UNIVERSITY OF KERALA

B. Tech Degree Course
In
Information Technology

Scheme and Syllabus
(2008 scheme)
UNIVERSITY OF KERALA

B.Tech Degree Course – 2008 Scheme

REGULATIONS

1. Conditions for Admission

Candidates for admission to the B.Tech degree course shall be required to have passed the Higher Secondary Examination, Kerala or 12th Standard V.H.S.E., C.B.S.E., I.S.C. or any examination accepted by the university as equivalent thereto obtaining not less than 50% in Mathematics and 50% in Mathematics, Physics and Chemistry/ Bio- technology/ Computer Science/ Biology put together, or a diploma in Engineering awarded by the Board of Technical Education, Kerala or an examination recognized as equivalent thereto after undergoing an institutional course of at least three years securing a minimum of 50 % marks in the final diploma examination subject to the usual concessions allowed for backward classes and other communities as specified from time to time.

2. Duration of the course

i) The course for the B.Tech Degree shall extend over a period of four academic years comprising of eight semesters. The first and second semester shall be combined and each semester from third semester onwards shall cover the groups of subjects as given in the curriculum and scheme of examination.

ii) Each semester shall ordinarily comprise of not less than 400 working periods each of 60 minutes duration.

iii) A candidate who could not complete the programme and pass all examinations within Ten (10) years since his first admission to the B.Tech programme will not be allowed to continue and he has to quit the Programme. However he can be readmitted to the first year of the programme if he/she satisfies the eligibility norms applicable to the regular candidates prevailing at the time of readmission.

3. Eligibility for the Degree

Candidates for admission to the degree of bachelor of technology shall be required to have undergone the prescribed course of study in an institution maintained by or affiliated to the University of Kerala for a period of not less than four academic years and to have passed all the examinations specified in the scheme of study

4. Subjects of Study

The subjects of study shall be in accordance with the scheme and syllabi prescribed

5. Evaluation

Candidates in each semester will be evaluated both by continuous assessment and end semester University examination. The individual maximum marks allotted for continuous assessment and University examination for each subject is as prescribed by the scheme of study.
5.1 Continuous Assessment (C.A)

The marks awarded for the continuous assessment will be on the basis of the day-to-day work, periodic tests (minimum two in a semester) and assignments (minimum of three – one each from each module). The faculty member concerned will do the continuous assessment for each semester. The C.A. marks for the individual subjects shall be computed by giving weightage to the following parameters.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Attendance</th>
<th>Tests</th>
<th>Assignments/Class Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory Subjects</td>
<td>20%</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>Drawing</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>Practical</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>Project Work</td>
<td>Work Assessed by Guide – 50%</td>
<td>Assessed by a three member committee out of which one member is the guide – 50%</td>
<td></td>
</tr>
</tbody>
</table>

The C.A. marks for the attendance (20%) for each theory, practical and drawing shall be awarded in full only if the candidate has secured 90% attendance or above in the subject. Proportionate reduction shall be made in the case of subjects in which he/she gets below 90% of the attendance for a subject. The CA marks obtained by the student for all subjects in a semester is to be published at least 5 days before the commencement of the University examinations. Anomalies if any may be scrutinized by the department committee and the final CA marks are forwarded to the university within the stipulated time.

5.2. End Semester University Examinations

i) There will be University examinations at the end of the first academic year and at the end of every semester from third semester onwards in subjects as prescribed under the respective scheme of examinations. Semester classes shall be completed at least 10 working days before the commencement of the University examination.

ii) The examination will be held twice in a year – April/May session (for even semester) and October/November session (for odd semester). The combined 1st and 2nd semester is reckoned as equivalent to an even semester for the purpose of conduct of examination and the University examination will be held during April/May. However VII and VIII Semester examination will be conducted in both the sessions. This schedule will not be changed.

iii) A student will be permitted to appear for the university examination only if he/she satisfies the following requirements

   a. He/she must secure not less than 75% attendance in the total number of working periods during the first year and in each semester thereafter and shall be physically present for a minimum of 60% of the total working periods. In addition, he/she also shall be physically present in at least 50% of total working periods for each subject

   b. He must earn a progress certificate from the head of the institution of having satisfactorily completed the course of study in the semester as prescribed by these regulations

   c. It shall be open to the Vice-Chancellor to grant condonation of shortage of attendance on the recommendation of the head of the institution in accordance with the following norms
d. The attendance shall not be less than 60% of the total working periods

e. He/she shall be physically present for a minimum of 50% of the total working periods

f. The shortage shall not be condoned more than twice during the entire course
g. The condonation shall be granted subject to the rules and procedures prescribed by the university from time to time.
h. The condonation for combined 1st and 2nd semesters will be reckoned as a single condonation for attendance purposes.

iv) A student who is not permitted to appear for the University examinations for a particular semester due to the shortage of attendance and not permitted by the authorities for condonation of shortage of attendance shall repeat the semester when it is offered again. This provision is allowed only once for a semester.

v) The university will conduct examinations for all subjects (Theory, Drawing & Practical)

vi) The scheme of valuation will be decided by the chief examiner for theory / drawing subjects

vii) For practical examinations, the examiners together will decide the marks to be awarded. The student shall produce the certified record of the work done in the laboratory during the examination. The evaluation of the candidate should be as per the guidelines given in the syllabus for the practical subject.

6. Letter Grades

For each subject in a semester, based on the total marks obtained by the student in the University examination and Continuous assessment put together a letter grade (S, A+, A, B+, B, C+, C, D, E and F) will be awarded. All letter grades except ‘F’ will be awarded if the marks for the University examination is 40 % or above and the total mark (C.A marks + University Exam mark) is 50 % or above. No absolute mark will be indicated in the grade card. Letter grade corresponding to total marks (C.A marks+ University Exam mark) and the corresponding grade point in a ten-point scale is described below.

<table>
<thead>
<tr>
<th>% of Total marks (C.A marks + University Exam mark)</th>
<th>Letter Grade</th>
<th>Grade Point (G.P)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 % and above</td>
<td>S</td>
<td>10</td>
<td>Excellent</td>
</tr>
<tr>
<td>85 % and above but less than 90%</td>
<td>A+</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>80 % and above but less than 85%</td>
<td>A</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>75 % and above but less than 80%</td>
<td>B+</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>70 % and above but less than 75%</td>
<td>B</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>65 % and above but less than 70%</td>
<td>C+</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>60 % and above but less than 65%</td>
<td>C</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>55 % and above but less than 60%</td>
<td>D</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>50 % and above but less than 55%</td>
<td>E</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Below 50% (C.A + U.E) or below 40 % for U.E only</td>
<td>F</td>
<td>0</td>
<td>Failed</td>
</tr>
</tbody>
</table>
7. Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)
Grade point average is the semester wise average points obtained by each student in a 10-point scale. GPA for a particular semester is calculated as per the calculation shown below.

\[
GPA = \frac{\sum \text{Credit} \times \text{GP obtained for the subject}}{\sum \text{credit for subject}}
\]

Cumulative Grade point Average (CGPA) is the average grade points obtained by the students till the end of any particular semester. CGPA is calculated in a 10-point scale as shown below.

\[
CGPA = \frac{\sum \text{Credits for semester} \times \text{GPA obtained for the semester}}{\sum \text{credits for the semester}}
\]

GPA and CGPA shall be rounded to two decimal points. The Grade card issued to the students shall contain subject number and subject name, credits for the subject, letter grades obtained, GPA for the semester and CGPA up to that particular semester. In addition to the grade cards for each semester all successful candidate shall also be issued a consolidated statement grades. On specific request from a candidate and after remitting the prescribed fees the University shall issue detailed mark to the individual candidate.

8. Minimum for a pass
a. A candidate shall be declared to have passed a semester examination in full in the first appearance if he/she secures not less than 5.5 GPA with a minimum of ‘E’ grade for the all individual subject in that semester.

b. A candidate shall be declared to have passed in an individual subject of a semester examination if he/she secures grade ‘E’ or above.

c. A candidate who does not secure a full pass in a semester examination as per clause (a) above will have to pass in all the subjects of the semester examination as per clause (b) above before he is declared to have passed in that semester examination in full.

9. Improvement of Grades
i) A candidate shall be allowed to re-appear for a maximum of two subjects of a semester examination in order to improve the marks and hence the grades already obtained subject to the following conditions

- a. The candidate shall be permitted to improve the examination only along with next available chance.
- b. The candidate shall not be allowed to appear for an improvement examination for the subjects of the VII & VIII semesters
- c. The grades obtained by the candidate for each subject in the improvement chance he has appeared for or the already existing grades – whichever is better will be reckoned as the grades secured.
- d. First & Second semester will be counted as a single chance and they can improve a maximum of three subjects

ii) A candidate shall be allowed to repeat the course work in one or more semesters in order to better the C.A. marks already obtained, subject to the following conditions

4
a. He/she shall repeat the course work in a particular semester only once and that too at the earliest opportunity offered to him/her.
b. He/she shall not combine this course work with his/her regular course work
c. He/she shall not be allowed to repeat the course work of any semester if he has already passed that semester examination in full
d. The C.A marks obtained by the repetition of the course work will be considered for all purposes

iii) A candidate shall be allowed to withdraw from the whole examination of a semester in accordance with the rules for cancellation of examination of the University of Kerala.

10. Classification of Successful candidates

i) A candidate who qualifies for the degree passing all the subjects of the eight semesters within five academic years (ten consecutive semesters after the commencement of his/her course of study) and secures not less than 8 CGPA up to and including eighth semester (overall CGPA) shall be declared to have passed the B.Tech degree examination in FIRST CLASS WITH DISTINCTION

ii) A candidate who qualifies for the degree passing all the subjects of the eight semesters within five academic years (ten consecutive semesters after the commencement of his/her course of study) and secures less than 8 CGPA but not less than 6.5 CGPA up to and including eighth semester shall be declared to have passed the B.Tech degree examination in FIRST CLASS.

iii) All other successful candidates shall be declared to have passed the B.Tech Degree examination in SECOND CLASS

iv) Successful candidates who complete the examination in four academic years (eight consecutive semesters after the commencement of the course of study) shall be ranked branch-wise on the basis of the CGPA in all eight semesters put together. In the case of a tie in the CGPA the total marks of the students who have got same CGPA shall be considered for finalizing the rank. Students who pass the examination in supplementary examination are also covered under this clause

11. Educational Tour

a. The students may undertake one educational tour preferably after fourth semester of the course and submit a tour report

b. The tour may be conducted during the vacation / holidays taking not more than 5 working days, combined with the vacation / holidays if required. Total number of Tour days shall not exceed 15 days.

c. The tour period shall be considered as part of the working periods of a semester

12. Revision of Regulations

The university may from time to time revise, amend or change the regulations, curriculum, scheme of examinations and syllabi. These changes unless specified otherwise, will have effect from the beginning of the academic year / semester following the notification of the University
## INFORMATION TECHNOLOGY

### SCHEME OF STUDIES AND EXAMINATION
FOR B. TECH DEGREE - 2008 ADMISSION

#### COMBINED I AND II SEMESTERS (COMMON FOR ALL BRANCHES)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>D/P</td>
<td>Maximum</td>
</tr>
<tr>
<td>08.101</td>
<td>Engineering Mathematics</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>08.102</td>
<td>Engineering Physics</td>
<td>2</td>
<td>1</td>
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<tr>
<td>08.103</td>
<td>Engineering Chemistry</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>50</td>
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<tr>
<td>08.104</td>
<td>Engineering Graphics</td>
<td>1</td>
<td>0</td>
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<td>50</td>
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<tr>
<td>08.105</td>
<td>Engineering Mechanics</td>
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<td>1</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>08.106</td>
<td>Basic Civil Engineering</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>08.107</td>
<td>Basic Mechanical Engineering</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>08.108</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>08.109</td>
<td>Basic Communication and Information Engineering</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>08.110</td>
<td>Engineering Workshops</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>50</td>
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The subject 08.109 shall be handled by the Department of Electronics and Communication Engineering.
### SEMESTER III

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.301</td>
<td>Engineering Mathematics II (CMPUNERFTAHB)</td>
<td>3 1 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.302</td>
<td>Problem Solving and Programming in C (R F)</td>
<td>2 2 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.303</td>
<td>Discrete Structures (R F)</td>
<td>2 1 0</td>
<td>50</td>
<td>3 100</td>
<td>3</td>
</tr>
<tr>
<td>08.304</td>
<td>Electronic Circuits (R F)</td>
<td>2 1 0</td>
<td>50</td>
<td>3 100</td>
<td>3</td>
</tr>
<tr>
<td>08.305</td>
<td>Digital System Design (R F)</td>
<td>2 2 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.306</td>
<td>Computer Organization (R F)</td>
<td>2 1 0</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.307</td>
<td>Electronic Circuits Lab (R F)</td>
<td>0 0 4</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
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<tr>
<td>08.308</td>
<td>Programming Lab (R F)</td>
<td>0 0 4</td>
<td>50</td>
<td>3 100</td>
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<td></td>
<td><strong>13 8 8</strong></td>
<td><strong>400</strong></td>
<td><strong>800</strong></td>
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</table>

**Total Marks** 1200

### SEMESTER IV

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.401</td>
<td>Engineering Mathematics III (CMPUNERFHB)</td>
<td>3 1 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
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<tr>
<td>08.402</td>
<td>Humanities (CRFTAHB)</td>
<td>3 0 0</td>
<td>50</td>
<td>3 100</td>
<td>3</td>
</tr>
<tr>
<td>08.403</td>
<td>Microcontroller-based Design</td>
<td>3 1 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.404</td>
<td>Object Oriented Techniques (R F)</td>
<td>2 1 0</td>
<td>50</td>
<td>3 100</td>
<td>3</td>
</tr>
<tr>
<td>08.405</td>
<td>Data Structures and Algorithms (R F)</td>
<td>2 2 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.406</td>
<td>Database Design</td>
<td>3 0 0</td>
<td>50</td>
<td>3 100</td>
<td>3</td>
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<tr>
<td>08.407</td>
<td>Data Structures Lab (R F)</td>
<td>0 0 4</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.408</td>
<td>Object Oriented Programming Lab</td>
<td>0 0 4</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>16 5 8</strong></td>
<td><strong>400</strong></td>
<td><strong>800</strong></td>
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**Total Marks** 1200
### SEMESTER V

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.501</td>
<td>Engineering Mathematics IV (ERFBH)</td>
<td>3 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.502</td>
<td>Advanced Mathematics &amp; Queueing Models (RF)</td>
<td>3 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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</tr>
<tr>
<td>08.503</td>
<td>Theory of Computation</td>
<td>2 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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</tr>
<tr>
<td>08.504</td>
<td>Systems Programming (RF)</td>
<td>2 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.505</td>
<td>Operating Systems</td>
<td>3 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.506</td>
<td>Data Communication</td>
<td>2 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.507</td>
<td>Digital Circuits Lab</td>
<td>0 L 0 T 4 D/P</td>
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<td>3 100</td>
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<tr>
<td>08.508</td>
<td>Database Lab</td>
<td>0 L 0 T 4 D/P</td>
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<td>3 100</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15</strong> L <strong>6</strong> T <strong>8</strong> D/P</td>
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<td><strong>800</strong></td>
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Total Marks 1200

### SEMESTER VI

<table>
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<tr>
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<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.601</td>
<td>Compiler Design (RF)</td>
<td>3 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
</tr>
<tr>
<td>08.602</td>
<td>Computer Networks</td>
<td>2 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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</tr>
<tr>
<td>08.603</td>
<td>Software Architecture</td>
<td>2 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.604</td>
<td>Internet Technology</td>
<td>3 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.605</td>
<td>Computer Graphics</td>
<td>2 L 1 T 0 D/P</td>
<td>50</td>
<td>3 100</td>
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<tr>
<td>08.606</td>
<td>Embedded Systems</td>
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<td>50</td>
<td>3 100</td>
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<tr>
<td>08.607</td>
<td>Internet Lab</td>
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<tr>
<td>08.608</td>
<td>Computer Graphics Lab</td>
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<td>3 100</td>
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<tr>
<td><strong>Total</strong></td>
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Total Marks 1200
## SEMESTER VII

<table>
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<th>Course Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.701</td>
<td>Software Project Management</td>
<td>2 1 0</td>
<td>50</td>
<td>3 100</td>
<td>3</td>
</tr>
<tr>
<td>08.702</td>
<td>Internetworking</td>
<td>3 1 0</td>
<td>50</td>
<td>3 100</td>
<td>4</td>
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<tr>
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Total Marks: 1150

## SEMESTER VIII

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<thead>
<tr>
<th>Course Code</th>
<th>Subject</th>
<th>Hours / Week</th>
<th>Maximum Sessional Marks</th>
<th>University Exams</th>
<th>Credits</th>
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Total Marks: 1250
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<tr>
<td><strong>A</strong> Design and Analysis of Algorithms</td>
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<td><strong>B</strong> Simulation and Modelling</td>
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<td><strong>C</strong> Principles of Programming Languages</td>
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<td><strong>D</strong> Communicative English &amp; Technical Writing</td>
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<tr>
<td><strong>A</strong> Computer Peripherals and Interfacing</td>
</tr>
<tr>
<td><strong>B</strong> Optimization Techniques</td>
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<tr>
<td><strong>C</strong> Data Mining Techniques</td>
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<tr>
<td><strong>A</strong> Advanced Microprocessors</td>
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<td><strong>B</strong> Network Programming</td>
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<td><strong>C</strong> Graph Theory</td>
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<td><strong>A</strong> Soft Computing</td>
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<td><strong>B</strong> Distributed Systems</td>
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<td><strong>C</strong> Web Services</td>
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08.101 ENGINEERING MATHEMATICS- I  
Credits: 6

MODULE- 1

Applications of differentiation:-- Definition of Hyperbolic functions and their derivatives-Successive differentiation- Leibnitz’ Theorem(without proof)- Curvature- Radius of curvature- centre of curvature- Evolute ( Cartesian ,polar and parametric forms)
Partial differentiation and applications:- Partial derivatives- Euler’s theorem on homogeneous functions- Total derivatives- Jacobians- Errors and approximations- Taylor’s series (one and two variables) - Maxima and minima of functions of two variables - Lagrange’s method- Leibnitz rule on differentiation under integral sign.
Vector differentiation and applications :- Scalar and vector functions- differentiation of vector functions-Velocity and acceleration- Scalar and vector fields- Operator \( \nabla \)- Gradient-Physical interpretation of gradient- Directional derivative- Divergence- Curl- Identities involving \( \nabla \) (no proof) - Irrotational and solenoidal fields – Scalar potential.

MODULE-II

Laplace transforms:- Transforms of elementary functions - shifting property- Inverse transforms- Transforms of derivatives and integrals- Transform functions multiplied by \( t \) and divided by \( t \) - Convolution theorem(without proof)-Transforms of unit step function, unit impulse function and periodic functions-second shiftig theorem- Solution of ordinary differential equations with constant coefficients using Laplace transforms.


MODULE-III


REFERENCES
2. Peter O’ Neil ; Advanced Engineering Mathematics, Thomson
5. Michel D Greenberg; Advanced Engineering Mathematics, Pearson International
08.102 ENGINEERING PHYSICS

L-T-P : 2-1-0

Credits: 6

MODULE-I


MODULE- II


MODULE – III


Statistical Mechanics:

**REFERENCE:**
1. Sears & Zemansky; *University Physics. XI Edn.*, Pearson
2. Frank & Leno; *Introduction to Optics. III Edn.*, Pearson
3. J.C. Upadhya; *Mechanics*. Ram Prasad & Sons
4. David J Griffiths; *Introduction to Electrodynamics, III Edn.*, Pearson
7. John R Taylor, Chris D Zafiratos & Michael A Dubson; *Modern Physics for Scientists and Engineers. II Edn.*, Prentice Hall of India
8. Eugene Hecht; *Optics. IV Edn.*, Pearson
9. Robert Resnick; *Introduction to Special Relativity*, John Willey and Sons
10. Richard L Liboff; *Introduction to Quantum Mechanics. IV Edn.*, Pearson
11. Donald A Mcquarrie; *Statistical Mechanics*, Vivo Books
12. Mark Ratner & Daniel Ratner; *Nanotechnology.*

**LIST OF DEMONSTRATION EXPERIMENTS**
2. Air Wedge – Diameter of a thin wire
5. Laser – Diffraction at a narrow slit.
6. Laser – Diffraction at a straight wire or circular aperture.
11. Computer stimulation – study of E & H. (Gauss’ law & Ampere’s law)

**Pattern of Question Paper**
University examination is for a maximum of 100 marks, in 3 hour duration. The syllabus is spread in 3 modules. The question paper will consist of two parts (A and B).

**Part A** contains short answer questions for 40 marks. This part contains 10 questions without any choice, each of 4 marks (uniformly taken from all modules).

**Part B** contains long answer questions for 60 marks. From each module, this part contains 3 questions out of which 2 are to be answered, each of 10 marks. Long answer questions from all the 3 modules will form 60 marks.

***********
08.103 ENGINEERING CHEMISTRY

L-T-T : 2-1-0

Credits: 6

MODULE-I

**Electrochemistry** - Electrodes- Electrode potential- Origin of electrode potential- Helmotz double layer- Nernst equation and application- Reference electrodes- Standared hydrogen electrode- Saturated calomel electrode- Quinhydron electrode-Determination of $\text{P}^\circ$ using these electrodes- Concentration cells- Fuel cells- Secondary cells- Lead acid cell- Nickel cadmium cell- Lithium-ion cell. - Conductometric and Potentiometric titrations (acid base, oxidation reduction and precipitation titrations). (12hrs)

**Corrosion and its control**- Theories of corrosion (chemical corrosion and electrochemical corrosion)- Galvanic series- Types of corrosion (Concentration cell corrosion, Stress corrosion, Galvanic corrosion) - Factors affecting corrosion (nature of metal and nature of environment) and different methods of corrosion control (corrosion inhibitors, cathodic protection). (5hrs)

**Protective coatings**- Metallic coatings- Chemical conversion coatings- paint (4hrs)

**Nano materials**- Introduction-Classification-preparation (laser abrasion technique and sputtering technique)- Chemical method (reduction)-Properties and Applications of nano materials-Nano tubes-Nano wires. (4hrs)

MODULE-II

**Water treatment**- Types of hardness- Degree of hardness- Related problems- Estimation of hardness- by EDTA method- Sludge and scales in boilers- Priming and foaming- Boiler corrosion-Water softening methods, Lime-soda process, Ion exchange methods-Internal treatments (colloidal, carbonate, phosphate and calgon conditioning)- Domestic water treatment- Methods of disinfection of water-Desalination process (Reverse osmosis, electrodialysis- Distillation). (12hrs)

**Environmental damages and prevention**- Air pollution- CFCs and ozone depletion-Alternative refrigerents-Green house effect-Water pollution- BOD and COD- Waste water treatment- Aerobic - Anaerobic and USAB processes. (3hrs)

**Thermal methods of analysis**-Basic principles involved in Thermo gravimetry, Differential thermal analysis and applications. (2hrs)

**Spectroscopy**- Molecular energy levels-Types of molecular spectra- Electronic spectra (Classification of electronic transitions- Beer Lamberts law, Vibrational spectra (mechanism of interaction and application), Rotational spectra (Determination of bond length and application). NMR spectra (Basic principle, chemical shift, spin-spin splitting) (6hrs)

**Chromatography**- General principles- High performance liquid chromatography- Gas chromatography. (2hrs)

MODULE-III

**Polymers**- Classifications- Mechanism of polymerisation (Addition, free radical, cationic, anionic and coordination polymerisation)- Thermoplastics and thermostetting plastics- Compounding of plastics-Moulding techniques of plastics (Compression, Injection, Transfer and Extrusion moulding)-Preparation, properties and uses of PVC, PVA, PMMA, Nylon, PET, Bakelite, Urea formaldehyde resin- Silicon polymers- Biodegradable plastics. Elastomers- structure of natural rubber- vulcanisation- synthetic rubbers (Buna-S, Butyl rubber and Neoprene) (12hrs)
Organo electronic compounds -Super conducting and conducting organic materials like Polyaniline, polyacetylene and [polypyrrol and its applications. (2hrs)

Fuels- Calorific value- HCV and LCV-Experimental determination of calorific value-Theoretical calculation of calorific value by Dulongs formula - Bio fuels -Bio hydrogen and Bio-diesel (5hrs)

Lubricants- Introduction-Mechanism of lubrication- solid and liquid lubricant- Properties of lubricants-Viscosity index- flash and fire point- cloud and pour point- aniline value. (4hrs)

Cement- Manufacture of Portland cement- Theory of setting and hardening of cement (2hrs)

LAB-EXPERIMENTS (DEMONSTRATION ONLY)
1. Estimation of total hardness in water using EDTA.
2. Estimation of chloride ions in domestic water.
3. Estimation of dissolved oxygen.
4. Estimation of COD in sewage water.
5. Estimation of available chlorine in bleaching powder.
8. Determination of flash and fire point of a lubricating oil by Pensky Marten’s apparatus.
12. Determinations of PH using glass electrode and quinhydrone electrode.

REFERENCES
1. H.A. Willard, L.L. Merrit and J.A. Dean; Instrumental methods of analysis
2. A.K. De; Environmental Chemistry
3. K.J.Kluhunde; Nanoscale materials in chemistry
4. B.R. Gowariker; Polymer science
5. B.W.Gonser; Modern materials
6. V.Raghavan; Material Science and engineering. A first course
7. L.H. Van Vlack; Elements of material science and engineering
8. J.W.Goodby; Chemistry of liquid crystals
9. S.Glassstone; A text book of physical chemistry
10. P.C. Jain; Engineering Chemistry
11. Juhaina Ahad; Engineering Chemistry
12. Shashi Chawla; A text book of Engineering Chemistry
14. J.C. Kuriakose and J. Rajaram; Chemistry of Engineering and Technology volume I & II
08.104 ENGINEERING GRAPHICS

L- T-D : 1-0-2  
CREDITS: 6

Introduction to technical drawing and its language. Lines, lettering, dimensioning, scaling of figures, symbols and drawing instruments. (1 sheet practice)

MODULE I

Plain Curves: Conic sections by eccentricity method. Construction of ellipse: (i) Arc of circles method (ii) Rectangle method (iii) Concentric circles method. Construction of parabola (i) Rectangle method (ii) Tangent method. Construction of hyperbola (i) Arc of circles method (ii) given ordinate, abscissa and the transverse axis (iii) given the asymptotes and a point on the curve. Construction of Tangent and Normal at any point on these curves

Miscellaneous Curves: Construction of Cycloid, Epicycloid and Hypocycloid, Involute of a circle. Archimedian spiral, Logarithmic spiral and Helix. Construction of Tangent and Normal at any point on these curves

Projection of Points and lines: Types of projections, Principles of Orthographic projection. Projections of points and lines. Determination of true length, inclination with planes of projection and traces of lines.

MODULE II

Projection of Solids: Projection of simple solids such as prisms, pyramids, cone, cylinder, tetrahedron, octahedron, sphere and their auxiliary projections.

Selection of Solids: Types of cutting planes, section of simple solids cut by parallel, perpendicular and inclined cutting planes. Their projections and true shape of cut sections.

Development of Surfaces: Development of surfaces of (i) simple solids like prisms, pyramids, cylinder and cone (ii) Cut regular solids.

MODULE III

Isometric Projection : Isometric scale, Isometric view and projections of simple solids like prisms, pyramids, cylinder, cone sphere, frustum of solids and also their combinations.

Intersection of Surfaces : Intersection of surfaces of two solids as given below. (i) Cylinder and cylinder (ii) Prism and prism. (iii) Cone and Cylinder. (Only cases where the axes are perpendicular to each other and intersecting with or without offset.)


CAD: Introduction to CAD systems, Benefits of CAD, Various Soft wares for CAD, Demonstration of any one CAD software.

General Note:
(i) First angle projection to be followed (ii) Question paper shall contain 3 questions from each module, except from CAD. Students are required to answer any two questions from each module. (iii) Distribution of marks - Module -I 2 x 16 = 32, Module -II 2 x 17 = 34 Module III 2 x 17 = 34 Total (32+34+34 =100)

REFERENCES
1. Luzadder and Duff; Fundamentals of Engineering Drawing
2. N. D. Bhatt; Engineering Drawing
3. K. Venugopal; Engineering Drawing and Graphics
4. P.S. Gill; Engineering Graphics
5. P.I. Varghese; Engineering Graphics
6. K.R. Gopalakrishnan; Engineering Drawing
7. Thamaraselvi; Engineering Drawing
8. K.C. John; Engineering Graphics
9. K.N. Anil Kumar; Engineering Graphics
08.105  ENGINEERING MECHANICS

L-T-P: 2 - 1 – 0  

Credits: 6

MODULE I (20 HRS)

Idealizations of Mechanics- Elements of vector algebra


MODULE II (20 HRS)

Properties of surfaces- centroid of composite areas- Theorems of Pappus-Gouldinus-Moment of inertia of areas, Parallel and perpendicular axes theorems- Radius of Gyration-moment of inertia of composite areas. Dynamics: Kinematics-Combined motion of translation and rotation-instantaneous centre, motion of link, motion of connecting rod and piston, wheel rolling without slipping. Relative velocity - basic concepts-analysis of different types of problems Kinetics-Newton’s laws of translatory motion- D’Alembert’s principle- Motion of lift- Motion of connected bodies.

MODULE III (20 HRS)


REFERENCES:


Note: Question For University Examination:- Part A – 8 compulsory questions covering entire syllabus, 5 marks each. (5 x 8 = 40) Part B – Three questions of 10 marks from each module, out of which two should be answered (10 x 2 x 3 = 60).
08.106 BASIC CIVIL ENGINEERING

L-T-P: 2-1-0 Credits: 6

MODULE I

Surveying: Object and Principles of Surveying.
Linear Measurements: Direct measurements - Tape & chain only - Ranging out survey lines-
Taking measurements of sloping ground - Errors - Tape correction (problems).
Levelling: Levelling instruments - Level (Dumpy Level, Tilting Level ) Levelling Staff.
Measurements in levelling - Temporary adjustments of a level, holding the staff, reading the
staff - Principles of leveling - recording measurements in the field book - reduction of level -
height of collimation method only (simple examples).
Contour maps (Brief description only). Computation of areas - Mid ordinate rule, average
ordinate rule, Trapezoidal rule, Simpson’s rule (examples)- Introduction to Distomat, Total
Station & GPS (Brief description only)

MODULE II

Building construction: Selection of site for buildings - types of buildings - Components of
buildings.
Foundation: Different types - Spread footing, Isolated footing, Combined footing, Mat
foundation, Pile foundation (description only).
Safe Bearing Capacity of Soil: Importance of determination of the Safe Bearing Capacity of
Soil (brief description only).
Super structure: Masonry - stone masonry, brick masonry –Types- desirable qualities of
stone and brick.
Partition: Materials used for making partition - plywood, particle boards & glass.
Doors, windows & ventilators: Types - materials used for the construction of doors and
windows - wood, steel & Aluminium.
Plastering: Mortar – properties - Preparation of Cement mortar
Painting: Preparation of surfaces for painting - plastered, wood and steel surfaces- Types of
paint - enamel, emulsion & distemper. Flooring: Types - mosaic tiles, ceramic tiles, marble,
granite and synthetic materials. Roofing: Selection of type of roof - flat roof, sloping roof -
Concrete roof, tiled roof. Selection of roof covering materials. GI Sheet , AC Sheet, PVC
Sheet

MODULE III

Concrete: Ingredients- cement, aggregate, and water. Qualities of ingredients (brief
description only).
Tests on Cement - consistency, initial and final setting times. Compressive strength -IS
Specifications.
Aggregates – desirable qualities of fine and coarse aggregates
Steel-common types used in construction- Mild Steel, HYSD Steel and their properties.
Reinforced Cement Concrete (RCC)-advantages of RCC over Plain Cement Concrete.
Elementary ideas on pre-cast and pre-stressed concrete constructions.
Building services – vertical transportation – stairs – types, escalators and elevators, ramps
(brief description only). Plumbing services- brief description of water supply and sewage
disposal arrangements for residential buildings.
REFERENCE:

8. Jha and Sinha, “Construction and Technology”
10. Santha Minu, “Basic Civil Engineering” Karunya Publications, Trivandrum

Note: The question paper will consists of two parts. Part I and part II.

*Part I is Compulsory covering the entire syllabus, for 40 marks. It contains 8 questions of 5 marks each.*

*Part II is to cover 3 modules. There will be two questions (20 marks each) from each module out of which one from each module is to be answered. (20 X 3 = 60)*
08.107 BASIC MECHANICAL ENGINEERING

L-T-P/D : 3-1-0

Credits: 6

MODULE I
Thermodynamics: Basic concepts and definitions of Zeroth law, First law, Second law of thermodynamics- concept of reversibility and entropy, p-v and T-s diagrams
Air cycles: Carnot, Otto and Diesel cycles-Air standard efficiency (simple problems)
IC Engines: Working and comparison of two stroke and four stroke petrol and diesel engines - general description of various systems using block diagrams – air system, fuel system, ignition system and governing system. A brief description of CRDI, MPFI, GDI and Hybrid Vehicles
Steam boilers: Classification – Cochran boiler, Babcock and Wilcox boiler, Benson boiler-fluidized bed combustion,

MODULE II
Principles and fields of application of - compressors - reciprocating and centrifugal, blower, pumps- reciprocating, centrifugal and jet pumps, steam and hydraulic turbines- impulse and reaction, gas turbine cycles- open and closed
Elementary ideas of hydro electric, thermal and nuclear power plants
Refrigeration & Air Conditioning: Refrigerants, CFC free refrigerants. Vapor compression refrigeration system, Comfort and Industrial air conditioning-typical window air conditioning unit (general description only).

MODULE III
Mechanical Power transmission systems: Belt, rope and gear drives-types, comparison and fields of application-velocity ratio-slip (simple problems) friction disc, single plate clutch, gear trains (no derivations).
Manufacturing processes: Elementary ideas of casting, forging, rolling, welding, soldering and brazing
Machining processes- turning, taper turning, thread cutting, shaping, drilling, grinding, milling (simple sketches and short notes).
Non conventional machining - Electro discharge machining (EDM) and Electro chemical machining (ECM)
Principle, application and advantages of C N C machine

REFERENCES
2. Gill, Smith and Zuirys, “Fundamentals of IC Engines”
3. Amstead, Ostwald and Begeman, “Manufacturing processes”
5. Roy and Choudhary, “Elements of Mechanical Engineering”
6. Hajra Choudhary, “Workshop Technology”
7. R K Bensal, “Fluid mechanics and machines”

Note: Lectures are to be supplemented by demonstration in laboratories.
The question paper will consist of two parts.
Part I is to be compulsory for 40 marks. This may contain 10 questions of 4 marks each.
Part II is to cover 3 modules. There can be 3 questions from each module (10 marks each) out of which 2 are to be answered.
08.108 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L-T-P : 2–1-0  Credits 6

MODULE – I

MODULE – II

MODULE – III
Diodes - PN junction diodes,. V-I characteristics, dynamic & static resistance, principle of working and V-I characteristics of Zener diode, principle of Photo diode, Solar cell, & LED. Rectifiers & power supplies - block diagram description of a dc power supply, circuit diagram & working of half-wave & full wave rectifier, final equations of Vrms, Vdc, ripple factor and peak inverse voltage in each case, principle of working of series inductor and shunt capacitor filters. Working of simple zener voltage regulator. Power devices – V – I characteristics and applications of SCR and Triac Working principle of UPS and SMPS. Transducers – Resistance strain guage, thermistor, LVDT.
REFERENCES
5. TP Imthias Ahmed, B. Premlet, “Introduction to Electrical Engineering”, Phaser Books, Kollam

Note: The question paper will consist of two parts. Part – A is to be compulsory for 40 marks (10 questions of 4 marks each). Part-B is to cover 3 modules for 60 marks. (50% choice- One out of two or two out of four from each module).
MODULE I (Qualitative Treatment)

(a) **Bipolar junction transistors:** NPN & PNP transistors, structure, typical doping, working of NPN transistor, concepts of common base, common emitter & common collector configurations, current gain of each, input & output characteristics of common emitter configuration, comparison of three configurations with reference to voltage & current gain, input & output resistances and applications. (6 hrs)

(b) **Field effect Transistors:** basic principles of JFET, MESFET and MOSFET, comparison with BJT. (3 hrs)

(c) **Amplifiers & Oscillators:** circuit diagram & working of common emitter amplifier, function of each component in the circuit, need of proper biasing, frequency response, voltage gain and 3dB bandwidth, concepts of class A, B, AB and Class C power amplifiers, circuit diagram & working of push pull amplifiers, concepts of feedback, working principles of oscillators, circuit diagram & working of RC phase shift oscillator (7 hrs)

(d) **Integrated circuits:** advantages of ICs, analog and digital ICs, functional block diagram of operational amplifier, ideal operational amplifier, use as inverting amplifier, non inverting amplifier, summing amplifier, integrator and comparator. (4 hrs)

(e) **Digital ICs:** logic gates, realization of logic functions, principle of combinational and sequential logic circuits, flip flop (JK), logic families: TTL and CMOS Logic (No internal diagram) (4 hrs)

(f) **IC fabrication:** purification of silicon, crystal growth, wafer preparation. Unit process: oxidation, diffusion, ion implantation, epitaxy, deposition, photolithography. (4 hrs)

MODULE II (Qualitative Treatment)

(a) **Measurements:** principle and block diagram of analog and digital multimeter, working principle of CRT, block diagram of CRO, measurements using CRO, principle of digital storage oscilloscope, principle and block diagram of function generator. (5hrs)

(b) **Radio communication:** principle of AM & FM, wave forms, bandwidths, block diagrams of AM & FM transmitters, principle of AM &FM demodulation, comparison of AM & FM, principle & block diagram of super heterodyne receiver. (4 hrs)

(c) **Color television:** TV Standards, interlaced scanning, block diagram of PAL TV transmitter & receiver, basic principles of cable TV, CCTV system, basic principles of HDTV, basic principles of LCD & Plasma displays. (5 hrs)

(d) **Radar and navigation:** principle of radar and radar equation, block schematics of pulsed radar, factors affecting range, applications of radar in measurements and navigation. (4 hrs)

(e) **Satellite communication:** microwave frequency bands, concept of geo-stationary satellite, frequency bands used, satellite transponder, block diagram of earth station transmitter & receiver, advantages of satellite communication, principle of Global Positioning System (GPS). (3 hrs)

(f) **Optical communication:** block diagram of the optical communication system, principle of light transmission through fiber, concepts of Single Mode and Multi Mode optical fiber, working principle of source (semiconductor Laser) & detector (PIN, APD), advantages of optical communication. (5 hrs)
MODULE III (Qualitative Treatment)

(a) Computer Architecture: functional units: basic concept of ALU- data path and control, memory hierarchy, caches, main memory, virtual memory, operating systems, microprocessors - functional block diagram of 8085 (9 hrs)
(b) Data communication: overview, analog and digital data transmission, transmission media, digitization of wave forms, PCM, digital modulation techniques- ASK, PSK, FSK, basic concepts of error detection, parity checking. (6hrs)
(c) Mobile communication: basic principles of cellular communications, concepts of cells, frequency reuse, principle and block diagram of GSM, principle of CDMA, WLL & GPRS technologies. (4hrs)
(d) Internet Technology: concepts of networking: client-server computing, IP addresses, domain names, network interface unit- modem, switching technologies- circuit switching and packet switching, LAN, MAN, WAN & World wide web, network topologies, communication protocols- TCP/IP, Introduction to web languages- HTML, XML, internetworking concepts, network devices- basic principles of router, bridge, switch, network security- Firewall. (7 hrs)

REFERENCES
1. Santiram Kal, Basic Electronics – Devices, Circuits and IT fundamentals, PHI
4. M. Moris Mano, Computer Architecture, PHI
5. Neil H E Weste, Kamran Eshraghian, Principles of CMOS VLSI design – A system perspective, Pearson Education [Module 1(f)]
6. David A. Bell, Electronic Instrumentation and Measurements, PHI [Module 2(a)]
7. N N Bhargava, D C Kulshreshtha, S C Gupta, Basic Electronics & Linear Circuits, TMH
9. R.R. Gulati, Monochrome and Colour Television, New Age International [Module 2 (c)]

This subject shall be handled by faculty of Dept. of Electronics and Communication in the Colleges.

Question Paper
The question paper shall consist of two parts. Part I is to cover the entire syllabus, and carries 40 marks. This shall contain 10 compulsory questions of 4 marks each. Part II is to cover 3 modules, and carries 60 marks. There shall be 3 questions from each module (10 marks each) out of which 2 are to be answered.
08.110 ENGINEERING WORKSHOPS

L - T-P: 0-0-2 CREDITS: 4

A. Carpentry:

B. Fitting:
Study of tools, Practice in filing, cutting, drilling and tapping. Male and female joints, Stepped joints.

C. Sheet Metal Work:
Study of tools. Selection of different gauge GI sheets for jobs. Practice on riveted joints. Preparing tube joints, frustums, trays and containers.

D. Plumbing:
Study of tools. Details of plumbing work in domestic and industrial applications. Study of pipe joints, cutting, threading and laying of pipes with different fittings using PVC pipes. Use of special tools in plumbing work.

E. Foundry:
Study of tools. Preparation of sand, moulding practice and demonstration of casting.

F. Welding:
Study of welding machines. Straight line practices, Making of Butt joint, T joint and Lap joint.

G. Smithy:
Study of tools. Demonstration on forging of square prism, hexagonal bolt, T bolt and Eye bolt.

H. Machine Tools:
Study and demonstration on working of machine tools. Lathe and Drilling machine.

NOTE: For the university examination the student shall be examined in sections A, B, C, D and E only.
Information Technology

Third Semester - Eighth Semester

University Examination Pattern
(for all theory subjects, unless otherwise specified)

<table>
<thead>
<tr>
<th>PART A</th>
<th>Short answer questions</th>
<th>10 x 4 marks=40 marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All questions are compulsory. There should be at least three questions from each module.</td>
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<table>
<thead>
<tr>
<th>PART B</th>
<th>Descriptive/Analytical/Problem solving questions</th>
<th>3 x 20 marks=60 marks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Candidates have to answer one question out of two or two questions out of four from each module.</td>
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</tbody>
</table>

Total Marks: 100
SEMINAR III

08.301 ENGINEERING MATHEMATICS II
(C M P U N E R F T A H B)

L-T-P : 3-1-0 Credits: 4

MODULE I (16 hours)


MODULE II (18 hours)

Fourier Series: Fourier series of periodic functions of period $2\pi$ and $2l$. Dirichlet’s condition for convergence. Odd and even functions. Half range expansions.

Fourier Transforms: Fourier integral theorem (no proof) – Fourier transforms – Fourier sine and cosine transforms, inverse Fourier transforms, properties.

MODULE III (18 hours)


Reference Books
08.302 PROBLEM SOLVING AND PROGRAMMING IN C

L-T-P : 2-2-0 Credits: 4

MODULE I (15 hours)


MODULE II (20 hours)


MODULE III (17 hours)


Text Books:
2. Programming with C – B.S. Gottfried, Schaum’s Series, TMH.
5. Fundamentals of computers – V. Rajaraman, PHI

Reference Books:
2. Programming with ANSI and Turbo C – Ashok N. Kamthane, Pearson Education India
08.303 DISCRETE STRUCTURES (R F)

L-T-P: 2 – 1 – 0

Credits: 3

MODULE I (11 hours)


MODULE II (14 hours)


MODULE III (14 hours)

Algebraic structures : simple algebraic systems and general properties, morphism, congruence relation, subalgebra, product algebra and factor algebra, semigroups & monoids - morphism, cyclic semi groups and monoids, subsemigroups and submonoids, groups – abelian groups, permutation groups, cyclic groups, subgroups and homomorphism, cosets and Lagrange's theorem, normal subgroups. Algebraic systems with two binary operations – ring, integral domain, field, error detection and correction using group codes. Lattices as partially ordered sets, properties of lattices, lattices as algebraic systems, sub lattices, direct product and homomorphism, Boolean algebra, subalgebra, direct product and homomorphism, Boolean functions. Basic concepts of graph theory - basic definitions of graphs, paths, reachability and connectedness (No theorems and proofs).

Text Books:
1. Discrete mathematical structures with applications to computer science – J.P. Tremblay and R. Manohar, TMH

Reference Books:
1. Elements of discrete mathematics - C.L. Liu, TMH
08.304 ELECTRONIC CIRCUITS (R F)

L-T-P: 2 – 1 – 0

Credits: 3

MODULE I (12 hours)

Design and analysis of Rectifiers, Filters, Clippers, Clampers, Regulators, Differentiators, Integrators-RC circuits-response of high pass / low pass RC to sine wave, pulse and square wave inputs- principle of operation of inverters, uninterruptible power supplies, switched mode power supplies

MODULE II (13 hours)

Transistor amplifiers- classification – small signal analysis – voltage divider bias – emitter follower configuration- feedback configurations- RC phase shift, Wein bridge, Colpitts, Hartely oscillator( No derivations), Multivibrators- monostable, bistable and astable- 555 timer and applications ( No derivations)

MODULE III (14 hours)

Operational Amplifiers, Block diagram, characteristic features of OP Amps, ideal OP Amps, common mode and difference mode- summing amplifier, differential amplifier, inverting, non inverting amplifiers. Active filters, Applications, Chebyshev and Butterworth filters, Low pass Butterworth Filter, High pass Butterworth Filter, Band Pass and Band rejection filters, Oscillators- Wein Bridge and Phase shift Oscillators

Text Books:
1. Electronic Devices and Circuits Theory – Boylestad and Nashelky, PHI

Reference Books:
08.305 DIGITAL SYSTEM DESIGN (R F)

L-T-P:2 – 2 – 0

Credits: 4

MODULE I (16 hours)


MODULE II (18 hours)


MODULE III (18 hours)


Text Books:
3. Digital Electronics Principles and Applications – Tokheim, TMH.

Reference Books:
1. Digital Electronics-an Introduction to Theory and Practice – W.H. Gothman, PHI.
08.306 COMPUTER ORGANIZATION (R F)

L-T-P: 2 – 1 – 0

Credits: 3

MODULE I (10 hours)


MODULE II (14 hours)


MODULE III (15 hours)


Text Books:

Reference Books:
5. The indispensable PC Hardware Book – H.P. Messmer
6. Upgrading and Repairing PCs – Scottmuller, Pearson Education.
08.307   ELECTRONIC CIRCUITS LAB  (R F)

L-T-P:  0 – 0 – 4  

2. CE characteristics of BJT.  
3. CS characteristics of FET.  
4. Rectifier circuits with and without filters.  
5. RC lowpass and highpass circuits.  
6. Differentiating and Integrating circuits.  
7. Clipping and Clamping circuits.  
8. Simple zener diode regulator.  
9. RC coupled amplifier using BJT.  
10. RC phase shift oscillator using BJT.  
11. Astable and Monostable multivibrators using 555 Timer IC.  
12. Astable and Monostable multivibrators using 741 OPAMP.
03.308 PROGRAMMING LAB  (R F)

L-T-P:  0 – 0 – 4  

Credits: 4

Familiarization of operating systems like DOS and Windows. Programming exercises in C based on the course 08.302 Problem Solving and Programming in C.

The programming exercises include:

**Decision making, branching and looping**
- if, if … else statements
- switch, goto statements
- while, do, for statements

**Arrays and strings**
- one-dimensional, two-dimensional, multidimensional arrays
- reading/writing strings
- operations on strings
- string handling

**Functions**
- user defined functions
- function calls, arguments & return values
- nesting of functions
- recursive functions
- passing arrays and strings to functions

**Structures and unions**
- copying and comparing structure variables
- arrays of structures
- arrays within structures
- structures with in structures
- structures and functions
- unions

**Pointers**
- pointers and arrays
- pointers and character strings
- array of pointers
- pointers and functions
- pointers and structures

**Files, memory allocation, bit-level programming**
- files → defining, opening/closing, input-output operations
- command line arguments
- memory allocation functions
- bit-wise operators
SEMESTER IV

08.401 ENGINEERING MATHEMATICS III
(C M P U N E R F H B)

L-T-P: 3 – 1 – 0  Credits: 4

MODULE I (17 hours)


Conformal mapping: the transformations $w = \frac{1}{z}$, $w = z^2$, $w = z + \frac{1}{z}$, Bilateral transformation.

MODULE II (17 hours)


MODULE III (18 hours)


Reference Books
08.402 HUMANITIES
(CRFTHB)

L-T-P: 3 – 0 – 0

Credits: 3

Part I – Economics (2 Periods per week)

MODULE I (13 hours)


Meaning of Demand and Supply – Types of demand – Determinants of Demand – Demand forecasting


MODULE II (13 hours)


Part II – Accountancy (1 Period per week)

MODULE III (13 hours)


Final accounts: Preparation of trading and profit and loss Account- Balance sheet (with simple problems) - Introduction to Accounting packages (Description only)

Reference Books:

Part I
1. Modern Economic theory – K.K Dewett
2. Economic Development – Michael Todaro, Addison Wesley Longman Ltd.

Part II
Internal Continuous Assessment (*Maximum Marks*: 50)

Marks shall be awarded for Part I and Par II in the ratio 70:30, respectively

25 Marks - Tests (minimum 2)
15 Marks - Assignments (minimum 3) such as home work, problem solving, literature survey, seminar, term-project, programming exercises, etc.
10 Marks - Regularity in the class

University Examination Pattern

Part I and Part II to be answered in separate answer books.

**Part I  Economics**

**PART A:** Short answer questions

All questions are compulsory. There should be at least four questions from each module and not more than six questions from any module.

**PART B:** Descriptive/Analytical/Problem solving questions

Candidates have to answer one question out of two or two questions out of four from each module.

**Part II  Accountancy**

Descriptive/Analytical/Problem solving questions

Candidates have to answer two questions out of three questions.

Maximum Total Marks: 100
08.403 MICROCONTROLLER-BASED DESIGN

L-T-P: 3 – 1 – 0

Credits: 4

MODULE I (18 hours)

Introduction to microcontrollers – general architecture of microcontrollers and microprocessors, embedded processors.
Overview of the 8051 family – 8051 architecture – memory organisation, registers and I/O ports, addressing modes, instruction sets and assembly language programming.
C programming in 8051.

MODULE II (17 hours)

Programming 8051 timer/counter in assembly language and C.
8051 Interrupts – handling and programming.
Serial communication using 8051 – interfacing with RS232, serial port programming.

MODULE I (17 hours)

8051 interfacing – keyboard, LCD, ADC, DAC and stepper motor interface – interfacing to external memory.
Introduction to PIC microcontrollers and ARM processors.
Concept of Embedded Systems – embedded software and hardware development tools.

Text Books:

Reference Books:
2. Design With PIC Microcontrollers, John B. Peatman, Pearson Education.
08.404 OBJECT ORIENTED TECHNIQUES (R F)

L-T-P: 2 – 1 – 0

Credits: 3

MODULE I (10 hours)

Fundamentals of object-oriented design: Data Abstraction, Encapsulation, classes, Inheritance and Polymorphism, class hierarchies. Designing an object-oriented system: Identifying the classes, Assigning Attributes and Behaviour, finding relationship between classes, Arranging classes into hierarchies: A design example. A first look at C++: Using streams for input and output. C++ enhancements to C: Default Function Arguments, Placement of variable declarations, the scope resolution operation, the “const” Qualifier, overloaded functions. References: References as Aliases, references and pointers similarities and differences, references as function parameters, references as return values.

MODULE II (13 hours)

Introduction to classes: Declaring and using classes, class members, creation and destruction of objects, accessing data members, returning a reference, “const” objects and member function. Classes and dynamic memory allocation: New, delete operators, “this” pointer. Static members, friends, array of class objects.

MODULE III (16 hours)

Inheritance and polymorphism: Derived class and base class, derived class constructors, overriding member functions, public and private inheritance, virtual functions, polymorphism, multiple inheritance, classes within classes. Operator overloading: Overloading unary operator, overloading binary operator, data conversion. Generic functions, generic classes. File processing – formatted – unformatted and random files. Microsoft foundation classes: Strings, data structure. Representing classes and attributes using UML.

Text Books:
2. Schaum’s outline of programming with C++ - J.R. Hubbard.
3. C++ Programming from problem analysis to program design 3rd Edn. – D.S. Malik, Thomson Publications

Reference Books:
2. Object Oriented Programming in Microsoft C++ – Balagurusamy.
3. Object Oriented Programming – Barkakti
4. Fundamentals of data structures in C++ – E. Horwitz, S. Sahni and D. Mehta, Universities Press (India)
5. Fundamentals of object oriented design in UML, 4th impression 2008 – Meilir P. Jones, Pearson Education (Chapter 4 – for UML part in Module III)
08.405 DATA STRUCTURES AND ALGORITHMS (R F)

L-T-P: 2–2–0 Credits: 4

MODULE I (14 hours)
Introduction to programming methodologies – structured approach, stepwise refinement techniques, programming style, documentation – analysis of algorithms: frequency count. Study of basic data structures – vectors, arrays, records, stacks, queues and de queues.

MODULE II (19 hours)

MODULE III (19 hours)

Text Books:
1. Introduction to data structures with applications – J.P. Tremblay and P.G. Sorenson, TMH.
3. Classic data structures – D. Samanta, PHI

Reference Books:
1. Theory and problems of data structures – Seymour Lipschuts, Schaum’s series.
4. Fundamentals of data structures in C – E. Horwitz, S. Sahni and S. Anderson-Freed, Universities Press (India)
08.406 DATABASE DESIGN

L-T-P: 3 – 0 – 0          Credits: 3

MODULE I (13 hours)

Introduction to database systems: traditional file system, database/DBMS distinction, approaches to building a database, data models, data independence, three schema architecture of a database, various components of a DBMS, E/R Model, Conceptual data modeling – motivation, entities, attributes and keys, relationships, E/R diagrams.

Relational Data Model: Concept of relations, schema-instance distinction, referential integrity and foreign keys, relational algebra operations, relational calculus, Converting database specification in E/R notation to the relational schema.

MODULE II (13 hours)

SQL – data definition in SQL, querying in SQL, embedded SQL.

Dependencies – importance of a good schema design, motivation for normal forms, dependency theory – functional dependencies, Armstrong's axioms, Membership and minimal covers, 1NF, 2NF, 3NF and BCNF, Decompositions and their desirable properties, Multi-valued dependencies and 4NF, Join dependencies and 5NF.

MODULE III (13 hours)

Data Storage and indexes – File Organisations, Primary and Secondary index structures, Hash based structures, B-Trees, B+ Trees.

Transaction Processing and Error Recovery - Concepts of transaction processing, ACID properties, Concurrency control, Serializability, Locking based protocols for Concurrency control, Logging and Recovery Methods.

Text Books:

Reference:
Data Base System concepts – Henry F Korth and Silberschatz, Mc Graw Hill.
Programming exercises in C based on the course **08.405 Data Structures and Algorithms**. The exercises may include the following:

1. Representation of sparse matrix – addition, multiplication and transpose of sparse matrices
2. Use of multidimensional arrays and structures
3. Linked list – singly linked list, circular linked list, and doubly connected linked list and application problems
4. String manipulation applications. Representation of polynomials, arithmetic operations on polynomials
5. Implementation of stacks using arrays and linked lists. Application problems using stacks – Maze problem, conversion between infix, postfix and prefix, expression evaluation etc.
6. Implementation of multiple stacks
7. Implementation of Queues using linked list and array – multiple Queues, Dequeues, priority queue and applications of queues
8. Creation and traversals of binary trees – counting nodes, finding height etc.
9. Creation of binary search tree – searching an item, insertion and deletion of nodes etc.
10. Implementation of sorting and searching algorithms

**08.408 OBJECT ORIENTED PROGRAMMING LAB**

L-T-P: 0 – 0 – 4  
Credits: 4

Implementation of topics covered in 08.404 (Object Oriented Techniques) using Java or C++. Standard Template Library – Containers, Associative Arrays, Iterators.
SEMESTER V

08.501 ENGINEERING MATHEMATICS
(E R F B H)

L-T-P: 3 – 1 – 0

Credits: 4

MODULE I (18 hours)

Discrete and continuous random variables and their probability distributions - Probability distribution (density) functions - Distribution functions - Mean and Variance - Simple problems. - Binomial, Poisson, uniform and exponential distributions - Mean and Variance of the above distributions - Normal distribution - Properties of normal distribution - Computing probabilities using Binomial, Poisson, uniform, exponential and normal distributions.

MODULE II (16 hours)

Curve fitting - Principle of least squares - Fitting a straight line - Fitting a parabola - Linear correlation and regression - Karl Pearson’s coefficient of correlation - Sampling distributions - Standard error - Estimation - Interval estimation of population mean and proportions ( small and large samples) - Testing of Hypothesis - Hypothesis concerning a mean, Equality of means- Hypothesis concerning one proportion, difference of two proportions.

MODULE III (18 hours)

Joint probability density function - Properties - Marginal and conditional distribution - Independence - Random processes - Classification of random processes - Examples - Average values such as mean, autocorrelation, auto covariance, correlation coefficient of random processes - stationarity - strict sense stationary process - wide sense stationary process - Autocorrelation function and its properties - Power spectral density and its properties (no proof) - Related problems - Markov chains. Transition probability matrices - Chapman-Kolmogorov equation (no proof) - Poisson process - Mean and autocorrelation of Poisson process - Related problems.

Reference Books
1. Probability, random variable and stochastic processes, Papoulis and S.U. Pillai, 4/e, TMH
2. Probability and Random Processes, Veerarajan, 2/e, TMH
3. Probability and Random processes with application to signal processing, Stark and Woods, 3/e, Pearson Education
08.502  ADVANCED MATHEMATICS & QUEUEING MODELS (RF)

L-T-P: 3 – 1 – 0  

Credits: 4

MODULE I (18 hours)


MODULE II (16 hours)

Partitioned matrices and matrix factorization - LU decompositions - Vector space and subspace - Null space and Column spaces - Bases - Co-ordinate systems - Dimension of vector space - Rank - Change of basis - Inner product space - Length and orthogonality - Orthogonal sets - Orthogonal projection - Gram-Schmidt process - Least square problem - Quadratic form - Constrained optimization of quadratic forms - Singular value decomposition (proof of the theorem are not included).

MODULE III (18 hours)

Queuing Theory- Queues-Characteristics of Queues-Kendal’s notation-Random arrivals-Arrival and Departure Distributions-Types of Queues- Basic Queuing models- M/M/1:∞/FIFO - P_0 = ρ^0 P_0 (no proof)-Derivation of the following Characteristics 
(a) Probability that queue size ≥ n (b) Average number of customers in the system 
(c) Average length of the waiting line – Waiting time distribution (no proof) – Waiting time in the system – Waiting time in the queue - Little’s Formulae – Problems based on the above results. 
M/M/1:N/FIFO model – Formulae (without proof) for the average number of units in the system and in the queue and the average waiting time – Problems.
M/M/c:∞/FIFO model – Standard results (no derivation) - Problems.

Reference Books
1. Linear Algebra with Applications, David C Lay, Pearson Education
2. Linear Algebra, Schaum Series
3. Linear Algebra, Kenneth Hoffmann and Ray Kunze, PHI.
4. Linear Algebra with Applications, Gareth Williams, Jones and Bartlett publications
5. Linear Algebra with Applications, Gilbert Strang, Thomson Learning
6. Linear Programming, G. Hadly, Addison Wesley
7. Operations Research, Ravindran, Philips, Solberg, Wiley
08.503  THEORY OF COMPUTATION

L-T-P: 2 – 1 – 0

Credits: 3

MODULE I (13 hours)

Introduction to the theory of computation. Finite state automata – description of finite automata, properties of transition functions, designing finite automata, NFA, finite automata with epsilon moves, 2-way finite automata, equivalence of NFA and DFA, Mealy and Moore machines, regular expressions, regular sets and regular grammars, pumping lemma for regular languages, closure properties of regular sets and regular grammars, applications of finite automata, decision algorithms for regular sets, minimization of FSA.

MODULE II (13 hours)

Chomsky classification of languages. Context-Free Grammar - derivation trees, ambiguity, simplification of CFLs, normal forms of CFGs, pumping lemma for CFGs, decision algorithms for CFGs, designing CFGs, PDA – formal definition, examples of PDA, Deterministic PDA, equivalence with CFGs.

MODULE III (13 hours)

Turing machines - basics and formal definition, language acceptability by TM, examples of TM, variants of TMs – multitape TM, NDTM, Universal Turing Machine, offline TMs, equivalence of single tape and multitape TMs. Recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility.

Text Books:
1. Introduction to Automata Theory, Languages and Computation – John E. Hopcroft, Jeffrey D. Ullman and Rajeev Motwani, Pearson Education.

Reference Books:
1. Introduction to The Theory of Computation (Second Edition), Michael Sipser, Thomson.
2. The Theory of Computation, Bernard M. Moret, Pearson Education.
08.504 SYSTEMS PROGRAMMING (RF)

L-T-P: 2 – 1 – 0  Credits: 3

MODULE I (13 hours)

Systems Programming – What is systems programming, Difference between systems programming and application programming – Dependence on systems programming on hardware – System software and Machine architecture. SIC & SIC/XE Architecture and Programming. Traditional (CISC) machines – VAX architecture, Pentium Pro architecture, RISC machine – ultra SPARK, Power PC.

MODULE II (13 hours)


MODULE III (13 hours)


Text Books:

Reference Books:
08.505 OPERATING SYSTEMS

L-T-P: 3 – 1 – 0

Credits:4

MODULE I (15 hours)

Introduction: Basic concepts – terminology. Historical perspective - early systems - types of OS - batch processing - multiprogramming - time sharing - real-time system - functions and components of an operating system - OS services - multiprocessor system - distributed system.

Information management: File concepts - file system - directory structure - gaining access to files - basic file system calls - sharing and security - file protection - allocation methods - implementation issues.

MODULE II (21 hours)


MODULE III (16 hours)

Device management: Physical characteristics – disk scheduling algorithms - sector queuing - device drivers.

Deadlocks: Deadlock problem - characteristics - prevention - avoidance - detection - recovery from dead lock - combined approach to dead lock handling.

Protection: Goals of protection - mechanisms and policies - access matrix and its implementation - dynamic protection structures - security.

Text Books:

Reference Books:
2. Operating Systems - Gary Nutt, Pearson Education.
MODULE I (12 hours)

Communication model- Simplex, half duplex and full duplex transmission.

MODULE II (13 hours)

Sampling theorem - Encoding digital data into digital signal - NRZ, Biphas, Multilevel binary - Encoding digital data into analog signals - ASK, FSK, PSK - Encoding analog data into digital signals - PCM, PM, DM - Encoding analog data into analog signals - AM, FM, PM - Multiplexing - TDM, FDM, WDM & DWDM.

MODULE III (14 hours)

Basics of wireless communication- Introduction to WiFi, WiMax, GSM, GPRS

Text Books:

References:
Computer Networks, Fourth Edition – Andrew S Tanenbaum, PHI.
08.507 DIGITAL CIRCUITS LAB

L-T-P: 4 – 0 – 0
Credits: 4

1. Realization of digital gates
2. Realization of flip-flops
3. Design and implementation of a counter
4. Design and implementation of a shift register
5. Multiplexer / Demultiplexer
6. Timer Circuits (using 555)
7. Experiments using the 8051 microcontroller

08.508 DATABASE LAB

L-T-P: 4 – 0 – 0
Credits: 4

1. Familiarization of creation of databases and SQL commands (DDL, DML and DCL). Suitable exercises to practice SQL commands may be given.
2. Write SQL procedure for an application which uses exception handling.
3. Write SQL procedure for an application with cursors.
4. Write a DBMS program to prepare reports for an application using functions.
5. Write SQL block containing triggers and stored procedures.
6. Develop a menu driven, GUI based user friendly database application in any one of the domains such as Banking, Electricity Billing, Library management, Payroll, Insurance, Inventory, Health care etc. integrating all the features specified in the above exercises.
SEMESTER VI

08.601  COMPILER DESIGN  (RF)

L-T-P:  3 – 1 – 0
Credits: 4

MODULE I (18 hours)

MODULE II (18 hours)
Compile time error handling, error detection, reporting, recovery and repair. Basic parsing techniques – Top down parsing – recursive descent parser, predictive parser simple LL(1) grammar. Bottom up parsers, operator precedence parser, LR grammar, LR(0), SLR(1), LALR(1) parsers.

MODULE III (16 hours)
Syntax directed translation schemes, intermediate codes, translation of assignments, translation of array reference, Boolean expressions, case statements, back patching, code optimization, loop optimization and global optimization, sources of sample code generation.

Text books:
2. Compiler Design – Santanu Chattopadhyaya, PHI.

Reference Books :
08.602 COMPUTER NETWORKS

L-T-P : 2 – 1 – 0

Credits: 3

MODULE I (12 hours)


MODULE II (13 hours)

MAC Sub layer – IEEE 802 FOR LANs & MANs. Bridges - Switches - High Speed LANs - Gigabit Ethernet. Wireless LANs 802.11 a/b/g/n, 802.15.

MODULE III (14 hours)

Transport Layer – TCP & UDP.

Text Books:
Computer Networks, Fourth Edition – Andrew S Tanenbaum, PHI.

References:
3. Handbook of Computer Communications Standards, Volume 1 – Willman Stallings, PHI.
08.603 SOFTWARE ARCHITECTURE

L-T-P: 2 – 1 – 0 Credits: 3

MODULE I (13 hours)


MODULE II (13 hours)


MODULE III (13 hours)


Text Books:
1. Object-Oriented Modeling and Design with UML (2nd Ed.), Michael Blah, James Rumbaugh, Pearson [M I]
2. Software Design – From Programming to Architecture, Eric Braude, Wiley [M II]

References:
1. Software Architecture, Mary Shaw, David Garlan, PHI
08.604  INTERNET TECHNOLOGY

L-T-P: 3 – 1 – 0  Creidts: 4

MODULE I (17 hours)

Introduction - Web Browsers and Web Servers – URL.
Web Content Preparation - HTML, Cascading Style Sheets, JavaScript (Introduction to
Scripting, Control Statements, Functions, Arrays, Objects), DHTML (Object Model and
Collections, Event Model), XML (Creating Markup with XML -XML Namespaces,
Document Type Definitions and Schema, Document Object Model, DOM Methods, Simple
API for XML, Extensible Stylesheet Language, Web Services).

MODULE II (18 hours)

Web Server - Proxy Server - Search Engines - Content Display - Browsers, Plug-ins, Helper
Applications.

Java – Packages and Interfaces, Exception Handling, Multithreaded Programming, Strings,
I/O, Applets, Event Handling, AWT components, Swing components.

MODULE III (17 hours)

Network Programming in JAVA – Looking Up Internet Addresses, Sockets for Clients,
Sockets for Servers, Non-Blocking I/O, UDP Datagrams and Sockets – RMI - Persistence -
Java Beans - CORBA, IDL.

Text Books:
1. Internet & World Wide Web – How To Program (Third edition), H.M. Deitel, P.J. Deitel,
   A.B. Goldberg, Pearson Education.
5. Component Software: Beyond Object-Oriented Programming, Clemens Szyperski, Pearson
   Education.
6. Inside CORBA, Mowbray, Pearson Education.
08.605  COMPUTER GRAPHICS

L-T-P: 2 – 1 – 0  

Credits: 3

MODULE I (12 hours)


MODULE II (13 hours)

Two dimensional transformations – Homogeneous coordinate systems – matrix formulation and concatenation of transformations – Windowing concepts – two dimensional clipping.

Introduction to graphics in three dimension – specification of a 3D view – 3D transformations

MODULE III (14 hours)


Text Books:
3. Pattern Recognition and Image Analysis – E. Gose, R. Johnsonbaugh, S. Jost. PHI

Reference Books
08.606 EMBEDDED SYSTEMS
L-T-P: 3 – 1 – 0 Credits: 3

MODULE I (18 hours)

Introduction - Definition and classification – Processors and hardware units in an embedded system – Software embedded into the system – Embedded system-on-chip - Processor and memory organization. I/O Devices - Synchronous, iso-synchronous and asynchronous communications from serial devices -Internal serial communication devices - Parallel port devices - Timer and counting devices - I²C, CAN, USB and advanced serial high-speed bus - PCI, PCI-X and advanced buses - Device drivers -Interrupt servicing mechanism.

MODULE II (16 hours)

Programming concepts - Assembly language vs high level language - C Program Elements - Queues, stacks and lists - Concepts of embedded programming in C++ - C compilers – Cross compiler – Optimization of memory usage.

MODULE III (18 hours)


Text Books:
08.607  INTERNET LAB

L-T-P: 0 – 0 – 4  
Credits: 4

1. Creation of HTML documents - use of external style sheets, ordered lists, tables, borders, padding, colors, embedded maps.

2. JavaScript - obtaining information on the browser and the operating system, timed JavaScript redirect, JavaScript features.

3. XML – conversion to HTML. Cascading Style Sheets, XSLT. XML document parsing using DOM.

4. Java applets – labels, lists, text fields and animation.

5. Java network programming – simple web client, e-mail client, TCP/IP client and server, chat application with datagram sockets and datagram packets.

6. Java RMI.

7. CORBA.


08.608  COMPUTER GRAPHICS LAB

L-T-P: 0 – 0 – 4  
Credits: 4

2D Graphics: Drawing Elementary figures (line, Polygon), Polygon Filling (Boundary fill, Flood fill and Scan fill), Transformations (Scaling, Rotation, Reflection, Translation, Shear), Windowing and clipping (Polygon and line clipping). Interactive Graphics: Interactive input techniques (mouse programming).

2D Animations using primitives (eg: man cycling along a road, a war aircraft bombing a ship, etc).

3D Graphics: Curves and Surfaces, Clipping, Hidden line and surface removal, Surface rendering, Rotation of a 3D object about arbitrary axis.

Basics of flash animation: Motion Tweening in flash player
SEMESTER VII

08.701 SOFTWARE PROJECT MANAGEMENT

L-T-P : 2 – 1 – 0        Credits: 3

MODULE I (12 hours)


MODULE II (14 hours)


MODULE III (13 hours)

Project scheduling and tracking: Basic concepts-relation between people and effort-defining task set for the software project-selecting software engineering task-refinement of major task-defining a task network-Scheduling-project plan. Software configuration management: baselines-the SCM process-identification of objects in software configuration-Version control-Change control-Configuration audit-status reporting-Software Quality Assurance-SQA activities.

Text Book:

References:
2. Software Project Management in Practice – Pankaj Jalote, Pearson Education
08.702 INTERNETWORKING

L-T-P: 3 – 1 – 0  

Credits: 4

MODULE I (17 hours)

Internet Architecture, Classful Internet Addresses, Mapping Internet Addresses to Physical addresses (ARP), Determining an Internet address at start-up (RARP), Connectionless Datagram Delivery (IPV4), Forwarding IP datagrams, Error and Control Messages (ICMP), Classless and Subnet Address Extensions (CIDR), Protocol Layering, User datagram Protocol, Reliable Stream Transport Service.

MODULE I (18 hours)

Routing Architecture : Cores, Peers, and Algorithms, Routing Between Peers (BGP), Routing Within an Autonomous System (RIP, OSPF), Internet Multi-casting, IP Switching and MPLS, Private Network Interconnection (NAT, VPN), Bootstrap and Autoconfiguration (DHCP).

MODULE I (17 hours)

Applications - DNS, Remote Login and Desktop (TELNET, SSH), File Transfer and Access (FTP, TFTP, NFS), Electronic Mail (SMTP, POP, IMAP, MIME), WWW (HTTP), Voice and Video Over IP (RTP, RSVP, QoS).

Text Books :
08.703 CRYPTOGRAPHY

L-T-P: 2 – 1 – 0

Credits : 3

MODULE I (12 hours)


MODULE II (14 hours)

The DES algorithm: Characteristics, Alternative descriptions, Analysis of the DES, DES modes. IDEA (International Data Encryption Algorithm).
Public Key Systems: Introduction, RSA system, Knapsack system, Cracking the Knapsack system, Public key systems based on elliptic curves.

MODULE III (13 hours)

Key Management: General aspects of key management, Key distribution for asymmetrical systems, Key distribution for symmetrical algorithms, Network security, Fair cryptosystems.

Text Books:
1. Basic Method of Cryptography, Jan C. A. Van Der Lubbe, CAMBRIDGE UNIVERSITY PRESS
MODULE I (13 hours)

Introduction - Web architecture - web application lifecycle - XML and J2EE. Design and development of a J2EE application - J2EE Layers, Application Components, J2EE Architecture, Development methodology - Task list for building J2EE Applications - database design - defining the application - creating the interface, building pages, creating data access objects, validating the code. JDBC: Architecture - JDBC API, Retrieving and updating Data, SQL-to-Java Data Types, JDBC Execution Types, Metadata, Scrollable Resultsets, transaction support, Batch Statements.

MODULE II (13 hours)

Servlets: Introduction to Servlets, Benefits of Servlets, use as controller in MVC, basic HTTP, servlet container, Servlets API, javax.servlet Package, Reading Servlet parameters, service method detail, HTML clients, servlet lifecycle, HTTP response header, session management, dispatching requests, Servlets with JDBC, web applications. Java Server Pages: Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values, Setting attributes, Error Handling and Debugging, Using JavaBeans Components in JSP Pages, Sharing Data Between JSP pages -Passing Control and Data between Pages – Sharing Session and Application Data – Application Models - MVC Design.

MODULE III (13 hours)

Enterprise JavaBeans : Overview, distributed programming, EJB framework, Session and entity beans, Stateless and tateful session bean, Bean attributes, Parts of a Bean, container-managed persistence (CMP) and bean managed - lifecycle of EJB - java message service (JMS) and message driven beans (MDB), distributed programming services, CORBA and RMI - Transaction management, Security, deployment, personal roles for EJB Development, building session beans - creating session beans - Entity beans.

Text Books :

Reference Books :
2. Java Server Pages –Hans Bergsten, SPD O’Reilly
08.705A ALGORITHM ANALYSIS AND DESIGN

L-T-P: 4-0-0 Credits :4

MODULE I (16 hours)

Concepts in algorithm analysis – the efficiency of algorithms, average and worst – case analysis, Asymptotic notation, time and space complexity, Recurrences – substitution method, iteration method and master method, Analysis of sorting algorithms – insertion sorting, heaps, maintaining the heap property, building heap, heap sort algorithm, priority queues. Description of quick sort, randomized version of quick sort.

MODULE II (18 hours)


MODULE III (18 hours)


Text Books :
1. Introduction to Algorithms – Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, PHI.
3. Fundamentals of sequential and parallel algorithms – Kenneth A. Merman and Jerome L. Paul, Vikas Publishing

Reference Books :
2. Introduction to the design and analysis of algorithms – A. Levitin, Pearson Education
3. Computer algorithms - Introduction to design and Analysis – Sara Baase, Allen Van Gelder
08.705B  SIMULATION AND MODELING

L-T-P: 4 – 0 – 0                    Credits : 4

MODULE I (18 hours)


MODULE I (17 hours)


MODULE I (17 hours)


<table>
<thead>
<tr>
<th>Text Book</th>
<th>Simulation Modeling and Analysis 4th Ed. Averill M. Law, TMH</th>
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<tbody>
<tr>
<td>Reference</td>
<td>System Simulation, Geoffrey Gordon, PHI</td>
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08.705C PRINCIPLES OF PROGRAMMING LANGUAGES

L-T-P: 4 – 0 – 0

Credits: 4

MODULE I (17 hours)

Names, Scopes, and Bindings: Names and Scopes, Binding Time, Scope Rules, Storage Management, Aliases, Overloading, Polymorphism, Binding of Referencing Environments, Separate Compilation.


Data Types: Type Systems, Type Checking, Records and Variants, Arrays, Strings, Sets, Pointers and Recursive Types, Lists, Files and Input/Output, Equality Testing and Assignment.

MODULE II (18 hours)

Subroutines and Control Abstraction: Static and Dynamic Links, Calling Sequences, Parameter Passing, Generic Subroutines and Modules, Exception Handling, Events.


Data Abstraction and Object Orientation: Encapsulation, Inheritance, Constructors and Destructors, Dynamic Method Binding, Multiple Inheritance, Smalltalk Object Model.

MODULE III (17 hours)

Innovative features of Scripting Languages: Scoping rules, String and Pattern Manipulation, Data Types, Object Orientation.

Concurrency: Threads, Coroutines, Synchronization, Language-Level Mechanisms.

Run-time program Management: Virtual Machines, Late Binding of Machine Code, Reflection, Symbolic Debugging, Performance Analysis.

Introduction to Formal Semantics and Program Verification: Operational Semantics, Denotational Semantics, Axiomatic Semantics, Proofs of Program Correctness, Assertions in C and JAVA.

Text Books:
   (Including the companion CD with the book).

Reference Books:
   Tata McGraw-Hill Edition
08.705D COMMUNICATIVE ENGLISH & TECHNICAL WRITING
(Common with 08.704(3) of CSE)

L-T-P: 3-1-0 Credits: 4

MODULE I (20 hours)

Listening, Reading, Speaking and Writing skills.
Listening Skills: Listening for general content- Intensive listening-Listening for specific information.
Speaking Skills: Oral practice-Describing objects/situations/people-Role play-Just A Minute/Group Discussion- informal letters-essentials of telephonic conversation-invitations-minutes of a meeting.
Reading Skills: Skimming the text- exposure to a variety of technical articles, essays, graphic representation, and journalistic articles.
Writing Skills: Skills to express ideas in sentences, use of appropriate vocabulary -sentence construction-paragraphs development-note making-editing a passage and essay writing.
Basics of Technical Communication.
Technical communication- features, Distinction between general and technical communication-language as a tool of communication- levels of communication-interpersonal, organizational, mass communication-the flow of communication: upward, downward and lateral-importance of technical communication- barriers to communication.

MODULE II (20 hours)

Forms of Technical communication.

MODULE III (12 hours)

A non-detailed study of the autobiography: “Wings of Fire-an autobiography by APJ Abdul Kalam”.
Students should read the book on their own and selected topics may be discussed in the class.

Reference Books:
4. Everyday Dialogues in English – Robert J Dixson, PHI.
08.706A COMPUTER PERIPHERALS & INTERFACING

L-T-P: 4 – 0 – 0 Credits: 4

MODULE I (17 hours)


MODULE I (18 hours)


MODULE I (17 hours)


Text Books:
1. Upgrading and Repairing PCs – ScottMueller, Pearson Education.
2. David Groth, A+ Study Guide - Core Module - - B.P.B

Reference:
The Indispensable PC Hardware Book – Hans Peter Messmer, Addison Wesley/Pearson Education
08.706B OPTIMIZATION TECHNIQUES

L-T-P: 4 – 0 – 0 Credits: 4

MODULE I (17 hours)

General methods of solving operations research models, scientific methods in operations research - Mathematical formulation of linear programming problem, Graphical solution, Simplex algorithm and its applications, use of artificial variables, quality, economic interpretation, degeneracy and elementary sensitivity analysis – Transportation problem – mathematical formulation – initial feasible solution by VAM method, degeneracy, unbalance transportation problem – Assignment problem, mathematical formulation, the assignment algorithm, unbalanced assignment problems

MODULE II (18 hours)

Replacement model, types of replacement problems, problem of choosing between two machines, determination of best replacement age of machine using present worth and discount rate, group replacement - game theory – definition of a game – two person zero sum game – graphical solution, application in marketing, advertisement etc. – decision theory – decision under risk – expected value of profit or loss, expected variance criterion, decision trees, decision under uncertainty – the Laplace criterion, the mini-max criterion, minimax regret criterion, Hurvitz criterion.

MODULE III (17 hours)

Network analysis – project scheduling by PERT – CPM, arrow head representation, calculation of critical path, probability and cost consideration in project scheduling. Construction of the time chart-resource leveling.

Text Books:
1. Operations research, B S Goel, S K Mittal
2. Operations Research , Frederick S Hiller, Generald J Liebermann
08.706C   DATA MINING TECHNIQUES  
(Common with 08.705(4) of CSE)

L-T-P: 4-0-0  Credits: 4

MODULE I (17 hours)

Fundamentals of data mining - Basic data mining tasks, Issues, DM versus KDD Data preprocessing- Aggregation, Sampling, Dimensionality reduction, Feature subset selection, Feature creation, Discretization and Binarization, Variable transformation. Data warehousing and OLAP Technology – Introduction to Data warehouse, Multidimensional data model, Data warehouse architecture and implementation, Data warehousing and data mining, System architecture.

MODULE II (17 hours)


MODULE III (18 hours)


Text Books :
1. Data Mining : Concepts and Techniques - Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers.
2. Data Mining : Introductory and Advanced Topics - Margaret H. Dunham, S.Sridhar, Pearson Education.

Reference Books :
3. Data Warehousing, Data Mining and OLAP – A. Berson and S. J. Smith, Tata McGraw-Hill.
08.707 COMPUTER NETWORKS LAB

L-T-P: 0-0-4 Credits : 4

Experiments Using Routers and Switches

1. Basic router configuration.
2. Implementing static routing.
3. Implementing dynamic routing using RIP
4. Implementing dynamic routing using OSPF
5. Implementing dynamic routing using EIGRP
6. Basic switch configuration
7. VLAN configuration
8. VTP, VTP pruning.
9. Implement inter-VLAN routing
11. Access Control List (Standard and Extended)
12. Configuring PPP.

Practice Experiments

Familiarization of different Network Cables- Color coding - Crimping.
Familiarization of Wireless Access Point.

08.708 SEMINAR / PROJECT DESIGN

L-T-P: 0 – 0 – 4 Credits : 4

Each student should present a seminar of 30 minutes duration on any one of the emerging topics in Information Technology. The seminars should preferably be based on research papers from reputed journals and should be done under the guidance of a faculty member of the department. A seminar report should be prepared and submitted.

Each student along with other team members and under the supervision of a faculty member should identify a problem for the final year project. It should be based on the core subjects of the discipline and could involve software and/or hardware implementation. The preliminary work for the project - literature survey, design etc. - should be carried out in this semester.

An evaluation should be conducted at the end of the semester. For awarding internal marks, the relative weightage of the seminar and the project design will be 1:1.
SEMESTER VIII

08.801 MOBILE COMPUTING

L-T-P: 3 – 1 – 0 Credits: 4

MODULE I (17 hours)


MODULE II (17 hours)


MODULE III (18 hours)


Text Books:
2. Wireless Communications and Networks - William Stallings, Pearson Education
08.802 E-COMMERCE

L-T-P: 3 – 0 – 0

Credits: 3

MODULE I (13 hours)

Definition and scope of e-commerce - Advantages and constraints - Strategy making in online environment - Framework for e-commerce.
Basic Technology - Intranets and extranets - Planning an intranet - Extranets and Supply Chain Management - Hosting a web site - Choosing an ISP - Mobile commerce - Website evaluation and usability testing.

MODULE II (13 hours)

Market opportunity analysis - Internet marketing - Tracking customers - Customer service - Web portals and web services - Branding.

MODULE III (13 hours)


Text Books:
08.803 E-SECURITY

L-T-P: 2 – 1 – 0  Credits: 3

MODULE I (12 hours)

MODULE I (14 hours)
Protection in general purpose Operating Systems.
Designing trusted Operating Systems.
Database Security.

MODULE I (13 hours)

Text Book:

Reference:
08.804 SOFTWARE TESTING

L-T-P: 2 – 1 – 0

Credits: 3

MODULE I (13 hours)


MODULE II (13 hours)

Test planning - Test strategy – Test plan templates (System testing) – Guidelines for developing test plan - Test Estimation – Test standards – Building Test data and Test cases - Test Scenario – Test Scripts - Tools used to build test data – testing object oriented software – Testing web applications.

MODULE III (13 hours)


Text Books:
2. Introducing Software Testing - Louise Tamres, Pearson

References:
1. Software Testing - Effective methods, Tools and Techniques - Renu Rajani, Pradeep Oak, TMH
2. The Art of Software Testing - Glenford J. Myers, Wiley
4. Effective Software Testing, 50 Specific Ways to Improve Your Testing - Elfriede Dustin Pearson
08.805A  ADVANCED MICROPROCESSORS

L-T-P: 4 – 0 – 0  
Credits : 4

MODULE I (17 hours)

Intel 8085 – Introduction-Addressing modes - Instruction set - CPU pins & associated signals - Interrupt Systems – Assembly Language Programming
The Mechanics of Program Execution.

MODULE II (17 hours)


MODULE III (18 hours)

64-Bit Computing and x86-64 - The G5: IBM's PowerPC 970- Understanding Caching and Performance-Intel's Pentium M, Core Duo, and Core 2 Duo.

Text Books :
08.805B NETWORK PROGRAMMING

L-T-P: 4 – 0 – 0

Credits: 4

MODULE I (18 hours)

Internet Protocol, The structure of TCP /IP software in an operating system, Network interface layer, Address Recovery and binding global, Software organization, Routing table and Routing algorithm, Fragmentation and reusability of datagrams, Error processing, Multicast processing.

MODULE II (17 hours)

User datagrams. TCP- Data structures and Input processing. Finite state machine implementation, Output processing timer management, flow control and adaptive retransmission, Urgent data processing and the push function.

MODULE III (17 hours)

Socket level interface, Active Route propagation and Passive acquisition, Route propagation with an SPF algorithm.

Text Books:
Internetworking with TCP / IP - Volume II, Design, Implementation and Internals, D. E. Comer and D. L Stevens, PHI.
08.805C  GRAPH THEORY  
(Common with 08.805(4) of CSE) 

L-T-P: 4-0-0  

Credits: 4 

MODULE I (16 hours) 

What is graph – Application of graphs – finite and infinite graphs – Incidence and Degree – Isolated vertex, pendent vertex, Null graph. 
Paths and circuits – Isomorphism, sub graphs, walks, paths and circuits, Connected graphs, disconnected graphs, Euler graphs, Hamiltonian paths and circuits – Travelling salesman problem. Trees – properties, pendent vertex, Distance and centres - Rooted and binary tree, counting trees, spanning trees. 

MODULE II(18 hours) 

Combinatorial versus geometric graphs, Planar graphs, Different representation of planar graphs, geometric dual, combinatorial dual, vector spaces of graph, ban2 vectors of a graph, orthogonal vectors and spaces Directed graphs – types of digraphs, Digraphs and binary relation, Euler graphs, trees with directed edges. 

MODULE III 18 hours) 

Graph theoretic algorithms and computer programming - Algorithm for computer representation of a graph, algorithm for connectedness and components, spanning tree, directed circuits, shortest path, searching the graphs, Isomorphism. 
Graphs in switching and coding theory – contact networks, Analysis of contact Networks, synthesis of contact networks, sequential switching networks, unit cube and its graph, graphs in coding theory. 

Text Books : 
2. Graph Theory – Narasingh Deo, PHI. 

Reference Books : 
2. A First Look at Graph Theory – John Clark and Derek Allan Hotton, Allied.
08.806A  SOFT COMPUTING

L-T-P: 4 – 0 – 0  
Credits: 4

MODULE I (17 hours)

Comparison of Soft Computing Methods - Neural networks, Fuzzy Logic, Genetic Algorithm with Conventional Artificial Intelligence (hard computing) 
Neural Networks- Different Architectures, Back-propagation Algorithm, Hybrid Learning Rule, Supervised Learning-

MODULE II(18 hours)

Fuzzy Set Theory – Basic Definition and terminology, Basic Concepts of Fuzzy Logic, Set Theoretic Operators, Membership functions- formulation and parameterization. Fuzzy Union, Intersection, and Complement. Fuzzy Rules and Fuzzy Reasoning. Fuzzy Inference Systems-

MODULE III(18 hours)

Genetic Algorithm – Basics of Genetic Algorithms, Design issues in Genetic Algorithm, 

Text Book :


References :

1. Neurofuzzy and Soft Computing, J S R Jang, C T Sun, E Mizutani, PHI.
5. Neural Fuzzy Systems, C T Lin & C S G Lee, PHI.
08.806B DISTRIBUTED SYSTEMS
L-T-P: 4 – 0 – 0 Credits: 4

MODULE I (17 hours)

MODULE II (17 hours)
Interprocess communication: the API for Internet protocol – external data representation and Marshalling – client server communication - group communication-Case study: inter process communication in Unix. Distributed objects and remote invocation: communication between distributed objects – remote procedure call – Events and notification.

MODULE III (18 hours)
Operating system support: Operating system layer – protection – processes and threads- communication and invocation – Operating system architecture.
Distributed file system: File service architecture – Sun network file system- Transactions and concurrency control: Transactions, nested transactions-locks-optimistic concurrency control.
Replication: System model and group Communication.

Text Books:
Distributed Systems: Concepts and Design – George Coulouris, Jean Dollimore and Tim Kindberg, Pearson Education

References:
1. Distributed Systems: Principles and Paradigms – Andrew S Tanenbaum and Maarten Van Steen, Pearson Education
2. Distributed Systems and Computer Networks – Morris Solomon and Jeff Krammer, PHI
08.806C  WEB SERVICES

L-T-P: 4 – 0 – 0  Credits: 4

MODULE I (18 hours)
Introduction to web services - Benefits of web services - How web services work. XML schema - Basic elements and attributes - Types - Occurrence constraints - Element groups - Namespaces - Qualification - Global declarations - Modular schemas - Extensions and restrictions - Substitution groups - Importing types.

MODULE II (17 hours)

MODULE III (17 hours)

Text Books :
08.807 WEB APPLICATIONS LAB

L-T-P: 0 – 0 – 4

Credits: 4

1. Implementing and deploying web applications using Servlets, HTML and JSPs.
2. Testing the application on an Application Server.
3. Debugging Web applications locally and remotely.
4. Developing applications in a team environment.
5. Retrieval of data from database using SQL and exchange of information in XML format.

08.808 PROJECT & VIVA VOCE

L-T-P: 0 – 0 – 4

Credits: 4

The project should be based on the core subjects of the discipline. The work can be carried out in the department under the supervision of a faculty member or with the help of an external organization. In the latter case, the motivation of the organizations should be purely academic and they should provide an external guide whose qualifications should be on par with that of a faculty member. An internal guide will be consistently interacting with the external guide and monitoring the progress of the project. There should be a mid-semester and end-semester evaluation of the project.

The student has to submit a thesis in the prescribed format, duly certified by the internal guide and external guide (if any).

In the viva voce, the student's performance will be evaluated based on the project work, the seminar presented and the knowledge of the courses in the whole curriculum. The distribution of the marks will be in the ratio 2:1:2, respectively.