUTED SYSTEMS SECURITY

UNIT – I

UNIT – II

UNIT - III

UNIT - IV

UNIT - V

REFERENCES
Infrastructure and Faculty requirements for M.Tech(CSE-IS)

Faculty–student ratio: 1:12 (As per AICTE norms for intake of 18: 1 Professor, 1 Associate Professor, 1 Assistant Professors)

Class room Equipment: Multimedia Projector, Black Board

Teacher qualification Specilzation: M.Tech. in Computer Science and Engineering

Class Room: 1 area of 30 sq.m

Laboratory: 1

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<tr>
<td>Computer systems node</td>
<td>18 No connected in LAN</td>
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<tr>
<td>UPS</td>
<td>Minimum of 5 KVA</td>
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<tr>
<td>Printer</td>
<td>2 No.</td>
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<tr>
<td>User License required for software (proprietary)</td>
<td>Minimum 18 No.</td>
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<td>Software</td>
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<td>1. Microsoft Server OS/ Linux Server OS/ UNIX Server OS/Any open source server OS / any Proprietary Server OS software²</td>
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<td>2. Proprietary/ open source clientS</td>
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<td>3. Borland C Compiler / Microsoft C compiler/ any open source C compiler/ any Proprietary C compiler</td>
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<td>4. Java development Kit (Latest Version)</td>
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<td>6. DB2 Server / ORACLE server/ SQL Server/ Open source DBMS server software</td>
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<td>7. Network simulator</td>
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<td>8. Open MP</td>
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<td>9. Firewalls and other information security tools</td>
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