REGULATIONS, CURRICULUM AND SYLLABUS

for

B. TECH

ELECTRONICS AND COMMUNICATION ENGINEERING

PONDICHERY UNIVERSITY
PONDICHERY-605 014
1. Conditions for Admission:

(a) Candidates for admission to the first semester of the 8 semester B.Tech. Degree programme should be required to have passed:

The Higher Secondary Examination of the (10+2) curriculum (Academic Stream) prescribed by the Government of Tamil Nadu or any other examination equivalent thereof to with minimum of 45% marks (a mere pass for OBC and SC/ST candidates) in aggregate of subjects – Mathematics, Physics and any one of the following optional subjects: Chemistry / Biotechnology/ Computer Science / Biology (Botany & Zoology) or an Examination of any University or Authority recognized by the Executive Council of the Pondicherry University as equivalent thereto.

(b) For Lateral entry into third semester of the eight semester B.Tech programme:

The minimum qualification for admission is a pass in three year diploma or four year sandwich diploma course in engineering / technology with a minimum of 60% marks (50% marks for OBC and a mere pass for SC/ST candidates) in aggregate in the subjects covered from 3rd to final semester or a pass in any B.Sc. course with mathematics as one of the subjects of study with a minimum of 60% marks (50% marks for OBC and a mere pass for SC/ST candidates) in aggregate in main and ancillary subjects excluding language subjects. The list of diploma programs approved for admission for each of the degree programs is given in Annexure A.

2. Age Limit:

The candidate should not have completed 21 years of age as on 1st July of the academic year under consideration. For Lateral Entry admission to second year of degree programme. Candidates should not have completed 24 years as on 1st July of the academic year under consideration. In the case of SC/ST candidates, the age limit is relaxable by 3 years for both the cases.

3. Duration of Programme:

The Bachelor of Technology degree programme shall extend over a period of 8 consecutive semesters spread over 4 academic years – two semesters constituting one academic year. The duration of each semester shall normally be 15 weeks excluding examinations.
4. Eligibility for the award of Degree:

No candidate shall be eligible for the award of the degree of Bachelor of Technology, unless he/she has undergone the course for a period of 8 semesters (4 academic years) / 6 semesters (3 academic years for Lateral Entry candidates) in the faculty of Engineering and has passed the prescribed examinations in all the semesters.

5. Branches of Study:

<table>
<thead>
<tr>
<th>Branch</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branch I</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>Branch II</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Branch III</td>
<td>Electronics &amp; Communication Engineering</td>
</tr>
<tr>
<td>Branch IV</td>
<td>Computer Science &amp; Engineering</td>
</tr>
<tr>
<td>Branch V</td>
<td>Electrical &amp; Electronics Engineering</td>
</tr>
<tr>
<td>Branch VI</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>Branch VII</td>
<td>Electronics &amp; Instrumentation Engineering</td>
</tr>
<tr>
<td>Branch VIII</td>
<td>Information Technology</td>
</tr>
<tr>
<td>Branch IX</td>
<td>Instrumentation &amp; Control Engineering</td>
</tr>
<tr>
<td>Branch X</td>
<td>Biomedical Engineering</td>
</tr>
</tbody>
</table>

or any other branches of study as and when offered. The branch allocation shall be ordinarily done at the time of admission of the candidate to the first semester.

6. Subjects of Study:

The subjects of study shall include theory and practical courses as given in the curriculum and shall be in accordance with the prescribed syllabus. The subjects of study for the first two semesters shall be common for all branches of study.

7. Examinations:

The theory and practical examinations shall comprise continuous assessment throughout the semester in all subjects as well as university examinations conducted by Pondicherry University at the end of the semester (November / December or April / May).

(a) Theory courses for which there is a written paper of 75 marks in the university examination.

The Internal Assessment marks of 25 has to be distributed as 10 marks each for two class tests and 5 marks for class attendance in the particular subject. The distribution of marks for attendance is as follows.

- 5 marks for 95% and above
- 4 marks for 90% and above but below 95%
- 3 marks for 85% and above but below 90%
2 marks for 80% and above but below 85%
1 mark for 75% and above but below 80%

In total, three tests are to be conducted and the best two are to be considered for assessment.

(b) Practical courses for which there is a university practical examination of 50 marks:

The internal assessment marks of 50 has to be distributed as 20 marks for the periodic practical works and records submitted thereof, 15 marks for an internal practical examination, 5 marks for an internal viva voce, and 10 marks for class attendance in the particular subject. The distribution of marks is as given below.

10 marks for 95% and above
8 marks for 90% and above but below 95%
6 marks for 85% and above but below 90%
4 marks for 80% and above but below 85%
2 marks for 75% and above but below 80%

8. Requirement for appearing for University Examination:

A candidate shall be permitted to appear for university examinations at the end of any semester only if:

(i) He / She secures not less than 75% overall attendance arrived at by taking into account the total number of periods in all subjects put together offered by the institution for the semester under consideration.

(Candidates who secure overall attendance greater than 60% and less than 75% have to pay a condonation fee as prescribed by University along with a medical certificate obtained from a medical officer not below the rank of Asst. Director)

(ii) He / She earns a progress certificate from the Head of the institution for having satisfactorily completed the course of study in all the subjects pertaining to that semester.

(iii) His / Her conduct is found to be satisfactory as certified by the Head of the institution.

A candidate who has satisfied the requirement (i) to (iii) shall be deemed to have satisfied the course requirements for the semester.

9. Procedure for completing the course:

A candidate can join the course of study of any semester only at the time of its normal commencement and only if he/she has satisfied the course requirements for the previous semester and further has registered for the university examinations of the previous semester in all the subjects as well as all arrear subjects if any.
However, the entire course should be completed within 14 consecutive semesters (12 consecutive semesters for students admitted under lateral entry).

10. Passing Minimum:

(i) A candidate shall be declared to have passed the examination in a subject of study only if he/she secures not less than 50% of the total marks (Internal Assessment plus University examination marks) and not less than 40% of the marks in University examination.

(ii) A candidate who has been declared “Failed” in a particular subject may reappear for that subject during the subsequent semesters and secure a pass. However, there is a provision for revaluation of failed or passed subjects provided he/she fulfills the following norms for revaluation.

(a) Applications for revaluation should be filed within 4 weeks from the date of declaration of results or 15 days from the date of receipt of marks card whichever is earlier.

(b) The candidate should have attended all the college examinations as well as university examinations.

(c) If a candidate has failed in more than two papers in the current university examination, his/her representation for revaluation will not be considered.

(d) The request for revaluation must be made in the format prescribed duly recommended by the Head of the Institution along with the revaluation fee prescribed by the University.

The internal assessment marks obtained by the candidate shall be considered only in the first attempt for theory subjects alone. For the subsequent attempts, University examination marks will be made upto the total marks. Further the University examination marks obtained in the latest attempt shall alone remain valid in total suppression of the University examination marks obtained by the candidate in earlier attempts.

11. Award of Letter Grades:

The assessment of a course will be done on absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain points, will be awarded as per the range of total marks (out of 100) obtained by the candidate, as detailed below:
<table>
<thead>
<tr>
<th>Range of Total Marks</th>
<th>Letter Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 to 100</td>
<td>S</td>
<td>10</td>
</tr>
<tr>
<td>80 to 89</td>
<td>A</td>
<td>9</td>
</tr>
<tr>
<td>70 to 79</td>
<td>B</td>
<td>8</td>
</tr>
<tr>
<td>60 to 69</td>
<td>C</td>
<td>7</td>
</tr>
<tr>
<td>55 to 59</td>
<td>D</td>
<td>6</td>
</tr>
<tr>
<td>50 to 54</td>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>0 to 49</td>
<td>F</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete</td>
<td>FA</td>
<td></td>
</tr>
</tbody>
</table>

‘F’ denotes failure in the course. ‘FA’ denotes absent / detained as per clause 8.

After results are declared, grade sheets will be issued to the students. The grade sheets will contain the following details:

(a) The college in which the candidate has studied.

(b) The list of courses enrolled during the semester and the grades scored.

(c) The Grade Point Average (GPA) for the semester and The Cumulative Grade Point Average (CGPA) of all enrolled subjects from first semester onwards.

(d) GPA is the ratio of sum of the products of the number of credits (C) of courses registered and the corresponding grades points (GP) scored in those courses, taken for all the courses and sum of the number of credits of all the courses.

$$GPA = \frac{\text{Sum of } (C \times GP)}{\text{Sum of } C}$$

CGPA will be calculated in a similar manner, considering all the courses enrolled from first semester. FA grades are to be excluded for calculating GPA and CGPA.

The conversion of CGPA into percentage marks is as given below

$$\% \text{Marks} = (\text{CGPA} \times 0.5) \times 10$$

12. Award of Class and Rank:

(i) A candidate who satisfies the course requirements for all semesters and who passes all the examinations prescribed for all the eight semesters (six semesters for lateral entry candidates) within a maximum period of 7 years (6 years for lateral entry candidates) reckoned from the commencement of the first semester to which the candidate was admitted shall be declared to have qualified for the award of degree.
(ii) A candidate who qualifies for the award of the degree passing in all subjects pertaining to semesters 3 to 8 in his/her first appearance within 6 consecutive semesters (3 academic years) and in addition secures a CGPA of 8.50 and above for the semesters 3 to 8 shall be declared to have passed the examination in **FIRST CLASS** with **DISTINCTION**.

(iii) A candidate who qualifies for the award of the degree by passing in all subjects relating to semesters 3 to 8 within a maximum period of eight semesters after his/her commencement of study in the third semester and in addition secures CGPA not less than 6.5 shall declared to have passed the examination in **FIRST CLASS**.

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

(v) For the Award of University ranks and Gold Medal for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first ten candidates in each branch of study.

13. **Provision for withdrawal:**

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

14. **Discontinuation of Course:**

If a candidate wishes to temporarily discontinue the course for valid reasons, he/she shall apply through the Head of the Institution in advance and obtain a written order from the University permitting discontinuance. A candidate after temporary discontinuance may rejoin the course only at the commencement of the semester at which he/she discontinued, provided he/she pays the prescribed fees to the University. The total period of completion of the course reckoned from the commencement of the first semester to which the candidate was admitted shall not in any case exceed 7 years, including of the period of discontinuance.

15. **Revision of Regulations and Curriculum:**

The University may from time to time revise, amend or change the regulations of curriculum and syllabus as and when found necessary.
ANNEXURE – A

<table>
<thead>
<tr>
<th>B.Tech courses in which admission is sought</th>
<th>Diploma courses eligible for admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Engineering</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td></td>
<td>Civil and Rural Engineering</td>
</tr>
<tr>
<td></td>
<td>Civil Engineering Architectural</td>
</tr>
<tr>
<td></td>
<td>Assistantship Architecture</td>
</tr>
<tr>
<td></td>
<td>Agricultural Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td></td>
<td>Automobile Engineering</td>
</tr>
<tr>
<td></td>
<td>Agricultural Engineering</td>
</tr>
<tr>
<td></td>
<td>Mechanical and Rural Engineering</td>
</tr>
<tr>
<td></td>
<td>Engineering Refrigeration and</td>
</tr>
<tr>
<td></td>
<td>Air-conditioning Agricultural Engineering</td>
</tr>
<tr>
<td></td>
<td>&amp; Farm Equipment Technology</td>
</tr>
<tr>
<td></td>
<td>Metallurgy</td>
</tr>
<tr>
<td></td>
<td>Production Engineering</td>
</tr>
<tr>
<td></td>
<td>Machine Design &amp; Drafting</td>
</tr>
<tr>
<td></td>
<td>Machine tool maintenance and Repairs</td>
</tr>
<tr>
<td></td>
<td>Printing Technology / Engineering</td>
</tr>
<tr>
<td></td>
<td>Textile Engineering / Technology</td>
</tr>
<tr>
<td></td>
<td>Tool Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical and Electronics Engineering</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Electrical &amp; Communication Engineering</td>
<td>Electrical and Electronics Engineering</td>
</tr>
<tr>
<td>Electronic and Instrumentation Engineering</td>
<td>Electronics and Instrumentation</td>
</tr>
<tr>
<td>Instrumentation and Control Engineering</td>
<td>Engineering</td>
</tr>
<tr>
<td>Bio Medical Engineering</td>
<td>Instrumentation Engineering / Technology</td>
</tr>
<tr>
<td></td>
<td>Medical Electronics</td>
</tr>
<tr>
<td></td>
<td>Instrumentation and Control Engineering</td>
</tr>
<tr>
<td></td>
<td>Applied Electronics</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td></td>
<td>Chemical Technology</td>
</tr>
<tr>
<td></td>
<td>Petrochemical</td>
</tr>
<tr>
<td></td>
<td>Technology Petroleum</td>
</tr>
<tr>
<td></td>
<td>Engineering Ceramic</td>
</tr>
<tr>
<td></td>
<td>Technology</td>
</tr>
<tr>
<td></td>
<td>Plastic Engineering</td>
</tr>
<tr>
<td></td>
<td>Paper &amp; Pulp Technology</td>
</tr>
<tr>
<td></td>
<td>Polymer Technology</td>
</tr>
<tr>
<td>Information Technology</td>
<td>Computer Science and Engineering</td>
</tr>
<tr>
<td>Computer Science &amp; Engineering</td>
<td>Computer Technology</td>
</tr>
<tr>
<td></td>
<td>Electrical and Electronics Engineering</td>
</tr>
<tr>
<td></td>
<td>Electronics &amp; Communication</td>
</tr>
<tr>
<td></td>
<td>Engineering Electronics &amp; Instrumentation</td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
</tr>
<tr>
<td></td>
<td>Instrumentation Engineering / Technology</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# PONDICHERRY UNIVERSITY

## B.Tech (Electronics and Communication Engineering)

### CURRICULUM

#### I Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>T101</td>
<td>Mathematics – I</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>T102</td>
<td>Physics</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T103</td>
<td>Chemistry</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T110</td>
<td>Basic Civil and Mechanical Engineering</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T111</td>
<td>Engineering Mechanics</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>T112</td>
<td>Communicative English</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Practical

|          |                                               |         |         |       |     |     |     |
|----------|-----------------------------------------------|---------|---------|-------|
| P104     | Physics lab                                   |         |         | 3     | 2   | 50 | 50 | 100|
| P105     | Chemistry lab                                 |         |         | 3     | 2   | 50 | 50 | 100|
| P106     | Workshop Practice                             |         |         | 3     | 2   | 50 | 50 | 100|

Total: 22 L, 2 T, 9 P, 29 IA, 300 UE, 600 TM

#### II Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>T107</td>
<td>Mathematics – II</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>T108</td>
<td>Material Science</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T109</td>
<td>Environmental Science</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>T104</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>T105</td>
<td>Engineering Thermodynamics</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>T106</td>
<td>Computer Programming</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Practical

|          |                                               |         |         |       |     |     |     |
|----------|-----------------------------------------------|---------|---------|-------|
| P101     | Computer Programming Lab                      |         |         | 3     | 2   | 50 | 50 | 100|
| P102     | Engineering Graphics                          | 2      | -      | 3    | 2   | 50 | 50 | 100|
| P103     | Basic Electrical & Electronics Lab            |         |         | 3     | 2   | 50 | 50 | 100|
| P107     | NSS / NCC *                                   |         |         |       |     |     |     |

Total: 22 L, 4 T, 9 P, 27 IA, 300 UE, 600 TM

*To be completed in I and II semesters, under Pass / Fail option only and not counted for CGPA calculation.*
### III Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA T31</td>
<td>Mathematics –III</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T32</td>
<td>Electrical Engineering</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T33</td>
<td>Object Oriented Programming</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T34</td>
<td>Electron Devices</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T35</td>
<td>Circuit Theory</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T36</td>
<td>Engineering Electromagnetics and Waves</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC P31</td>
<td>Electrical Engineering Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P32</td>
<td>Object Oriented Programming Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P33</td>
<td>Electron Devices Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

### IV Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA T41</td>
<td>Probability and Random Process</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T42</td>
<td>Electronic Circuits-I</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T43</td>
<td>Signals and Systems</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T44</td>
<td>Networks and Transmission Lines</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T45</td>
<td>Digital Circuit Design</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T46</td>
<td>Control Systems</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC P41</td>
<td>Electronic Circuits – I Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P42</td>
<td>Digital Circuit Design Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P43</td>
<td>Networks and Transmission Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>SP P44</td>
<td>Physical Education *</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

* Under pass/fail option only and not accounted for CGPA calculation
## V Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA T51</td>
<td>Numerical Methods and Techniques</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T52</td>
<td>Electronic Circuits-II</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T53</td>
<td>System Design using ICs</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T54</td>
<td>Digital Signal Processing</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T55</td>
<td>Analog Communication Systems</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T56</td>
<td>Waveguides, Antennas and Propagation</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC P51</td>
<td>Electronic Circuits – II Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P52</td>
<td>System Design using ICs Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>PE P53</td>
<td>Communication Lab-I</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>HS P54</td>
<td>General Proficiency – I</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>20</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

## VI Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC T61</td>
<td>Information Theory and Coding</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>EC T62</td>
<td>Digital Communication</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T63</td>
<td>Computer and Communication Networks</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EC T64</td>
<td>Microprocessor and Microcontroller</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Elective-I</td>
<td></td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Elective-II</td>
<td></td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC P61</td>
<td>Communication Lab II</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P62</td>
<td>Computer Networks Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>EC P63</td>
<td>Microprocessor and Microcontroller Lab</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>HS P64</td>
<td>General Proficiency - II</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>23</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>
### VII Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L  T  P</td>
<td>IA  UE  TM</td>
<td></td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC T71</td>
<td>Engineering Economics</td>
<td>3  1</td>
<td>3  25  75  100</td>
<td></td>
</tr>
<tr>
<td>EC T72</td>
<td>Microwave and Optical Engineering</td>
<td>4  -</td>
<td>4  25  75  100</td>
<td></td>
</tr>
<tr>
<td>EC T73</td>
<td>Embedded Systems</td>
<td>4  -</td>
<td>4  25  75  100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective-III</td>
<td>4  -</td>
<td>3  25  75  100</td>
<td></td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC P71</td>
<td>Communication Lab III</td>
<td>-  -</td>
<td>2  50  50  100</td>
<td></td>
</tr>
<tr>
<td>EC P72</td>
<td>Embedded Systems Lab</td>
<td>-  -</td>
<td>2  50  50  100</td>
<td></td>
</tr>
<tr>
<td>EC P73</td>
<td>Seminar</td>
<td>-  -</td>
<td>1  100 - 100</td>
<td></td>
</tr>
<tr>
<td>EC P74</td>
<td>Industrial Visit/Training</td>
<td>-  -</td>
<td>1  100 - 100</td>
<td></td>
</tr>
<tr>
<td>EC PW7</td>
<td>Project Work</td>
<td>-  -</td>
<td>2  100 - 100</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>15 1 15</td>
<td>22 500 400 900</td>
<td></td>
</tr>
</tbody>
</table>

### VIII Semester

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Name of the Subjects</th>
<th>Periods</th>
<th>Credits</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L  T  P</td>
<td>IA  UE  TM</td>
<td></td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC T81</td>
<td>Industrial Management</td>
<td>4  -</td>
<td>3  25  75  100</td>
<td></td>
</tr>
<tr>
<td>EC T82</td>
<td>Telecommunication Switching Networks</td>
<td>4  -</td>
<td>4  25  75  100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective-IV</td>
<td>4  -</td>
<td>3  25  75  100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elective-V</td>
<td>4  -</td>
<td>3  25  75  100</td>
<td></td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC P81</td>
<td>Advanced Communication Lab</td>
<td>-  -</td>
<td>2  50  50  100</td>
<td></td>
</tr>
<tr>
<td>EC P82</td>
<td>Comprehensive Viva</td>
<td>-  -</td>
<td>2  50  50  100</td>
<td></td>
</tr>
<tr>
<td>EC P83</td>
<td>Professional Ethics</td>
<td>-  -</td>
<td>1  100 - 100</td>
<td></td>
</tr>
<tr>
<td>EC PW8</td>
<td>Project Work</td>
<td>-  - 9</td>
<td>6  50  50  100</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>16 1 18</td>
<td>24 350 450 800</td>
<td></td>
</tr>
</tbody>
</table>
VI Semester Electives
EC E61 Advanced Digital Signal Processing
EC E62 Industrial Electronics
EC E63 Opto Electronic Devices
EC E64 Radar and Navigational AIDS
EC E65 Spread Spectrum Communication
EC E66 Cryptography and Network Security
EC E67 Visual Programming
EC E68 - Digital Signal Processors and Applications

VII Semester Electives
EC E71 Digital Image Processing
EC E72 Television Engineering
EC E73 VLSI Design

VIII Semester Electives
EC E81 Bio-Medical Instrumentation
EC E82 Cellular Mobile Communication
EC E83 Satellite Communication Systems
EC E84 Microwave Integrated Circuit Design
EC E85 Special Topics in Communication Engineering
EC E86 Data Communications and Networking
EC E87 Introduction to Soft Computing
UNIT I

Calculus: Curvature, radius of curvature, evolutes and involutes. Beta and Gamma functions and their properties.

UNIT II

Multiple Integrals and Applications: Multiple integrals – change of order of integration. Applications: Areas (double integration) and volumes by triple integration (Cartesian and polar) – mass and center of mass (constant and variable densities).

UNIT III

Analytical Solid Geometry: Directional cosines and ratios – angle between two lines – the equation of plane - equations to a straight line and shortest distance between two skew lines.

UNIT IV

Differential Equations: Exact equations, First order linear equations, Bernoulli’s equation, orthogonal trajectories, growth and decay, geometrical applications and electric circuits. Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut’s type.

UNIT V

Differential Equations (Higher order): Linear differential equations of higher order – with constant coefficients, the operator D - Euler’s linear equation of higher order with variable coefficients - simultaneous linear differential equations – solution by variation of parameters method – simple applications to electric circuits.

Text Book

Reference Book
T102 PHYSICS

UNIT I

**Acoustics and NDT:** *Ultrasonics - Ultrasonic Waves Productions (Piezoelectric and Magnetostriction method) – Detections (Acoustic Grating)*

*Acoustics - Factors affecting Acoustic of Buildings (Reverberation, Loudness, Focusing, Echo, Echelon Effect and Resonance) and their Remedies - Sabine's formula for Reverberation Time. NDT applications - Pulse Echo Method - Liquid Penetrant Method*

UNIT II


UNIT III


*Fiber Optics - Principle and Propagation of light in optical fiber – Numerical aperture and acceptance angle – Types of optical fibers (material, refractive index, mode)*

UNIT IV


UNIT V

**Nuclear Energy Source:** General Properties of Nucleus (Size, Mass, Density, Charge) – Mass Defect – Binding Energy - Disintegration in fission – Nuclear Fusion (p-p and C-N cycle) – Nuclear Reactor: Materials Used in Nuclear Reactors. – PWR – BWR - FBTR

Text Books

Reference Books
UNIT I


UNIT II


UNIT III

**Electrochemical Cells:** Galvanic cells, single electrode potential, standard electrode potential, electromotive series. EMF of a cell and its measurement. Nernst equation. Electrolyte concentration cell. Reference electrodes-hydrogen calomel, Ag /AgCl and glass electrodes. Batteries - primary and secondary cells, laclanche cell, lead acid storage cell, Ni-Cd battery and alkaline battery. Fuel cells - H₂-O₂ fuel cell.

UNIT IV

**Corrosion And Its Control:** Chemical and electrochemical corrosion-Galvanic series-galvanic, pitting, stress and concentration cell corrosion. Factors influencing corrosion-corrosion control methods - cathodic protection and corrosion inhibitors. Protective coating - types of protective coatings-metallic coating-tinning and galvanizing, cladding, electroplating and anodizing.

UNIT V

**Phase Rule:** Definition and derivation of phase rule. Application to one component system - water and sulphur systems. Thermal analysis, condensed phase rule. Two component alloy systems - Pb-Ag, Cu-Ni and Mg-Zn systems.

Text books

Reference Books
T 110 BASIC CIVIL AND MECHANICAL ENGINEERING

PART-A CIVIL ENGINEERING

UNIT I
Buildings, Building Materials: Buildings-Definition-Classification according to NBC-plinth area, Floor area, carpet area, floor space index-construction materials-stone, brick, cement, cement-mortar, concrete, steel- their properties and uses.

UNIT II

UNIT III

PART - B MECHANICAL ENGINEERING

UNIT IV
Internal and External Combustion Systems: Working principles of IC engines – Classification – Diesel and petrol engines: two stroke and four stroke engines. Steam generators(Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories.


UNIT V

Casting : Green and dry sand moulding processes for ferrous and non-ferrous metals – applications.

UNIT VI
Metal Joining: Elements of arc and gas welding, brazing and soldering – Bolted joint types – Adhesive Bonding; classification of adhesives – applications. Sheet Metal Processing- Punching, blanking, shearing, bending, and deep drawing processes; descriptions and applications .
**Text Books:**

**Reference Books**
T111 ENGINEERING MECHANICS

UNIT I
Fundamental of Mechanics: Basic Concepts Force System and Equilibrium, Definition of Force, Moment and Couple, Principle of Transmissibility, Varignon’s theorem, Resultant of force system – Concurrent and non concurrent coplanar forces, Condition of static equilibrium for coplanar force system, stability of equilibrium, concept of free body diagrams, applications in solving the problems on static equilibrium of bodies.

UNIT II
Plane Trusses: Degrees of freedom, Types of supports and reactions, Types of loads, Analysis of Trusses-method of joints, method of sections
Friction: Introduction, Static dry friction, simple contact friction problems, ladders, wedges, screws and belt friction.

UNIT III
Properties of Surfaces: Properties of sections – area, centroids of lines, areas and volumes, moment of inertia first moment of inertia, second moment of inertia and product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia.

UNIT IV

UNIT V
Kinematics and Kinetics of Rigid bodies: Plane motion, Absolute motion, Relative motion, translating axes and rotating axes, work and energy, impulse and momentum

Text Books

Reference Books
UNIT I

Basic Communication Theory: Importance of Communication – stages of communication, modes of communication – barriers to communication – strategies for effective communication – Listening: Importance, types, barriers – Developing effective listening skills.

UNIT II

Comprehension and Analysis: Comprehension of technical and non-technical material – Skimming, scanning, inferring-Note making and extension of vocabulary, predicting and responding to context- Intensive Reading and Reviewing

UNIT III

Writing: Effective sentences, cohesive writing, clarity and conciseness in writing – Introduction to Technical Writing – Better paragraphs, Definitions, Practice in Summary Writing – Four modes of writing – Use of dictionaries, indices, library references – making bibliographical entries with regard to sources from books, journals, internet etc.

UNIT IV


UNIT V


Reference Books:
P104 PHYSICS LABORATORY

List of experiments (Any 10 Experiments)

1. Thermal conductivity – Lee’s DISC
2. Thermal conductivity - Radial flow
3. Spectrometer – Prism or Hollow prism
4. Spectrometer – Transmission grating
5. Spectrometer - Ordinary & Extraordinary rays
6. Newton’s rings
7. Air – wedge
8. Half shade polarimeter – Determination of specific rotatory power
9. Jolly’s experiment – determination of $\alpha$
10. Magnetism: i – h curve
11. Field along the axis of coil carrying current
12. Vibration magnetometer – calculation of magnetic moment & pole strength
13. Laser experiment: wavelength determination using transmission grating, reflection grating (vernier calipers) & particle size determination
14. Determination of optical absorption coefficient of materials using laser
15. Determination of numerical aperture of an optical fiber

P105 CHEMISTRY LABORATORY

List of experiments (Any 10 Experiments)

1. Determination of dissolved oxygen in water.
2. Determination of total hardness of water by EDTA method.
3. Determination of carbonate and bicarbonate in water.
4. Estimation of chloride content in water.
5. Estimation of magnesium by EDTA.
7. Estimation of ferrous by permanganometry.
8. Estimation of ferrous and ferric iron in a solution mixture by dichrometry.
10. Estimation of copper in copper sulphate solution.
11. Estimation of calcium by permanganometry.
12. Estimation of iron by colorimetry.

Demonstration Experiments( Any two of the following)

1. Determination of COD of water sample.
2. Determination of lead by conductometry.
3. Percentage composition of sugar solution by viscometry.
### List of Exercises

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Trade</th>
<th>List of Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fitting</td>
<td>Study of tools and Machineries. Exercises on symmetric joints and joints with acute angle.</td>
</tr>
<tr>
<td>2.</td>
<td>Welding</td>
<td>Study of arc and gas welding equipment and tools – Edge preparation – Exercises on lap joint and V Butt joints – Demonstration of gas welding</td>
</tr>
<tr>
<td>4.</td>
<td>Carpentry</td>
<td>Study of tools and Machineries – Exercises on Lap joints and Mortise joints</td>
</tr>
</tbody>
</table>

#### I Fitting

1. Study of tools and Machineries  
2. Symmetric fitting  
3. Acute angle fitting

#### II Welding

1. Study of arc and gas welding equipment and tools  
2. Simple lap welding (Arc)  
3. Single V butt welding (Arc)

#### III Sheet metal work

1. Study of tools and machineries  
2. Funnel  
3. Waste collection tray

#### IV Carpentry

1. Study of tools and machineries  
2. Half lap joint  
3. Corner mortise joint.
UNIT I

Algebra: Binomial, exponential and logarithmic series (without proof) – problems on summation, approximation and coefficients.

UNIT II


UNIT III

Trigonometry: Expansions for \( \sin^n \theta \), \( \cos^n \theta \), \( \tan^n \theta \), \( \sin(n\theta) \), \( \cos(n\theta) \), \( \tan(n\theta) \). Exponential, circular, hyperbolic, inverse hyperbolic and logarithmic functions of a complex variable – separation of real and imaginary parts.

UNIT IV

Vector Analysis: Scalar fields and Vector fields – Gradient, Divergence and Curl – their properties and relations – Gauss and Stokes theorems (without proof), simple problems for their verification.

UNIT V

Statistics: Moments, kurtosis and skewness based on moments only. Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions. Correlation and regression – rank correlation.

Text Books:

Reference Book:
UNIT I
Crystal Structure and Defects: Crystal Systems – Bravais Lattices – Coordination Number, Atomic Radius, Packing Factor for FCC & HCP structures – Miller Indices for a cubic crystal – Powder X Ray Diffraction Method - Lattice defects – Qualitative ideas of point, line, surface and volume defects

UNIT II

UNIT III

UNIT IV

UNIT V
Advanced Materials: Liquid Crystals – Types – Application as Display Devices – Metallic Glasses – Nanomaterials (one, Two & three Dimensional) – Physical Properties and Applications of Carbon Nano Tubes

Text books:

Reference Books:
UNIT I


UNIT II


UNIT III

Air Pollution: Air pollution-sources of air pollution. Sources, effects and control measures of oxides of nitrogen, oxides of sulphur, oxides of carbon, hydrocarbon, chlorofluro carbons and particulates. Green house effect-causes and effects on global climate and consequences. Ozone depletion-causes, mechanism and effect on the environment. Smog-sulfurous and photochemical smog-effect on the environment. Acid rain-theory of acid rain and effects.

UNIT IV

Water Pollution and Solid Waste Management Sources: effects and control measures of –water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and radioactive pollution. Solid waste management – causes, effect and control measures of urban and industrial wastes.

UNIT V

Human population and the environment—population growth, variation among nations, population explosion, role of information technology in environment and human health.

Text Books:


Reference Books:

2. G. S. Sodhi, Fundamental concepts of environmental chemistry, Narosa publishing house, New Delhi
T104 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

PART A – ELECTRICAL
UNIT – I

UNIT – II
Node and mesh methods of analysis of DC circuits and simple AC circuits - Introduction to three phase circuits, Introduction to three phase system - phase and line parameters – relations, power measurement – voltmeter and ammeter method, two and three wattmeter methods.

UNIT – III
Principle of DC generator and motor - Transformer, synchronous generator, induction motor (single phase). Sources for electrical energy conversion-thermal and hydraulic plant (Block diagram approach only). Components of AC transmission and distributions systems – line diagram.

PART B – ELECTRONICS
UNIT – IV
Half-wave rectifier and Full-wave rectifier- filters - Amplifiers-common emitter and common collector amplifiers- Hartley oscillator and RC phase shift oscillator. Transducers – Resistance temperature detector (RTD) – Linear variable differential transformer (LVDT) - Strain gauge – Piezo electric transducer.

UNIT - V

UNIT - VI
Model of communication system – Analog and digital – Wired and wireless channel. Block diagram of various communication systems – Microwave, satellite, optical fiber and cellular mobile system. Network model – LAN, MAN and WAN – Circuit and packet switching – Overview of ISDN.

Text Books

Reference Books
2. J.B.Gupta, A Course in Electrical Power, Katson Publishing House, New Delhi,
T105 THERMODYNAMICS

UNIT I

**Basic Concepts and Definitions:** Energy conversion and efficiencies - System, property and state - Thermal equilibrium - Temperature - Zeroth law of Thermodynamics.

UNIT II

**First Law of Thermodynamics:** The concept of work and adiabatic process - First law of thermodynamics - Conservation of Energy principle for closed and open systems - Calculation of work for different processes of expansion of gases

UNIT III

**Second Law of Thermodynamics:** Equilibrium and the second law - Heat engines - Kelvin-Planck statement of second law of thermodynamics - Reversible and irreversible processes - Carnot principle - Clausius inequality- Entropy

UNIT IV

**Gas Power Cycles:** Air standard cycles: The air standard Carnot cycle - Air standard Otto cycle, diesel cycle, dual cycle and Bryton cycles and their efficiencies

UNIT V

**Refrigeration Cycles and Systems:** Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems (only theory) - Gas refrigeration cycle - Absorption refrigeration system (only theory)- Liquifaction and solidification of gases

Text Books:

Reference Books:
T106 COMPUTER PROGRAMMING

UNIT – I

UNIT – II
Problem solving techniques – Program – Program development cycle – Algorithm design – Flowchart - Pseudo code.
Introduction to C – C tokens – data types – Operators and expressions – I/O functions

UNIT – III
Decision making statements – branching and looping – arrays – multidimensional arrays – Functions – Recursion – Passing array to functions
Storage classes – Strings – String library functions

UNIT – IV
Structures – Arrays and Structures – nested structures – passing structures to functions – user defined data types– Union
Pointers – pointers and arrays – pointers and functions - pointers and strings - pointers and structures

UNIT – V
Files – operations on a file – Random access to files – command line arguments
Introduction to preprocessor – Macro substitution directives – File inclusion directives – conditional compilation directives – Miscellaneous directives

Text Books

Reference Books
P101 COMPUTER PROGRAMMING LAB

List of Exercises

OS Commands, Word Processor and Spreadsheets

1. Study of OS commands-Compilation and execution of simple C programs
2. Use of mail merge in word processor
3. Use of spreadsheet to create Charts(XY, Bar, Pie) and apply the formulae wherever necessary C Programming (Flowcharts and algorithms are essential for the programming exercises)
4. Greatest of three numbers using conditional operator and if statement
5. Read two numbers and swap those two numbers using temporary variable and without using temporary variable.
6. Solve quadratic equation for different sets of inputs.
7. Use of Switch….Case statements
8. Generation of prime and Fibonacci series
9. Evaluate the COSINE series using for, while and do..while loops
10. Matrix operations
   1. Addition
   2. Transpose
   3. Multiplication
11. Evaluate the sin(x) series using functions and recursive functions
12. Read a string and find solution to remove the duplicates of a given string from the given sentence
13. Create an array of structures for a list of items with the following details

<table>
<thead>
<tr>
<th>Item_Code</th>
<th>Item_Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>Paste – Colgate</td>
</tr>
<tr>
<td>102</td>
<td>Paste – Pepsodent</td>
</tr>
<tr>
<td>102</td>
<td>Paste – Close-up</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Cinthol</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Lux</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Hamam</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Dove</td>
</tr>
</tbody>
</table>

Arrange the set of items in ascending order of its Item_Code and descending order of its Item_Name as given below

<table>
<thead>
<tr>
<th>Item_Code</th>
<th>Item_Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Soap – Lux</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Hamam</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Dove</td>
</tr>
<tr>
<td>101</td>
<td>Soap – Cinthol</td>
</tr>
<tr>
<td>102</td>
<td>Paste – Pepsodent</td>
</tr>
<tr>
<td>102</td>
<td>Paste – Colgate</td>
</tr>
<tr>
<td>102</td>
<td>Paste – Close-up</td>
</tr>
</tbody>
</table>

14. Use of Structure to define a user defined data types, input the data and write the data into the file
15. Use of pointers and array of pointers
16. Functions with static data types
17. Write command line program to implement the following DOS commands using files
   - Del
   - Copy
P102 ENGINEERING GRAPHICS

Unit 0

Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning

Unit I

Conic sections, Involute, Spirals, Helix. Projection of Points, Lines and Planes

Unit II

Projection of Solids and Sections of Solids.

Unit III

Development of surfaces - Intersection of surfaces (cylinder-cylinder, cylinder-cone)

Unit IV

Isometric projections and Orthographic projections

Unit V

Computer Aided Drafting: Introduction to Computer Aided Drafting hardware - Overview of application software - 2D drafting commands (Auto CAD) for simple shapes - Dimensioning.

Text Books


Reference Books

P103 BASIC ELECTRICAL AND ELECTRONICS LAB

ELECTRICAL LAB
1. Study of tools and accessories
2. Study of joints
3. Staircase wiring
4. Doctor’s room wiring
5. Godown wiring
6. Tube Light and Fan connection
7. Lamp controlled from three different places-wiring

ELECTRONICS LAB
1. Rectifiers
   Construction of half wave and full wave rectifiers with and without filters – Calculation of ripple factors.

2. Frequency Response of RC Coupled Amplifiers
   Determination of frequency response of given RC coupled amplifier - Calculation of bandwidth.

3. Verification of Kirchoff’s Voltage and Current Laws
   Determine the voltage and current in given circuits using Kirchoff’s laws theoretically and verify the laws experimentally.

4. Study of Logic Gates
   1. Verification of Demorgan’s theorems
   2. Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR, EX-NOR gates and Flipflops - JK, RS, T and D
   3. Implementation of digital functions using logic gates

5. Study of CRO
   1. Measurement of AC and DC voltages
   2. Frequency and phase measurements (using Lissajou’s figures)

6. Study of Transducers
   1. Displacement and load measurements with transducers
   2. Temperature measurement with thermocouple
NCC/NSS training is compulsory for all the Undergraduate students

1. The above activities will include Practical/field activities/Extension lectures.
2. The above activities shall be carried out outside class hours.
3. In the above activities, the student participation shall be for a minimum period of 45 hours.
4. The above activities will be monitored by the respective faculty incharge and the First Year Coordinator.
5. Pass /Fail will be determined on the basis of participation, attendance, performance and behaviour. If a candidate Fails, he/she has to repeat the course in the subsequent years
6. Pass in this course is mandatory for the award of degree.
MA T31 - MATHEMATICS - III

UNIT - I


UNIT - II

Function of a Complex Variable: Functions of a complex variable - continuity, derivative and analytic function - Cauchy - Riemann equations - Necessary and sufficient conditions for analyticity - Harmonic and orthogonal properties of real and imaginary parts - Conformal mapping - Bilinear transformations.

UNIT - III

Complex Integration: Cauchy’s theorem - Cauchy’s integral formula - Taylor’s and Laurent series - Residue theorem - Contour integration round the unit circle and semi-circular contour.

UNIT - IV


UNIT - V

Fourier Transform: Definition and properties - Fourier Integral theorem - statement - Fourier sine transform and cosine transforms - Inverse Fourier transform.

Text Books:

Reference Books:
EC T32 - ELECTRICAL ENGINEERING

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TEXT BOOKS:

REFERENCE BOOKS
EC T33 OBJECT ORIENTED PROGRAMMING

UNIT I


UNIT II


UNIT III


UNIT IV

Files and Threads: Files – serialization – threads- life cycle – multiple threads- synchronization – exception handling- throw catch blocks - Packages and Interfaces importing package - strings

UNIT V

Object Oriented Design: Classification and Overview of methodologies, Object-Oriented Software life cycle models, process, analysis, design, prototyping, implementation, Testing, documentation and maintenance.

Textbooks

References
EC T34 - ELECTRON DEVICES

UNIT- I
Electron Ballistics and Semiconductor Theory: Force on charge in electric field – two dimensional motion- force in a magnetic field - parallel and perpendicular electric and magnetic field – electrostatic and magnetic deflection in CRT. Energy band structure of insulators, conductors and semiconductors – conductivity of an intrinsic semiconductor – Fermi Dirac distribution and energy band diagram – Fermi levels in extrinsic semiconductor – Hall effect.

UNIT- II

UNIT- III

UNIT- IV
Special Diodes and Photonic Devices: Construction, Principle of operation, application and characteristics of Schottky barrier diode, Varactor diode, Tunnel diode, PIN diode. LED, LCD, Seven segment display, Photoconductivity – Photodiode, APD, Phototransistor, Solar cells.

UNIT- V

Text Books:

Reference Books:
UNIT- I

DC Circuit Analysis: Sources-Transformation and manipulation, Network theorems - Superposition theorem, Thevenin’s theorem, Norton’s theorem, Reciprocity theorem, Millman’s theorem, Compensation theorem, Maximum power transfer theorem and Tellegen’s theorem – Application to DC circuit analysis.

UNIT- II


UNIT- III


UNIT- IV

Magnetically Coupled Circuits: Self inductance - Mutual inductance - Dot rule - Coefficient of coupling - Analysis of multiwinding coupled circuits - Series, Parallel connection of coupled inductors - Single tuned and double tuned coupled circuits.

UNIT -V


Text Book:

Reference Books:
UNIT-I


UNIT-II


UNIT-III


UNIT-IV

EM Waves and Wave Equations: Maxwell’s equation in point and integral form– Poynting’s theorem – Energy in electromagnetic field, Electromagnetic wave equation, wave equation for free space and conducting medium.

UNIT-V


Text Books:

Reference Books:
EC P31 - ELECTRICAL ENGINEERING LABORATORY

1. OC and SC test on single phase transformer.
2. Load test on single phase transformer.
3. Load test on DC shunt motor.
4. OCC characteristics of generator.
5. Two wattmeter method of power measurement.
6. Swinburne’s test.
7. Load test on single phase IM.
8. Load test on 3 phase transformer.
9. Load test on 3 phase induction motor.

EC P32 OBJECT ORIENTED PROGRAMMING LABORATORY

Programs in C++

Experiment involved the following concepts

1. Classes and objects, constructor and destructors
2. Function overloading
3. Inheritance
4. Operator overloading
5. Friend function
6. Templates

Programs in Java

Experiment involved the following concepts

7. Simple Java applications - Handling strings in java
8. Simple Package creation - Developing user defined packages in Java
9. Interfaces - Developing user-defined interfaces and implementation
   - Use of predefined interface
10. Threading and Multithreading
11. Exception Handling mechanism in Java
    - Handling pre-defined exceptions
    - Handling user-defined exception
12. Programs using applets
1. V-I characteristics of semiconductor diodes
   (i) Obtaining forward and reverse bias characteristics
   (ii) Determination of cut-in voltage
   (iii) Determination of static and dynamic resistance from the characteristics of
         a) PN Junction diode
         b) Point contact diode
         c) Zener diode
2. Characteristics of BJT in CB configuration
   (i) Determination of input and output characteristics
   (ii) Determination of voltage gain, current gain, input and output resistance from the
        characteristics
3. Characteristics of BJT in CE configuration
   (i) Determination of input and output characteristics
   (ii) Determination of voltage gain, current gain, input and output resistance from the
        characteristics
4. Characteristics of JFET
   (i) Determination of output and transfer characteristics
   (ii) Determination of pinch off voltage, $r_d$, $g_m$ and $\mu$ from the characteristics
5. Characteristics of MOSFET
   (i) Determination of output and transfer characteristics
   (ii) Determination of $r_d$, $g_m$ and $\mu$ from the characteristics
6. Characteristics of SCR and TRIAC
   (i) Determination of characteristics of SCR.
   (ii) Determination of characteristics of TRIAC
7. Characteristics of UJT
   (i) Determination of intrinsic stand off ratio
8. Characteristics of photonic devices
   (i) Determination of V-I characteristics of LED
   (ii) Determination of V-I and intensity characteristics of phototransistor
9. Clipper circuits using diodes
   (i) Study the operation of positive, negative, biased and combinational clippers
10. Switching circuit
    (i) Study of logic gates AND and OR using diodes
    (ii) Study of NOT gate using transistor
MA T41 - PROBABILITY AND RANDOM PROCESSES

UNIT-I

Discrete Random Variables: Random Variables and their event spaces The probability mass function Distribution functions Special discrete distributions (Bernoulli, Binomial, Geometric, Negative Binomial, Poisson, Hypergeometric, Discrete Uniform, Constant and Indicator) Probability Generating function.

UNIT-II

Continuous Random Variables: The Exponential distribution The Reliability, Failure density and Hazard function - Some important distributions (Hypoexponential, Erlang, Gamma, Hyper exponential, Weibull, Gaussian, Uniform and Pareto distributions).

UNIT-III


UNIT- IV


UNIT- V

Continuous Parameter Markov Chain: The Birth and Death process (M/M/1, M/M/c, M/M/1/N, M/M/c/N (c<N), M/M/c/c, M/M/ models only, derivation of mean number of customer in the system, in the queue and waiting time Simple applications) Special case of Birth and Death model (Pure Birth and Pure Death Processes)

Text Books:

Reference Book:
EC T42 - ELECTRONIC CIRCUITS –I

UNIT- I

Biasing and Stabilization: Operating point and Q-point - Different types of BJT biasing – Fixed bias, Collector to base bias, Self bias - Stabilization of Q point and stability factor – Bias compensation- Thermistor and sensistor compensation –Thermal runaway and thermal stability. FET biasing – gate bias, self bias and voltage divider biasing – MOSFET biasing

UNIT- II

Transistor Low Frequency Analysis: Two port devices and hybrid model – transistor hybrid model and h parameters - determination of h-parameters from the characteristics – Analysis of transistor amplifier using h-parameters – emitter follower -comparison of transistor amplifier configurations – CE amplifier with an emitter resistance; Low frequency FET model –Common source and Common drain amplifiers

UNIT- III

Transistor High Frequency Analysis: Hybrid pi CE transistor model – Hybrid pi conductances and capacitances - CE short circuit current gain and current gain with resistance- CE transistor amplifier response. High frequency FET model – common source and common drain amplifiers at high frequencies.

UNIT- IV


UNIT- V


Text Books:

Reference Books:
EC T43 - SIGNALS AND SYSTEMS

UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V


Text Book:

Reference Books:
EC T44 - NETWORKS AND TRANSMISSION LINES

UNIT- I


UNIT- II


UNIT- III


UNIT- IV


UNIT-V


Text Books:

Reference Books:
EC T45 - DIGITAL CIRCUIT DESIGN

UNIT – I
Number Systems and Boolean Algebra: Review of binary, octal and hexadecimal number systems - conversion methods-number representations - signed, unsigned, fixed point, floating point numbers –Binary code BCD, Gray code - error detection and correction codes - parity codes- Boolean algebra – basic postulates, theorems - canonical forms-Simplification of Boolean function using Karnaugh map and Quine-McClusky method – Implementations of logic functions using gates, NAND –NOR implementations –Multi level gate implementations- Multi output gate implementations

UNIT - II

UNIT - III

UNIT – IV

UNIT - V
Introduction to Hardware Language : Basic concepts Hardware language – Module representation - Gate level modeling - Data flow modeling - Behavioural modeling – HDL for combinational logic circuit –Arithmetic circuits, decoder, encoder, MUX and Demux - HDL for registers and counters – Shift register, synchronous and asynchronous counters – Test bench - Simulation

Text Book:

References:
EC T46- CONTROL SYSTEMS

UNIT I
System Modelling: Introduction to control system - Basic elements in control system - Open and closed loop control systems – Differential equation representation of physical systems – Transfer function – Mathematical modeling of electrical and mechanical systems (Translational and Rotational) – Analogous system - Block diagram representation of systems - Block diagram reduction techniques – Signal flow graph - control system components - synchros-tachometer-dc and ac servomotors-stepper motors.

UNIT II

UNIT III

UNIT IV

UNIT V

Text Book:

Reference Books:
EC P41 - ELECTRONIC CIRCUITS – I LAB

1. Biasing Circuits
   a. To design, construct and test the following biasing circuits
      i. Fixed bias ii. Collector to base bias iii. Self bias
   b. To simulate the biasing circuits and obtain the Q point using PSPICE

2. RC coupled amplifier
   a. To design, construct and obtain frequency response of the circuit
   b. To measure signal handling capacity, input and output impedance
   c. Compare performance practically and through simulation

3. Emitter follower
   a. To design, construct and obtain frequency response of the circuit
   b. To measure signal handling capacity, input and output impedance
   c. Compare practical and simulated results

4. FET amplifier
   a. To design, construct and obtain frequency response of the common source and common drain amplifier circuits
   b. To measure signal handling capacity, input and output impedance
   c. Compare performance practically and through simulation

5. Cascade Amplifier
   a. To design, construct and obtain frequency response of a two stage RC coupled amplifier
   b. To measure signal handling capacity, input and output impedance
   c. Compare performance practically and through simulation

6. Darlington pair
   To design, construct and obtain frequency response practically and through simulation

7. Cascode amplifiers
   To design, construct and obtain frequency response practically and through simulation

8. Differential amplifier
   To obtain common mode and differential mode performance of differential amplifier

9. Rectifiers
   a) To construct bridge rectifiers with and without filters- Calculation of ripple factors.
   b) Simulation of bridge rectifiers and trace their output waveforms with and without filters

10. Regulated power supply
    To construct and study the voltage regulation characteristics of shunt, series and IC regulators
EC P42 - DIGITAL CIRCUIT DESIGN LAB

1. Adder, subtractors and flip flops
   a) Boolean function implementation using NAND/NOR logic gates
   b) To construct half adder, full adder, half subtractor, full subtractor, RS, JK, D
      and T flipflops using logic gates and verify their truth tables

2. Code converters
   To construct and verify the truth table for code conversion a) Gray to BCD
   b) BCD to Excess-3-code  c) BCD to Gray code  d) Excess-3-code to BCD

3. Parity generator/checker, magnitude comparator
   a) Implementation of error detection circuit using odd and even parity
      generator and decoder
   b) To construct and verify 2-bit magnitude comparator

4. Multiplexers, Demultiplexers, Encoders and Decoders
   To perform combinational logic implementation of the following
   a) 4 to 1 multiplexer and demultiplexer
   b) Priority encoder
   c) 4x16 decoder using 3 to 8 decoder

5. Shift register
   Various types of shift register implementation using Flip flops

6. Synchronous Counters
   a) Design and implement a binary counter
   b) Design and implement non-sequential counters
   c) Design, construct and verify the state diagram of binary up/down counters,
      BCD counters

7. Asynchronous Counters
   a) Design, construct and verify the state diagram of binary counter

8. Memory chips
   a. Simple exercises like READ and WRITE involving memory chips
   b. Expansion of Memory Size

9. Simulation and verification of Combinational Circuits using verilog HDL
   - Simple Gates
   - Simple Boolean Expressions
   - Adder and subtractor
   - Parallel Adder design

10. Simulation and verification of sequential Circuits using verilog HDL
    - Flip-flops
    - Registers
    - Counters
EC P43 - NETWORK AND TRANSMISSION LAB

1. Design of k type Low pass and high pass filters.
   a. To obtain the frequency and phase response of the Low pass filter using Lumped elements.
   b. To obtain the frequency and phase response of the High pass filter using Lumped elements.

2. Design of k type Band pass and Band stop filters.
   a. To obtain the frequency and phase response of the Band pass filter using Lumped elements.
   b. To obtain the frequency and phase response of the Band stop and notch filter using Lumped elements.

3. Design of m derived filters.
   a. To obtain the frequency and phase response of the m derived low pass filter.
   b. To obtain the frequency and phase response of the m derived high pass filter.

4. Simulation of filters.
   Through a MATLAB program, design LPF/HPF/BPF/BEF, T / π, constant k/m derived/composite for the given cutoff frequency. Also simulate the phase and frequency response of the designed filter.

5. Design of switched Twin T network.
   a. To obtain the frequency response and phase response of a Twin T network.

   a. To measure the attenuation of a transmission line for various lengths (like 25, 50, 75, 100 meters) and find the frequency response of the line at a fixed length.
   b. To study the frequency response of an equalizer that can boost or cut frequencies 50Hz, 1 KHz and 10 kHz.

7. Simulation of equalizer.
   Through a MATLAB program, design an attenuation/phase equalizer and obtain the relevant responses.

8. Impedance (Z) and ABCD Parameters of a transmission line
   a. To measure the Z parameters of a transmission line constructed using Lumped elements.
   b. To measure the ABCD parameters of a transmission line constructed using Lumped elements.

9. Design of LC resonant circuit
   a. To obtain the frequency response and measure the quality factor of a LC resonant circuit.

    a. To measure the characteristic impedance of the twin pair transmission line.
    b. To measure the capacitance and inductance per unit length of a coaxial cable.
    c. To measure the voltage reflection coefficient and voltage standing wave ratio on a twin pair using VSWR meter.
SP P44 - PHYSICAL EDUCATION

Physical Education is compulsory for all the Undergraduate students

1. The above activities will include games and sports / extension lectures.

2. In the above activities, the student participation shall be for a minimum period of 45 hours.

3. The above activities will be monitored by the Director of Physical Education.

4. Pass /Fail will be determined on the basis of participation, attendance, performance and behaviour. If a candidate Fails, he/she has to repeat the course in the subsequent years.

5. Pass in this course is mandatory for the award of degree.
MA T51 - NUMERICAL METHODS AND TECHNIQUES

UNIT - I
Solution of Algebraic and Transcendental Equation and Eigen Value Problem:
Solution of algebraic and transcendental equation by the method of bisection, the method
of false position, Newton-Raphson method and Graeffe’s Root squaring method. Eigen
value problem by power method and Jacobi method.

UNIT-II
Solution of System of Equations and Matrix Inversion:
Solution of linear algebraic
equation: Gauss and Gauss-Jordan elimination methods- Method of Triangularization and
Crout’s reduction. Iterative methods: Gauss-Jacobi, Gauss-Seidel and Relaxation methods.
Matrix inversion by Gauss - Jordan elimination and Crout’s methods.

UNIT-III
Interpolation:
Finite Differences, Relation between operators - Interpolation by Newton’s
forward and backward difference formulae for equal intervals. Newton’s divided
difference method and Lagrange’s method for unequal intervals. Numerical differentiation
in one variable. Numerical Integration by Trapezoidal and Simpson’s rule with respect to
one and two variables.

UNIT-IV
Solution of Ordinary Differential Equation:
Single step methods: Taylor series method,
Picard’s method of successive approximation, Euler and Improved Euler methods, Runge-
Kutta method of fourth order only. Multistep methods: Milne and Adams - Bashforth
methods.

UNIT - V
Solution of Partial Differential Equations:
Boundary value problems: Laplace and
Poison equations- Liebmann’s iterative method. Diffusion equation: Explicit and Crank-

Text Book:
Company Ltd, New Delhi.

References:
Publishing Company, Madras.
Delhi.
UNIT I
Feedback Amplifiers: Concept of feedback- topological classification-voltage series, voltage shunt, current series, current shunt - effect of feedback on gain, stability, distortion, band width, input and output impedances – practical feedback amplifier circuits and their analysis – multistage feedback amplifier.

UNIT II

UNIT III

UNIT IV

UNIT V
Large Signal Amplifiers: Classification of power amplifiers - Class A power amplifier-direct and transformer coupled amplifiers; - Class B - Push-pull arrangements and complementary symmetry amplifiers; conversion efficiency calculations, cross over distortion – class AB amplifier - amplifier distortion – power transistor heat sinking – Class C and D amplifiers.

Text Books:

Reference Books:
EC T53 - SYSTEM DESIGN USING INTEGRATED CIRCUITS

UNIT- I


UNIT- II


UNIT- III

Digital Integrated Circuits: Digital IC characteristics, Digital IC families -RTL and DTL, HTL, I2L, TTL, ECL, MOS and CMOS logic circuits, Comparison of digital IC families.

UNIT- IV


UNIT- V


Text Books:

Reference Books:
EC T54 - DIGITAL SIGNAL PROCESSING

UNIT- I


UNIT- II


UNIT- III


UNIT- IV


UNIT- V


Text Books:

Reference Books:
EC T55 - ANALOG COMMUNICATION SYSTEMS

UNIT-I

Noise and Amplitude Modulation: General communication systems-external and internal noise-Noise figure and noise temperature-AWGN-Need for modulation-Amplitude modulation-Frequency spectrum-Power relation-Different types of AM modulators-SSB and VSB generation-AM transmitters-Block diagram-Functions of each block-High level transmitter.

UNIT-II

Angle Modulation: Principle of frequency and phase modulation-Relation between FM and PM waves-Bandwidth of FM-Narrow band and wideband FM-Generation of FM wave-Direct and Indirect methods-FM transmitters-Block diagram-Function of each block.

UNIT-III


UNIT-IV


UNIT-V

Television: Introduction of Television-Television systems and standards-Black and white transmission-black and white reception-color transmission and reception-Introduction to modern TV cameras, LCD and plasma displays

Text Book:

Reference Books:
UNIT I

**Guided Waves:** Introduction - Waves between parallel planes - Transverse electric waves, Transverse magnetic waves, Transverse electromagnetic waves and their characteristics - Wave impedances. Rectangular waveguides - TE and TM waves in rectangular waveguide - Dominant mode - Impossibility of TEM waves in wave guides - Wave impedance and characteristic impedance - Excitation methods for various modes.

UNIT II

**Circular Wave Guides:** Introduction – TE and TM waves in circular waveguide - Wave impedance - Attenuation factor and Q of wave guides - Wave impedance - Excitation modes in circular wave guides. Microwave resonators introduction – Coaxial resonator - Waveguide, rectangular and circular cavity resonator - Cavity excitation and tuning - Q factor of micro wave cavities (Qualitative treatment only).

UNIT-III

**Antenna Fundamentals:** Power density, directivity, gain, radiation resistance, input impedance, radiation patterns, beam width, bandwidth and polarization. Retarded potential - Radiation from a current element and monopole – Radiation of half-wave and centre-fed dipole – Near and far fields, current distribution of dipole antennas. Linear and array antennas - Arrays of two point sources – Broad side and end fire arrays, binomial array - Principle of pattern multiplication –Adaptive arrays.

UNIT-IV

**Special Purpose Antennas:** (Qualitative treatment only) Loop antennas, Travelling wave antennas, V and rhombic antennas, Horn antennas, Yagi-Uda arrays, Wideband antennas, Log periodic antennas. Babinet’s principle – Slot radiators- Parabolic reflectors – Radiation pattern, aperture efficiencies – Feeding techniques for parabolic antennas.

UNIT-V

**Propagation:** Factors involved in the propagation of radio waves - Ground wave, reflection of radio waves by the surface of the earth - Space wave propagation, considerations in space wave propagation, atmospheric effect in space wave propagation - Ionosphere and its effect on radio waves, Mechanism of ionospheric propagation - Ray paths – Skip distance -Critical frequency-Maximum usable frequency - Fading of signal - Types of fading- Diversity reception.

**Text Books:**

**Reference Books:**
EC P51 - ELECTRONIC CIRCUITS – II LAB

1. Negative feedback amplifier
   a. To design, construct and test response of
      i. voltage shunt ii. voltage series feedback amplifiers with and without feedback for
         the given specification
   b. To compare their frequency response through PSPICE simulation

2. RC Phase shift oscillators
   To design, construct and test the
   a. RC Phase shift oscillator   b. Wien bridge oscillator for the given specification

3. Hartley and Colpitts oscillators
   To design, construct and test the
   a. Hartley oscillator   b. Colpitts oscillator for the given specification

4. Clamps and Voltage Multipliers
   a. To design, construct and observe output of
      i. Positive, negative and biased clampsers
      ii. Voltage doubler and tripler
   b. To simulate the circuits using PSPICE

5. Astable multivibrator and Monostable multivibrator
   a. To design, construct and observe output of a transistor astable multivibrator
   b. To design, construct and observe output of a transistor monostable multivibrator

6. Bistable multivibrator and Schmitt trigger
   To design, construct and observe output of a transistor bistable multivibrator and
   Schmitt trigger circuits

7. Time base generators
   To construct and observe output waveforms of a Miller integrator and Bootstrap
   ramp generator

8. UJT saw tooth generator
   To construct and observe output waveforms of a UJT sweep circuit

9. Class A power amplifier
   To obtain the frequency Vs power and load Vs power characteristics

10. Class B complementary symmetry amplifier
    To obtain the frequency Vs power and load Vs power characteristics
1. Applications of Op-amp
   To study the application of Opamp IC741 as
   a. Inverting amplifier
   b. Non-inverting amplifier
   c. Voltage follower
   d. Summer
   e. Subtractor

2. Differentiator and Integrator
   To study the op-amp performance as differentiator and integrator for various time constants

3. Comparator circuits
   To study zero crossing detector, window detector and Schmitt trigger using opamp 741

4. Signal converters
   To study operation of op-amp as V to I and I to V converters

5. Active filters using Op-amp
   To design and test the performance of a 2\textsuperscript{nd} order LPF, HPF, BPF and BSF

6. Log, antilog and instrumentation amplifier
   To study 1. logarithmic and antilog amplifiers
   2. Instrumentation amplifier

7. Multivibrators using Op-Amp
   To design and study the working of
   a. astable multivibrator
   b. monostable multivibrator using IC 741.

8. Data converters
   Construction and study performance of
   a. DAC circuits – R-2R and ladder type.
   b. Successive approximation type ADC.

9. Multivibrators using IC 555
   To design and study the working of
   a. astable multivibrator
   b. monostable multivibrator using IC 555.

10. Frequency synthesizers
    To study performance of
    a. Frequency multiplier using PLL IC 565
    b. Frequency synthesizer using IC XR2240

11. Precision rectifiers
    To study performance of half wave and full wave precision rectifiers using IC 741.
1. AM modulator and demodulator  
   a) To construct AM modulator and demodulator circuit and to trace message, carrier, modulated and demodulated signal.  
   b) To determine the modulation index of AM by classical method and trapezoidal method.  
2. FM modulator and demodulator  
   a) To construct frequency modulator and demodulator circuit and to trace message, carrier, modulated and demodulated signal.  
3. Sample & hold and PAM  
   a) To construct sample and hold circuit and to trace the message and sample and hold signal.  
   b) To construct PAM circuit and to trace the input and PAM signal.  
4. Pre-emphasis and de-emphasis  
   a) To construct pre-emphasis and de-emphasis circuit and to determine the frequency response.  
5. Tuned and wideband amplifiers  
   a) To construct tuned and wideband amplifiers and to determine the frequency response.  
6. Frequency mixer and ring modulator  
   a) To construct a frequency mixer and to test its operation.  
   b) To construct a ring modulator and to trace the DSB-SC waveform.  
7. Simple and delayed AGC  
   a) To construct simple and delayed with and without AGC circuit and to test its impact.  
8. PWM and PPM  
   a) To construct PWM and PPM circuit and trace the output waveforms.  
9. TDM  
   a) To construct TDM circuit and to trace the multiplexed and de-multiplexed waveform.  
10. Simulation of AM, FM, PAM, PWM and PPM  
    a) To simulate AM modulator and demodulator using PSPICE/EWB and to trace the time domain and frequency domain signal.  
    b) To simulate Direct and Indirect FM generation and detection using MATLAB and to trace the time domain and frequency domain waveform.  
    c) To simulate PAM, PWM and PPM circuits using PSPICE/EWB and to trace the time domain signal.  
    d) To simulate PAM, PWM and PPM using MATLAB and to trace the time domain and frequency domain waveform.  
11. Simulation of Pre-emphasis, De-emphasis, TDM and FDM  
    a) To simulate TDM and FDM using PSPICE/EWB and to trace the multiplexed and de-multiplexed signal.  
    b) To simulate Pre-emphasis and De-emphasis using PSPICE/EWB and to trace their characteristics.
HS P54 - GENERAL PROFICIENCY-I

UNIT –I

Art of Communication: Verbal and Non-verbal Communication – Barriers to Communication – Importance of Body Language – Effective Listening – Feedback

UNIT - II


UNIT – III

Writing: Importance of Writing – Written Vs Spoken Language – Formal and Informal Styles of writing – Resources for improving writing – Grammar and Usage – Vocabulary Building – SWOT analysis

UNIT – IV


UNIT – V

Aptitude: Verbal and Numerical aptitude

References:

EC T61 - INFORMATION THEORY AND CODING

UNIT- I
Introduction to Information Theory: Measure of information- Entropy of symbols - Continuous and discrete cases, Conditional entropies- Basic relationship among different entropies- Mutual information and Trans information, Redundancy and Efficiency

UNIT- II
Channel Classification and Capacity: Continuous and discrete communication channels- Discrete memoryless channels-Channel representations- noiseless channel, lossless channel, deterministic, Binary Symmetric channel, Binary Erasure channel and their capacities - Continuous and discrete channels with noise- Shannon Hartley theorem and its implications.

UNIT- III

UNIT- IV
Source Coding: Purpose of encoding- Uniquely decipherable codes- Code efficiency and redundancy, Shannon’s first and second fundamental theorem, Shannon’s encoding algorithm, Shannon Fano code, Huffman code

UNIT- V
Error Correcting Codes: Linear block codes, cyclic codes- Hamming, Block codes, BCH and RS codes, Convolutional codes- Viterbi algorithm, Concatenated codes, Trellis code modulation, Turbo codes- coding, decoding and performance, LDPC codes- construction and decoding

Text Book:

Reference Books:
EC T62 - DIGITAL COMMUNICATION

UNIT- I

UNIT- II
Band Pass Transmission: ASK, FSK, PSK, QPSK, DQPSK, MSK, QAM - Detection of signals in noise - Coherent and Non-coherent detection of ASK, FSK and PSK - Comparison of error performance of non- coherently and coherently detected ASK, FSK and PSK systems - M-ary signaling - Vectorial view of MPSK and MFSK - error performance

UNIT- III
Spread Spectrum Communication: Spread spectrum technologies - spreading techniques - PN sequences - Direct sequence spread spectrum systems - Frequency hopping spread spectrum systems - Hybrid systems - Demodulation schemes - RAKE Receivers - Use of spread spectrum with code division multiple access

UNIT- IV
Synchronization: Receiver synchronization - Coherent systems - Symbol and frame synchronization - Network synchronization - Open and closed loop transmitter synchronization - Tracking and acquisition in spread spectrum system

UNIT- V
Encryption and Decryption: Model encryptor - decryptor - Classical encryption techniques - Cipher principles - Data encryption standard - Stream encryption- Key management - Diffie-Hellman key exchange - Elliptic curve architecture and cryptography - Public key encryption system- RSA algorithm

Text Books:

Reference Books:
EC T63 - COMPUTER COMMUNICATION NETWORKS

UNIT- I


UNIT- II

Data Link Control: Types of errors- Error detection and correction- Checksum- Framing-Flow control-Error control- Stop and wait protocol- Go-back N- Selective repeat protocols-HDLC-Random access protocols- Controlled access- Wired LANs- Ethernet- Fast Ethernet- Gigabit Ethernet- IEEE standards, IEEE 802.3, 802.4, 802.5 and 802.6- Wireless LANs- IEEE 802.11 and Bluetooth.

UNIT- III

Network Routing Algorithms: Logical addressing- IPv4 addresses- IPv6- Internet protocol- Transition from IPv4 to IPv6- Mapping logical to physical address- Mapping physical to logical address- ICMP-Direct Vs indirect delivery- Forwarding- Unicast and Multicast routing protocols- Routers and gateways.

UNIT- IV

Congestion and Traffic Management: Queuing analysis- Queuing models- Single server and multi server queues- Congestion control in data networks and internets- Effects of congestion- Congestion and control- Traffic management- Congestion control in packet networks- TCP flow control- TCP congestion control- Requirements for ATM traffic and congestion control- Performance of TCP over ATM.

UNIT- V


Text Books:

Reference Books:
EC T64 - MICROPROCESSORS AND MICROCONTROLLERS

UNIT I


UNIT II

8086 Hardware Architecture: Architecture – 8086 system configurations.

UNIT III


UNIT IV

Microcontroller Peripheral Programming: 8051 Hardware connection and Intel HEX file – 8051 Timer programming in C – 8051 Serial port programming in C - 8051 Interrupts programming in C.
PIC18 Timer Programming in Assembly and C - PIC18 Serial Port Programming in Assembly and C

UNIT V


Text books:


References:

1. Construct an Amplitude Shift Keying (ASK) modulator and demodulator circuit. Obtain the ASK modulated and demodulated waveforms.

2. Construct a Frequency Shift Keying (FSK) modulator and demodulator circuit. Obtain the FSK modulated and demodulated waveforms.

3. Construct a Binary Phase Shift Keying (BPSK) modulator and demodulator circuit. Obtain the BPSK modulated and demodulated waveforms.

4. To study the different line coding techniques 1) NRZ unipolar format 2) NRZ polar format 3) NRZ bipolar format and 4) Manchester format. Obtain the waveforms of the different formats.

5. Construct a Pulse code modulator and demodulator circuit. Obtain the coded output for the given sine wave.

6. Construct a Delta modulator and demodulator circuit. Obtain the coded output for the given sine wave.

7. To design and construct DS-CDMA circuit and verify its operation. Obtain the DS-CDMA waveform.

8. Construct a time division multiplexing circuit to combine two different data streams onto a single channel by assigning time slots to each. Obtain the TDM output.

9. Construct a frequency synthesizer circuit using PLL for the given frequency. Obtain the synthesized waveform.


12. Implementation of data encryption and decryption using Matlab.
1. Simulation of ON-OFF and voice traffic model
   a) To simulate the ON-off traffic model and plot the following waveform
      i. User numbers Vs ON period.
      ii. Time slot Vs number of users.
      iii. Time slot Vs bandwidth allotted.
   b) To simulate voice traffic model and obtain
      i. Time slot Vs bandwidth plot.
      ii. Time slot Vs error plot.
      iii. Average error rate.
      iv. The optimum buffer size for which error rate will be less than stipulated value.

2. Simulation of data traffic and video traffic model
   a) To simulate the data traffic and multiple rate video traffic for multiple users and to obtain
      i. Time slot Vs bandwidth plot.
      ii. Time slot Vs BER plot.
      iii. The optimum buffer size for which error rate will be less than stipulated value.

3. Simulation of ISDN traffic model
   a) To simulate the ISDN traffic model for multiple users and to obtain
      i. Time slot Vs bandwidth plot.
      ii. Time slot Vs BER plot.
      iii. Time slot Vs un-served video user.
      iv. Time slot Vs un-served data user.

4. PN sequence generation and testing
   a) To generate maximal and non maximal length PN sequence and test its randomness properties.

5. M/M/I queuing model
   a) To simulate M/M/I queuing model and obtain
      i. Time slot Vs packet loss plot.
      ii. Maximum and average packet loss without buffer.
      iii. Buffer size for the given loss.
      iv. Maximum and average packet loss with buffer.

6. M/G/I and G/G/I queuing model
   a) To simulate a M/G/I and G/G/I queuing model and obtain
      i. Time slot Vs packet loss plot.
      ii. Maximum average packet loss without buffer.
      iii. Buffer size for the given loss.
      iv. Maximum and average packet loss with buffer.

7. Encryption and decryption
   a) To simulate and test the following encryption and decryption algorithm.
      i. Mono alphabetic cipher- caeser cipher.
      ii. Poly alphabetic cipher- Trithemius key, Vigenere key, Vigenere plain and cipher key.
      iii. RSA with and without digital signature.
8. Flow control
   a) To simulate and test
      i. Stop and wait protocol
      ii. Go back N protocol
      iii. Selective repeat protocol

9. Error control protocol
   a) To simulate and test
      i. Cyclic redundancy check
      ii. Hamming code

10. Routing algorithms
    a) To simulate and test
        i. Shortest path routing algorithm
        ii. Hierarchical routing algorithm

11. Generation of PDF
    a) To study, generate and trace the following PDF
        i. Gaussian distribution   v. Binomial distribution
        ii. Uniform distribution   vi. Negative binomial distribution
        iii. Exponential distribution vii. Gamma distribution
        iv. Rayleigh distribution  viii. Poisson distribution

12. Wireless LAN
    a) To establish wireless LAN test bed (or) wireless LAN environment and perform
        i. Uni-cast
        ii. Multicast
        iii. File transfer protocol
Using 8085 kits and writing program in Assembly

1. Simulation of number
   Write a program to find the sum of \( n \) numbers
2. Sorting of number
   Write a program to find largest/smallest number in an array of numbers

Using 8051 microcontroller kit and writing program in C

1. Counter Design
   Display digits starting from 00 up to 99, incremented every second
2. Lamp Controller
   Switch ON a lamp through a relay and switch it OFF after say 2 minutes under program control
3. Water Level Indicator
   Sense the presence or absence of water and switch ON or OFF an LED.
4. DAC Interface
   Interface DAC to the microcontroller to generate a saw-tooth, square and triangular waveform,
5. ADC Interface
   Interface to ADC and display the input analogue voltage to digital display of 8 LEDs.
6. STEPPER MOTOR INTERFACE
   Interface to a Stepper motor to rotate.
7. LCD Interface
   Interface an 16 x 2 LCD display
8. Serial Communication
   Establish serial communication between two microcontrollers
UNIT – I
Composition Analysis: Technical and Non-Technical Passages (GRE Based) – Differences in American and British English – Analyzing Contemporary issues – Expanding Terminology

UNIT – II
Writing: Job Application Letter Writing – Resume Writing

UNIT – III

UNIT – IV
Adapting to Corporate Life: Corporate Etiquette – Grooming and Dressing

UNIT – V
Aptitude: Verbal and numerical aptitude

Reference Books:
1. Pushplata and Sanjay Kumar, Communicate or Collapse : A Handbook of Effective Public Speaking, Group Discussions and Interviews, PHI Learning, Delhi, 2007.
EC T71 - ENGINEERING ECONOMICS

UNIT I


UNIT II


UNIT III


UNIT IV

Replacement and Maintenance Analysis: Types of Maintenance, Types of Replacement Problem, Determination of Economic Life of an Asset, Replacement of an Asset with a New Asset – Capital Recovery with Return and Concept of Challenger and Defender, Simple Probabilistic Model for items which fail Completely.

UNIT V


Text Books:

Reference Books:
EC T72 - MICROWAVE AND OPTICAL ENGINEERING

UNIT I

UNIT II
Microwave Passive Devices: Waveguide corners, bends, twists, Directional couplers, Circulators, Isolators, Frequency meters, Attenuators, Wave guide Tee, Hybrid Tee, Hybrid rings (rat-race), Slotted line section, Terminator and micro wave antennas.

UNIT III

UNIT IV

UNIT V
Optical Networks: Optical transmitters and receivers, System block diagram - point to point link – link design, power budget analysis. WDM- DWDM and SONET/SDH. Introduction to AON , PON and FTH.

Text Books:

Reference Books:
2. Annapoorna Das and Sisir K. Das, “Microwave Engineering”, TMH.
EC T73 - EMBEDDED SYSTEMS

UNIT I
**Introduction to Embedded Processors:** Introduction to Embedded Computing, Issues and Challenges in Embedded system Design, Trends: SC, custom designed chips, configurable designed chips, configurable processors and multi-core processors.

Embedded processor architecture: General concepts, instruction sets, Levels in architecture, Functional description-hardware/software trade-off Introduction to RISC architecture, Pipelining, Instruction issue and execution, Instruction formats, Addressing modes, Data alignment and byte ordering, Introduction to VLIW and DSP processors.

UNIT II

UNIT III

UNIT IV
**Real Time Operating Systems:** Definitions of process, tasks and threads – Inter Process Communication:- Shared data problem, Use of Semaphore(s), Priority Inversion Problem and Deadlock Situations, Message Queues, Mailboxes, Pipes, Virtual (Logical) Sockets, Remote Procedure Calls (RPCs) - Operating System Services:- Goals, Structures, Kernel, Process Management, Memory Management, Device Management - Real Time Operating System - RTOS Task scheduling models:- Co-operative Round Robin Scheduling, Cyclic Scheduling with Time Slicing.

UNIT V

**Textbooks:**

**References:**
1. Reflex Klystron characteristics
   Obtain the mode characteristics of given Reflex Klystron Oscillator and estimate
   the bandwidth, ETS and ETR from the plot drawn.

2. Gunn diode characteristics
   Perform the V-I characteristics of Gunn diode and measure the wavelength and
   frequency of operation of the Gunn diode using slotted waveguide (without
   frequency meter).

3. Determination of VSWR and impedance of unknown load
   Establish the basic microwave setup using one of the active sources and determine
   the voltage standing wave ratio (VSWR) of given loads and also measure the
   impedance of the given loads using setup.

4. Radiation pattern measurement of antenna
   Establish the basic microwave setup using Reflex Klystron oscillator and measure
   the E-plane and H-plane radiation patterns of the given antenna. Also estimate
   FNBW, HPBW and side lobe level of the given antenna from the plots drawn.

5. Dielectric constant measurements
   With the help of basic microwave setup, measure the relative and absolute
   dielectric constant of given dielectric materials.

6. Characteristics of optical fibers
   With the help of optical kit, perform the following characteristics study for the
   given fiber.
   a) Frequency response b) Attenuation c) Coupling loss d) Numerical aperture

7. Study of fiber fault characteristics using OTDR
   Study the given OTDR setup. Also understand how the location and range of the
   fiber fault can be determined using the setup. Explore its applications.

8. Characterisation of microwave components
   With the help of basic microwave setup characterise the given passive microwave
   components (DC, E-plane, Magic Tee etc.). Also validate the values obtained
   through simulation using any environment.

9. Study of TDM using optical kit
   With the help of given optical kit, study the concept of TDM and its parameters
   after establishing the digital link.

10. Study of fiber sensors
    Establish the optical link and measure the temperature of the given system or
    pressure of the given system or strain in the given system. Also plot the transducer
    response.
EC P72 - EMBEDDED SYSTEMS LABORATORY

1. Voltage Measurement
   Design a voltmeter to measure voltage from 0 to 5 volts and display on 2 digits, 7 segment displays
2. Water Pump Controller
   Design a water pump controller by sensing the low and high level in water tank
3. Digital Clock
   Design a digital clock, using LCD display
4. Temperature Measurement
   Design a Thermometer, using LM35 and 2 digits, 7 segment displays
5. PC Communication
   Interface the microcontroller to a PC through RS232 interface. Display messages sent by the microcontroller on the PC using Visual Basic program running in PC
6. Remote Control through FM Link
   Establish a remote link between two microcontrollers using FM transmitter and receiver. Exchange messages between the two microcontrollers.
7. Hot Chamber Controller
   Design a hot chamber to maintain the temperature say at 40 degrees centigrade.
8. Obstacle Detector through Ultra Sonic
   Design a obstacle detection system using ultrasonic transmitter receiver.
9. Sprinkler Controller
   Design a moisture sensor and sprinkler controller
10. Lamp Controller
    Design a light sensor and a timer to control a lamp for 3, 4 or 8 hours.
EC P73 SEMINAR

Each one of the students will be assigned a Seminar Topic in the current and frontier areas. The student has to conduct a detailed study/survey of the material available on the assigned topic and prepare a report, running to 30 or 40 pages. The student will make a oral presentation for a period of about 30 minutes, followed by a brief question and answer session. The Seminar (presentation and report) will be evaluated by the internal assessment committee (comprising of the Head of the Department and two faculty members) for a total of 50 marks.

EC P74 INDUSTRIAL VISIT/TRAINING

The students are required to undergo in plant training for a period of two weeks /four industrial visits during the summer vacation after the fourth semester. Each student has to submit a detailed report on the training programme undergone. Each student will be evaluated by an internal assessment committee (comprising of the Head of the Department and two faculty members) for a total of 50 marks

EC PW7 PROJECT WORK

Each batch of 2 or 3 students will be assigned an experimental or a theoretical project to be carried out under the supervision of a guide. The project work has to be carried out in the 7th and 8th semesters and completed by the end of the 8th semester. In the phase I of the project work, the progress of the work carried out in the 7th semester will be monitored and assessed internally for a total of 50 marks. A committee of departmental faculty members comprising the project guide, the Head of the Department and one more faculty member will conduct the internal assessment.
EC T81 INDUSTRIAL MANAGEMENT

UNIT I


UNIT II

General Management: Basic concepts of management – Scientific management – Henry Fayal’s principles of management – Types and functions of management. Types of organization – characteristics, merits and demerits. Types of industrial ownership – characteristics, merits and demerits.

UNIT III


UNIT IV


UNIT V

Marketing and Human Resources Management: Marketing Management: Core concepts of marketing; needs, wants and demands; marketing Vs selling – products and markets - pricing and relative factors: channel of distribution; promotion, advertising; market research. Human Resource Management: individual and group behaviour – motivation and morale - fatigue – accidents: causes and remedies - manpower planning – Job evaluation and merit rating.

Text / Reference Books:
EC T82  TELECOMMUNICATION SWITCHING NETWORKS

UNIT-I
Principles and Evolution of Switching Systems: Basics of switching system, manual switching system, rotary dial telephone, signaling tones, strowger switching components, step-by-step switching, design for 100 line, 1000 line, 10,000 line exchange, touch tone dial telephone, cross bar switching and exchange organization. Four wire concept, operation of hybrid, echo suppressors. Centralized and distributed SPC, software architecture, application software, enhanced services offered by SPC.

UNIT-II
Space Division Switching: Two, three and multistage space division networks, blocking probability calculations using Lee’s method.
Time Division Switching: Basic time division space switching, time division time switching, time multiplexed space switching, time multiplexed time switching.
Combination Switching: S-T, T-S, S-T-S, T-S-T and other multistage combination switching.

UNIT-III
Traffic Engineering: Network traffic load and parameters, GOS and blocking probability, modeling switching systems, incoming traffic and service time characterization, blocking models and loss systems, delay systems.

UNIT-IV
Telephone Networks: Subscriber loop systems, high data rate digital subscriber loop, asymmetric digital subscriber loop, VDSL, transmission plan, transmission systems, numbering plan, charging plan, basics of signalling, In channel signalling, common channel signalling.

UNIT-V
Data Networks: Data transmission in PSTN, switching techniques for data transmission, OSI reference model, Satellite based data networks, fiber optic networks, protocol stacks, internetworking. ISDN services, transmission channels and user network interface in ISDN, ISDN protocol architecture, ISDN standards, ISDN numbering and addressing. Introduction to the basic principles of frame relay, TCP/IP and ATM.

Text Books:

Reference Book:
1. Study of Microwave Communication Systems
   Establish the microwave link using active source and demonstrate the audio
   transmission (External modulation) over the link. Also record the values of signal at
   different points.
2. Demonstration of ISDN concept
   Demonstrate the concept of ISDN with the help of either with optical link or with
   microwave link. Note down the response of the link at various stages.
3. Study of RCA
   With the help of Radio Communication Analyzer, study the performance of FM
   transmitter and receiver. Tabulate the values.
4. Study of the spectrum of modulated signals
   With the help of Spectrum Analyzer, obtain the spectrum of analog and digital
   modulated signals. Also obtain their time domain equivalent. Validate these results
   through simulation.
5. Study of the spectrum of TV signals
   With the help of Spectrum Analyzer, estimate the spectrum of any one of the TV
   channels. Also identify the components of the composite signal with the help of
   Spectrum Analyzer.
6. Design and testing of filters using Vector Network Analyzer
   Design, test and obtain the response of LP/HP/BP/BS filter for FM range using
   Vector Network Analyzer and also validate the result through simulation.
7. Design and testing of antenna using Vector Network Analyzer
   Design, test and obtain the response of the given antenna (for FM range) using
   Vector Network Analyzer. Also measure the impedance of the designed antenna.
8. Study of Radar trainer kit
   Study the Radar trainer kit and obtain the following.
   a) Detection of the moving/static object
   b) Range of the objects
   c) Velocity of the moving objects.
9. Study of computer communication
   Establish a secure PC to PC communication (wire/wireless). Transmit the given
   voice and data and evaluate their performance.
10. Simulation of spread spectrum, microwave, optical and satellite communication
    systems
    Simulate and obtain the response of atleast any two of the following using any
    environment
    a) Error performance of CDMA in AWGN and fading channel for multiuser
       environment
    b) Characterise the given microwave link and validate through analytical measure
    c) Power budget and rise time link analysis of a given optical link
    d) Given satellite link.
EC P82 COMPREHENSIVE VIVA-VOCE

The student will be tested for his understanding of the basic principles of the core engineering subjects. The internal assessment for a total of 50 marks will be made by a committee comprising of the faculty members of the department. The committee will conduct three written examinations of short questions type from the subjects (Test1-Analog and Digital Electronic Circuits, Electric Circuits, Microprocessor and VLSI; Test 2-Signal Processing, Electromagnetic Waves and Waveguides, Antennas Control Systems; Test 3- Analog and digital communication, Advanced communication systems). The external university examination, which carries a total of 50 marks, will be a Viva Voce examination conducted by a committee of one external examiner and one internal examiner appointed by the university.

EC PW8 PROJECT WORK (PHASE II)

Extension and completion of project work started in the previous semester. On completion of the project work, each student has to prepare a project report and submit the same to the department. In the Phase II, the project work and the report will be evaluated by the internal assessment committee by conducting two reviews and one demo for a total of 50 marks. The external university examination, which carries a total of 50 marks, will have report evaluation and viva voce examination conducted by a committee of one external examiner and one internal examiner appointed by the university.

EC P83 PROFESSIONAL ETHICAL PRACTICE

The course should cover the following topics by way of Seminars, Expert Lectures and Assignments:

1. Engineering Ethics – Moral issues, Ethical theories and their uses
2. Engineering as Experimentation – Code of Ethics
3. Engineer’s responsibility for safety
4. Responsibilities and rights
5. Global issues of engineering ethics

Reference Book:

ELECTIVES SIXTH SEMESTER

EC E61 - ADVANCED DIGITAL SIGNAL PROCESSING

UNIT- I


UNIT- II


UNIT- III


UNIT- IV


UNIT- V


Text Book:

Reference Books:
EC E62 - INDUSTRIAL ELECTRONICS

UNIT-I

UNIT-II
Regulators of Voltage and Motor Speed: Voltage compensator – Solid state DC voltage regulation – DC shunt motor – Armature control and field control of motor speed – Electronic control of DC motor – Speed regulator action – Full wave motor speed regulation by one SCR.

UNIT-III

UNIT-IV

UNIT-V
Programmable Logic Controllers: Number system and codes – Basics of PLC programming – Timer and counter instructions – Data manipulation instructions – Shaft register and sequence instructions.

Text Books:
EC E63 - OPTO ELECTRONIC DEVICES

UNIT-I
Physics of Light and Fiber Basics: Electromagnetic waves- Wave nature of light, basic optical laws and definition-Introduction to optical fibers-Principles of light propagation through optical fiber-Different types of fibers-Structures and their properties.

UNIT-II

UNIT-III
Opto Electronic Modulator and Optical Sensors: Electro optic modulator-Magneto optic devices-Acousto optic devices-All fiber modulators- Interferometric Sensors, Fabry perot, Mach Zender, Michelson and Sagnac interferometric sensors.

UNIT-IV

UNIT-V

Text Book:

Reference Books:
EC E64 - RADAR AND NAVIGATIONAL AIDS

UNIT-I

Radar Fundamentals: Radar block diagram and operation, radar frequency, radar range equation, prediction of range performance, minimum detectable signal, radar cross section of targets, cross section fluctuations, transmitter power, Pulse repetition frequency and range ambiguities, system losses and propagation effect.

UNIT-II

CW and FMCW Radar: Doppler effect, CW radar, basic principle and operation of FMCW radar. MTI and Pulse Doppler Radar: MTI block diagram and description, delay line cancellers, range gated Doppler filters, Non coherent MTI, Pulse Doppler radar: Tracking Radar – sequential lobing, conical scan and simultaneous lobing monopulse.

UNIT-III


UNIT-IV


UNIT-V

Electronic Navigation: Adcock directional finder, Automatic Directional finder, VHF omni directional range, Hyperbolic systems of navigation –Loran and Decca Navigation system, Tactical air navigation (TACAN), ILS and GCA as aids to approach and landing.

Text Books:

Reference Books:
EC E65 - SPREAD SPECTRUM COMMUNICATION

UNIT-I

UNIT-II
Direct Sequence Spread Spectrum System: Coherent direct sequence systems – Model of a DS/BPSK system, Chernoff bound – Performance of encoded DS/BPSK – Constant power and pulse jammer. Coded DS/BPSK Performance for known and unknown channel states

UNIT-III

UNIT-IV

UNIT-V
Applications: Space systems – Satellite communication. Anti jam military communication – Low probability of intercept communication – Mobile communications.

Reference Books:
EC E66 - CRYPTOGRAPHY AND NETWORK SECURITY

UNIT-I

UNIT-II

UNIT- III

UNIT- IV

UNIT- V
System Security: Intruders and intrusion detection-Malicious software, Viruses and related threats, virus counter measures, distributed denial of services attack-Firewalls design principles-Trusted systems.

Text Book:

Reference Book:
EC E67 - VISUAL PROGRAMMING

UNIT-I

UNIT-II

UNIT-III
Data Objects: Open Data Base Connectivity (ODBC)-Active Data Objects (ADO) - Data Access Objects (DAO) - Active X Data Objects and Data Connection (ADODC) - Data environment-Data report-ADODC based controls.

UNIT-IV
Application Development and Automation: MDI-Menu-Toolbar- Active X-Mouse events- OLE based Automation-Class-Modules-DLL.

UNIT-V

Text Books:
EC E68 - DIGITAL SIGNAL PROCESSORS AND APPLICATIONS

UNIT-I

Freescale DSP56XXX Architecture and Programming: Introduction, Core Architecture Overview, Data Arithmetic Logic Unit, Address Generation Unit, Program Control Unit, PLL and Clock Generator, Debugging Support, Instruction Cache, External Memory Interface, DMA Controller, Operating Modes and Memory Spaces, Instruction Set, Benchmark Programs.

UNIT-II


UNIT-III

TMS320C6x Architecture: CPU Operation – Pipelined CPU- VelociTI – C64x DSP-Software tools: EVM – DSK Target C6x board – Assembly file – Memory management-Compiler utility- Code initialization – Code composer studio – Interrupt data processing.

UNIT-IV


UNIT-V

Frame Processing, Real Time Analysis and Scheduling: Frame processing: DMA DSP Host Communication- DFT and FFT Implementation- Real time FFT – Real time analysis-Real time scheduling – real time data exchange – DSP / BIOS – Data synchronization and communication.

Text Books
1. Digital Signal Processing Applications using the ADSP – 2100 Family, Volume 1 Analog devices , DSP Division Prentice Hall, 1992(Unit I,II).
2. Nasser Kehtarnavaz and Mansour Keramat, “DSP System design using the TMS320C600 Prentice hall 2001(Unit III,IV ,V)

Reference Books
1. Mohammed El-Sharkawy,Digital Signal Processing Applications With Motorola's DSP56002.
5. DSP56300 Family Manual from Freescale Semiconductors.
ELECTIVES SEVENTH SEMESTER

EC E71 - DIGITAL IMAGE PROCESSING

UNIT-I

UNIT-II
Mathematical Preliminaries and Image Transform: Two dimensional system and mathematical preliminaries, Image transforms – 1D DFT, 2D DFT, Discrete Cosine transform, Discrete Sine transform, Hadamard transform, Haar transform, Slant transform, KL transform, SVD transform, Wavelet transform.

UNIT-III

UNIT-IV

UNIT-V

Text Books:

Reference Book:
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V
Text Books:

Reference Books:
EC E73 VLSI DESIGN

UNIT I
VLSI Circuits and Basic Electrical Properties of MOS and Bi CMOS Circuits: NMOS, CMOS and BI CMOS fabrication-p well, n well and twin tub process-comparison between CMOS and bipolar technology-Electrical parameters-pull up to pull down ratio-Device modeling

UNIT II
MOS and Bi MOS Circuit Design Process and Scaling: MOS layers-stick diagrams-design rules and layout-inverter delays-propagation delays-wiring capacitances-choice of layers-scaling models and scaling factors for device parameters-limitations of scaling

UNIT III
VLSI Logic Circuits, Design Process and Layout: Pass transistor and Transmission gates-inverter-NAND gates and NOR gates for n MOS, CMOS and Bi CMOS-parity generator-multiplexers-code converters-PLA-clocked sequential circuits-4 bit adder-multiplexers-design of ALU-memories-registers

UNIT IV
Ultra Fast VLSI Circuits and Programmable ASIC’s: Ultra fast systems-GaAS crystal structure-GaAS fabrication-device modeling and performance estimation-only GaAS) Antifuse and SRAM Practical issues-FPCA economics, programmable logic cells, Actel ACT1, ACT2 and ACT3-Xilinx LCA, Ultra FLEX and Ultra MAX

UNIT V
An Introduction to HDL, Verilog and VHDL: Verilog: Basics of Verilog, operators, hierarchy procedures and assignments, timing controls and delays, tasks and functions, control statements. VHDL: Syntax and semantics, identifiers, and literals, entities and architectures, packages and libraries interface, type and other declarations, sequential statements, operators, arithmetic operators, VHDL and logic synthesis, Verilog and logic synthesis

Text Books:

Reference Book:
ELECTIVES OF EIGHTH SEMESTER

EC E81 - BIO-MEDICAL INSTRUMENTATION

UNIT-I
Basic Physiology: Cells and their structures- transport of ions through cell membrane- Resting and excited state-transmembrane potential-action potential-Bio Electric potential- nervous system-physiology of muscles-heart and blood circulations-respiratory system-urinary system.

UNIT-II

UNIT-III
Cardiovascular System: The heart and cardiovascular system-blood pressure-characteristics of blood flow-heart sounds Electro cardiography - measurement of blood pressure-measurement of blood flow and cardiac o/p-plethysmography - measurement of heart sounds.

UNIT-IV
X-ray and Radioisotope Instrumentation: X-ray imaging, radiography fluoroscopy-image intensifier, angiography-medical use of radio isotopes, Beta radiations detectors-radiation therapy.

UNIT-V

Text Books:
EC E82 - CELLULAR MOBILE COMMUNICATION

UNIT-I

Introduction: The cellular concept – Frequency reuse – Interference and system capacity – Trunking and Grade of service – Improving coverage and capacity in cellular systems - Advanced Mobile Phone service - Global system for mobile communication - EIA/T IA IS-136 Digital cellular system - EIA/T IA IS-95 Digital cellular system - cordless telephony and low tier TCS - Third generation wireless system

UNIT-II

Mobility Management: Handoff - Roaming management - Handoff detection – channel Assignment techniques - Radio link transfer IS-41 Network signaling – Intersystem handoff and Authentication - PACS Network Signaling - cellular digital packet data

UNIT-III

GSM: GSM Network signaling - GSM Mobility management GSM short message service - International roaming for GSM - GSM operation, Administration and maintenance - Mobile number Mobile number portability’s, VoIP service for mobile networks.

UNIT-IV


UNIT-V

Special Topics: Third generation mobile services - Wireless local loop – Wireless enterprise networks - Bluetooth technology.

Text Book:

Reference Books:
EC E83 - SATELLITE COMMUNICATION SYSTEM

UNIT-I
Introduction to Satellite Communication: Types of satellites- Satellite orbit- satellite constellation- orbital mechanics- equation of orbit-orbital elements- look angle determination- limits of visibility- eclipse- sub satellite point- sun transit outage- space craft technology structural, primary power, attitude and orbit control, thermal, propulsion, telemetry, tracking and command, communication and antenna subsystems- launching procedures and launch vehicles

UNIT-II
Earth Station and Satellite Link Design: Earth station technology- terrestrial interface, receiver and transmitter, antenna systems-Basic transmission theory- satellite uplink and down link analysis and design for IMMARSAT, INTELSAT etc. Link budget and $E_b/N_0$ calculation. Performance impairments – system noise, inter modulation and interference. Propagation characteristics and frequency consideration- system reliability and design life time

UNIT-III
Satellite Access: Types- FDMA concepts- inter modulation and back off- SPADE system- TDMA concept- frame and burst structure- satellite switch TDMA- CDMA concept- DS & FH CDMA system- comparison of multiple access scheme

UNIT-IV
Laser Satellite Communication: Inter satellite links- optical communication for satellite networks- laser cross link analysis- optical beam acquisition, tracking and pointing.

UNIT-V
Satellite Services: Packet satellite networks and services, fixed satellite services, broadcast satellite services, mobile satellite services- VSAT, global positioning satellite system maritime satellite services, gateways, ATM over satellite, role of satellite in future network.

Text Book:

Reference Books:
UNIT-I
Transmission Lines: Characteristics of conventional transmission structures, various planar transmission lines for MICs, comparison of various MIC transmission media. Design of stripline and microstrip transmission lines. Design of coupled striplines and microstrip lines. Stripline and microstrip discontinuity. Losses of microstrip lines and frequency effects. Review of scattering, ABCD, impedance and admittance matrices for two port networks.

UNIT-II

UNIT-III
Active and Passive Microwave Devices: Microwave transistor, equivalent circuit. Basic operation principles of FET, MESFET model, power FETs. Introduction, equivalent circuit and figure of merit of schottky barrier junctions, varactor diodes, step recovery diodes and pin diodes.

UNIT-IV
Microwave Semiconductor Sources and Amplifiers: Oscillators: Introduction, concept of negative resistance, three port S-parameter characterization of transistors, oscillation and stability conditions, design of fixed frequency oscillators. Amplifiers: Two port representation of transistor, stability consideration, amplifier characterization, Non-linear behavior, biasing networks, and linear amplifier design.

UNIT-V
Fabrication of MMC’s/MMIC’s: Introduction, materials, mask layouts and mask fabrication, hybrid MIC, Mimics- design considerations, design procedures and MMIC fabrication. Hybrid versus Mimics.

Text Book:

Reference Book:
EC E85 - SPECIAL TOPICS IN COMMUNICATION ENGINEERING

UNIT I

ISDN Overview: A conceptual view of ISDN- ISDN standards- service capabilities- Teleservice protocol architecture- facsimile- teletex message handling system. ISDN interfaces and function; transmission structure- user network interface configuration- ISDN protocol architecture- ISDN connection- terminal adaptation- addressing- internet working. ISDN physical layer: line coding techniques, basic user network interface- primary user role- network interface.

UNIT II

ISDN Data Link Layer: Hap D, bearer channel link control using 465/ v 120, frame mode bearer service and protocol. ISDN network layer: ISDN call control, Frame relay connection control. Signaling system number Z: SS7 architecture, signaling- data link level-link level, network level- signaling connection control part- ISDN user part. ATM networking capabilities - ATM networking asynchronous technology problems address by ATM, ATM solution, ATM cell and its structure.

UNIT III


UNIT IV

Internet Concepts: The net and its features main Internet features, email news groups, telnet, gopher, browsing in WWW. Control modems: speed/ time continuum, communication software Internet finding tools, Archie, gopher commands: TCP/IP pictures, graphics and binary files via news groups: compression software: processing file- sound and images: animation. Internet resources- library card catalogues: establishing web services intranet- creating web home page.

UNIT V


Reference Books:
EC E86 - DATA COMMUNICATIONS AND NETWORKING

UNIT I

UNIT II

UNIT III

UNIT IV
The Internet and TCP/IP: Introduction – Internet history – Use of the Internet – Accessing the Internet – Internet Addresses – Intranets and Extranets – TCP/IP technology behind Internet.

UNIT V

Text Books:

Reference Books:
EC E87 - INTRODUCTION TO SOFT COMPUTING

UNIT-I


UNIT-II

**Neural Networks:** Biological inspiration – Neuron model and Network architectures perception – Architecture, learning rule. Limitations of multiplayer perception- Back propagation algorithm – Learning rule – Computer assignments.

UNIT-III


UNIT-IV

**Evolutionary Programming:** Single and multi objective optimization-General algorithm- Binary GA, Real parameter GA, constraint handling in GA Evolution strategies general programming – Computer assignments.

UNIT-V

**Applications:** Applications to various branches of Engineering and science- Application of fuzzy, neural, GA and EP in computer science, electrical, communication, instrumentation and control, mechanical and civil engineering.

**Text Books:**