GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)
(Deemed to be University, Estd. u/s 3 of UGC Act 1956)
* VISAKHAPATNAM * HYDERBAD * BENGALURU *
Accredited by NAAC with ‘A’ Grade

REGULATIONS & SYLLABUS

Bachelor of Technology
in
Electrical & Electronics & Engineering
Program Code: EUREE 200802
(W.e.f 2014-15 admitted batch)

Website: www.gitam.edu
B. Tech. (Electrical & Electronics & Engineering)  
Programme Code: EUREE200802  
REGULATIONS  
(W.e.f 2014-15 admitted batch)

1.0 ADMISSIONS

1.1 Admissions into B.Tech (Electrical & Electronics Engineering) programme of GITAM University are governed by GITAM University admission regulations.

2.0 ELIGIBILITY CRITERIA

2.1 A pass in 10+2 or equivalent examination approved by GITAM University with Physics, Chemistry and Mathematics.

2.2 Admissions into B.Tech will be based on an All India Entrance Test (GAT) conducted by GITAM University and the rule of reservation, wherever applicable.

3.0 STRUCTURE OF THE B.Tech. PROGRAMME

3.1 The Programme of instruction consists of:

   (i) A general core programme comprising Basic Sciences, Basic Engineering, Humanities & Social Sciences and Mathematics.
   (ii) An engineering core programme imparting to the student the fundamentals of engineering in the branch concerned.
   (iii) An elective programme enabling the students to take up a group of departmental / interdepartmental courses of interest to him/her.

In addition, a student has to

   (i) Carry out a technical project approved by the department and submit a report.
   (ii) undergo summer training in an industry for a period prescribed by the department and submit a report.

3.2 Each academic year consists of two semesters. Every branch of the B.Tech programme has a curriculum and course content (syllabi) for the courses recommended by the Board of Studies concerned and approved by Academic Council.
4.0 CREDIT BASED SYSTEM

4.1 Each course is assigned certain number of credits which will depend upon the number of contact hours (lectures & tutorials) per week.

4.2 In general, credits are assigned to the courses based on the following contact hours per week per semester.

One credit for each Lecture / Tutorial hour.
One credit for two hours of Practicals.
Two credits for three (or more) hours of Practicals.

4.3 The curriculum of B.Tech programme is designed to have a total of 190 to 200 credits for the award of B.Tech degree.

4.4 Every course of the B Tech programme will be placed in one of the nine groups of courses with minimum credits as listed in the Table 1.

4.5 - Table 1: Group of Courses

<table>
<thead>
<tr>
<th>S.No,</th>
<th>Group of Courses</th>
<th>Code</th>
<th>Minimum credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Humanities &amp; Social Sciences</td>
<td>HS</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Basic Sciences</td>
<td>BS</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Mathematics</td>
<td>MT</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Basic Engineering</td>
<td>BE</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Core Engineering</td>
<td>CE</td>
<td>68</td>
</tr>
<tr>
<td>6</td>
<td>Departmental Elective</td>
<td>DE</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Inter Departmental Elective</td>
<td>IE</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Project Work</td>
<td>PW</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Industrial Training</td>
<td>IT</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>160</strong></td>
</tr>
</tbody>
</table>

5.0 MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English.

6.0 REGISTRATION

Every student has to register himself/herself for each semester individually at the time specified by the Institute / University.

7.0 CONTINUOUS ASSESSMENT AND EXAMINATIONS

7.1 The assessment of the student’s performance in each course will be based on continuous internal evaluation and semester-end examination. The marks for each of the component of assessment are fixed as shown in the Table 2.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Component of assessment</th>
<th>Marks allotted</th>
<th>Type of Assessment</th>
<th>Scheme of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Theory</td>
<td>40</td>
<td>Continuous evaluation</td>
<td>1. Best two mid examinations of the three mid examinations for 15 marks each for a total of 30 marks 2. Remaining 10 marks are given by the teacher by conducting quiz / assignments / surprises tests etc.</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>60</td>
<td>Semester-end examination</td>
<td>The semester-end examination in theory courses will be for a maximum of 60 marks.</td>
</tr>
<tr>
<td>2</td>
<td>Practicals</td>
<td>100</td>
<td>Continuous evaluation</td>
<td>(i) 40 marks are allotted for record work and regular performance of the student in the lab. (ii) One examination for a maximum of 20 marks shall be conducted by the teacher handling the lab course at the middle of the semester (iii) One examination for a maximum of 40 marks shall be conducted at the end of the semester (as scheduled by the Head of the Department concerned).</td>
</tr>
<tr>
<td>3</td>
<td>Project work (VII &amp; Eighth Semester)</td>
<td>100</td>
<td>Project evaluation</td>
<td>(i) 50 marks are allotted for continuous evaluation of the project work throughout the semester by the guide. (ii) 50 marks are allotted for the presentation of the project work &amp; viva-voce at the end of the semester.*</td>
</tr>
<tr>
<td>4</td>
<td>Industrial Training (Seventh Semester)</td>
<td>100</td>
<td>Industrial training evaluation</td>
<td>(i) 50 marks are allotted for report submission and seminar presentations after completion of the training. (ii) 50 marks are allotted for the viva-voce at the end of the semester.*</td>
</tr>
<tr>
<td>5</td>
<td>Comprehensive Viva (Eighth Semester)</td>
<td>100</td>
<td>Viva-voce</td>
<td>100 marks are allotted for comprehensive viva to be conducted at the end of programme.*</td>
</tr>
</tbody>
</table>

* Head of the Department concerned shall appoint two examiners for conduct of the examination.
8.0 RETOTALLING, REVALUATION & REAPPEARANCE

8.1 Retotalling of the theory answer script of the end-semester examination is permitted on a request made by the student by paying the prescribed fee within ten days of the announcement of the result.

8.2 Revaluation of the theory answer script of the end-semester examination is also permitted on a request made by the student by paying the prescribed fee within fifteen days of the announcement of the result.

8.3 A Student who has secured ‘F’ Grade in any theory course / Practicals of any semester shall have to reappear for the semester end examination of that course / Practicals along with his / her juniors.

8.4 A student who has secured ‘F’ Grade in Project work / Industrial Training shall have to improve his report and reappear for viva – voce Examination of project work at the time of special examination to be conducted in the summer vacation after the last academic year.

9.0 SPECIAL EXAMINATION

9.1 A student who has completed the stipulated period of study for the degree programme concerned and still having failure grade (‘F’) in not more than 5 courses (Theory / Practicals), may be permitted to appear for the special examination, which shall be conducted in the summer vacation at the end of the last academic year.

9.2 A student having ‘F’ Grade in more than 5 courses (Theory/practicals) shall not be permitted to appear for the special examination.

10.0 ATTENDANCE REQUIREMENTS

10.1 A student whose attendance is less than 75% in all the courses put together in any semester will not be permitted to attend the end - semester examination and he/she will not be allowed to register for subsequent semester of study. He /She has to repeat the semester along with his / her juniors.

10.2 However, the Vice Chancellor on the recommendation of the Principal / Director of the University College / Institute may condone the shortage of attendance to the students whose attendance is between 66% and 74% on genuine medical grounds and on payment of prescribed fee.
11.0 GRADING SYSTEM

11.1 Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester in each course. The letter grades and the corresponding grade points are as given in Table 3.

Table 3: Grades & Grade Points

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade points</th>
<th>Absolute Marks</th>
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<tbody>
<tr>
<td>O</td>
<td>10</td>
<td>90 and above</td>
</tr>
<tr>
<td>A+</td>
<td>9</td>
<td>80 – 89</td>
</tr>
<tr>
<td>A</td>
<td>8</td>
<td>70 – 79</td>
</tr>
<tr>
<td>B+</td>
<td>7</td>
<td>60 – 69</td>
</tr>
<tr>
<td>B</td>
<td>6</td>
<td>50 – 59</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>40 – 49</td>
</tr>
<tr>
<td>F</td>
<td>Failed, 0</td>
<td>Less than 40</td>
</tr>
</tbody>
</table>

11.2 A student who earns a minimum of 5 grade points (C grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course. However, a minimum of 24 marks is to be secured at the semester end examination of theory courses in order to pass in the theory course.

12.0 GRADE POINT AVERAGE

12.1 A Grade Point Average (GPA) for the semester will be calculated according to the formula:

\[
\text{GPA} = \frac{\sum [C \times G]}{\sum C}
\]

Where

- \(C\) = number of credits for the course,
- \(G\) = grade points obtained by the student in the course.

12.2 Semester Grade Point Average (SGPA) is awarded to those candidates who pass in all the courses of the semester.

12.3 To arrive at Cumulative Grade Point Average (CGPA), a similar formula is used considering the student’s performance in all the courses taken in all the semesters completed up to the particular point of time.

12.4 The requirement of CGPA for a student to be declared to have passed on successful completion of the B.Tech programme and for the declaration of the class is as shown in Table 4.
Table 4: CGPA required for award of Degree

<table>
<thead>
<tr>
<th>Degree</th>
<th>CGPA</th>
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<tbody>
<tr>
<td>Distinction</td>
<td>≥ 8.0*</td>
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<tr>
<td>First Class</td>
<td>≥ 7.0</td>
</tr>
<tr>
<td>Second Class</td>
<td>≥ 6.0</td>
</tr>
<tr>
<td>Pass</td>
<td>≥ 5.0</td>
</tr>
</tbody>
</table>

* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester in first attempt.

### 13.0 ELIGIBILITY FOR AWARD OF THE B.TECH DEGREE

13.1 Duration of the programme:
A student is ordinarily expected to complete the B Tech. programme in eight semesters of four years. However a student may complete the programme in not more than six years including study period.

13.2 However the above regulation may be relaxed by the Vice Chancellor in individual cases for cogent and sufficient reasons.

13.3 A student shall be eligible for award of the B.Tech degree if he / she fulfils all the following conditions.

   a) Registered and successfully completed all the courses and projects.
   b) Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time.
   c) Has no dues to the Institute, hostels, Libraries, NCC / NSS etc, and
   d) No disciplinary action is pending against him / her.

13.4 The degree shall be awarded after approval by the Academic Council.
RULES

1. With regard to the conduct of the end-semester examination in any of the practical courses of the programme, the Head of the Department concerned shall appoint one examiner from the department not connected with the conduct of regular laboratory work, in addition to the teacher who handled the laboratory work during the semester.

2. In respect of all theory examinations, the paper setting shall be done by an external paper setter having a minimum of three years of teaching experience. The panel of paper setters for each course is to be prepared by the Board of Studies of the department concerned and approved by the Academic Council. The paper setters are to be appointed by the Vice Chancellor on the basis of recommendation of Director of Evaluation / Controller of Examinations.

3. The theory papers of end-semester examination will be evaluated by internal/external examiner.

4. Panel of examiners of evaluation for each course is to be prepared by the Board of Studies of the department concerned and approved by the Academic Council.

5. The examiner for evaluation should possess post graduate qualification and a minimum of three years teaching experience.

6. The appointment of examiners for evaluation of theory papers will be done by the Vice Chancellor on the basis of recommendation of Director of Evaluation / Controller of Examinations from a panel of examiners approved by the Academic Council.
### Scheme of Instruction
#### B. Tech. (EEE) – I SEMESTER

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Scheme of Instruction</th>
<th>Scheme of Examination</th>
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<tr>
<td>1</td>
<td>EURG 101</td>
<td>Engg. English – I</td>
<td>HS</td>
<td>3</td>
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<tr>
<td>2</td>
<td>EURMT 102</td>
<td>Engg. Mathematics</td>
<td>MT</td>
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<tr>
<td>3</td>
<td>EURPH 103</td>
<td>Engg. Physics - I</td>
<td>BS</td>
<td>4</td>
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<tr>
<td>4</td>
<td>EURCH 104</td>
<td>Engg. Chemistry – I</td>
<td>BS</td>
<td>4</td>
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<td>5</td>
<td>EURCS 105</td>
<td>Programming with C</td>
<td>BE</td>
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**DRAWING / PRACTICALS:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Hours per week</th>
<th>Total</th>
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<tr>
<td>EURPH 112</td>
<td>Engg. Physics Lab</td>
<td>BS</td>
<td>2</td>
<td>3</td>
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<tr>
<td>EURCS 113</td>
<td>Programming with C Lab</td>
<td>BE</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EURME 115</td>
<td>Engineering Graphics Practice</td>
<td>BE</td>
<td>2</td>
<td>4</td>
<td>3</td>
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**Total:** 24 18 10 28 --- 360 440

### B. Tech. (EEE) – II SEMESTER

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Scheme of Instruction</th>
<th>Scheme of Examination</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tr>
<tr>
<td>1</td>
<td>EURG 201</td>
<td>Engg. English – II</td>
<td>HS</td>
<td>3</td>
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<tr>
<td>2</td>
<td>EURMT 202</td>
<td>Higher Engineering Mathematics – I</td>
<td>MT</td>
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<td>3</td>
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<tr>
<td>3</td>
<td>EURMT 203</td>
<td>Higher Engineering Mathematics – II</td>
<td>MT</td>
<td>3</td>
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<tr>
<td>4</td>
<td>EURPH 204</td>
<td>Engg. Physics - II</td>
<td>BS</td>
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<tr>
<td>5</td>
<td>EURCH 205</td>
<td>Engg. Chemistry – II</td>
<td>BS</td>
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<tr>
<td>6</td>
<td>EURCS 206</td>
<td>Object Oriented programming with C++</td>
<td>BE</td>
<td>3</td>
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</tbody>
</table>

**DRAWING / PRACTICALS:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Hours per week</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>EURCS 213</td>
<td>Objected oriented programming with C++ Lab</td>
<td>BE</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>EURCH 214</td>
<td>Engg. Chemistry Lab</td>
<td>BS</td>
<td>2</td>
<td>3</td>
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</tbody>
</table>

**Total:** 22 18 06 24 --- 360 440
### B. Tech. (EEE) – III SEMESTER

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Scheme of Instruction</th>
<th>Hours per week</th>
<th>Total</th>
<th>Scheme of Examination</th>
<th>Duration in Hrs.</th>
<th>Maximum Marks</th>
<th>Con. Eval</th>
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<tr>
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<td>EUREE 301</td>
<td>Advanced Engg. Mathematics</td>
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<tr>
<td>2</td>
<td>EUREE 302</td>
<td>EMF Theory</td>
<td>CE</td>
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<td>EUREE 303</td>
<td>Electric Circuit Theory and Analysis</td>
<td>CE</td>
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<td>4</td>
<td>EUREE 304</td>
<td>Electronics - I</td>
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<td>5</td>
<td>EUREE 305</td>
<td>DC Machines &amp; Transformers</td>
<td>CE</td>
<td>4</td>
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<td>6</td>
<td>EUREE 306</td>
<td>Electrical Measurements</td>
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**DRAWING / PRACTICALS:**

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<tr>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Scheme of Instruction</th>
<th>Hours per week</th>
<th>Total</th>
<th>Scheme of Examination</th>
<th>Duration in Hrs.</th>
<th>Maximum Marks</th>
<th>Con. Eval</th>
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<tr>
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<td>Networks Lab</td>
<td>CE</td>
<td>2</td>
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<tr>
<td>EUREE 312</td>
<td>Electronics – I LAB</td>
<td>CE</td>
<td>2</td>
<td>3</td>
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<tr>
<td>EUREE 313</td>
<td>Advanced Communication Skills &amp; English Language Lab</td>
<td>HS</td>
<td>2</td>
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**Total:** 28 21 09 30 --- 360 540

### B. Tech. (EEE) – IV SEMESTER

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course Code</th>
<th>Name of the Course</th>
<th>Category</th>
<th>Credits</th>
<th>Scheme of Instruction</th>
<th>Hours per week</th>
<th>Total</th>
<th>Scheme of Examination</th>
<th>Duration in Hrs.</th>
<th>Maximum Marks</th>
<th>Con. Eval</th>
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### B. Tech. (EEE) – V SEMESTER

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### B. Tech. (EEE) – VI SEMESTER

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**Total:** 22 18 06 24 --- 360 440
## B. Tech. (EEE) – VII SEMESTER

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|         |              |                                             |          |         | in Hrs.               |       | Maximum Marks         |
|         |              |                                             |          |         | L/T | D/P | | | | | | | Sem. | End Exam | Con. | | | Eval |
| 1       | EUREE 701    | Digital Signal Processing & Applications   | CE       | 4       | 4 | --- | 4 | 3 | 60 | 40 |
| 2       | EUREE 702    | Digital Control Systems                    | CE       | 3       | 3 | --- | 3 | 3 | 60 | 40 |
| 3       | EUREE 703    | Computer Aided Power System Analysis       | CE       | 3       | 3 | --- | 3 | 3 | 60 | 40 |
| 4       | EUREE 721 to EUREE 723 | Departmental Elective – I (DE- I)    | DE       | 4       | 3 | --- | 4 | 3 | 60 | 40 |
| 5       | EUREE 731 to EUREE 734 | Departmental Elective – II (DE – II ) | DE       | 4       | 3 | --- | 4 | 3 | 60 | 40 |

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**Departmental Elective - I: (DE- I)**

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<td>VLSI</td>
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<td>High – Voltage Engineering</td>
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<td>Microprocessors &amp; Micro Controllers</td>
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<td>EUREE 842</td>
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<td>Data Communications</td>
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List of Inter Departmental Electives (IE – I & II)

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<td>Software Engineering</td>
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<td>Systems Modeling &amp; Simulation</td>
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<td>Software Project Management</td>
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<td>EUREE 8506</td>
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<td>EUREE 8507</td>
<td>Transducers &amp; Signal Conditioning</td>
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B. Tech. (EEE) – III SEMESTER
EUREE 301: ADVANCED ENGINEERING MATHEMATICS

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT – I
Functions of Complex Variables & Applications
Analytic functions, Cauchy – Ricmann equations, Harmonic functions, Application to flow problems, Some standard transformations, Conformal mappings, Special conformal mapping \( w = z^2, w = e^z, w = z + \frac{1}{z}, w = \cosh z \).

UNIT – II
Complex Integration
Cauchy’s theorem, Cauchy’s integral formulas, Taylors theorem (without proof), Laurents theorem (without proof) Residue theorem, evaluation of real and definite integrals.

UNIT – III
Fourier Transforms:
Definition, Fourier integral theorem, Fourier transforms, properties of Fourier transformations, Convolution theorem, Parseval’s identity for fourier transformations, Relation between Fourier and laplace transforms, Fourier transforms of the derivatives of a functions.

UNIT – IV
Difference equations

UNIT – V

Text Books:
1. Higher Engineering Mathematics by Dr. B.S.Grewal, Khanna publishers.

Reference Books:
B. Tech. (EEE) – III SEMESTER
EUREE 302 – EMF THEORY

Hours per week: 3
Credits: 3
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I:
Electrostatic Fields: Different co-ordinate systems, review of vector calculus, Coulomb’s law, Electric field Intensity, electric field due to different charge Distributions, Gauss’s law and applications, Electric Potential, Potential Gradient, Electric Dipole, Energy density.

UNIT-II:
Conductors & Dielectrics: Electrical properties of Conductors & Dielectrics, Continuity of current, Ohm’s law in point form, Polarization, Boundary conditions, Poisson’s and Laplace’s Equations and their Applications, Capacitance, Capacitance of parallel plate and spherical capacitors.

UNIT-III:
Magnetostatic Fields: Lorentz Law of force, magnetic field intensity, Biot–savart Law, Ampere’s Law, Magnetic field due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density, Scalar magnetic potential, Vector Magnetic potential Magnetic dipole & dipole moment, A differential current loop as a magnetic dipole, Torque on a current loop placed in a magnetic field.

UNIT-IV:
Fields in Magnetic Material: Magnetization, Self and mutual inductance, Neumann’s formula, Determination of self inductance of solenoids and toroid and mutual inductance, Energy stored & density in a magnetic Field, boundary conditions.

UNIT-V:

Text Books:
3. Introduction to Electro-dynamics, David J.Griffiths, PHI.

Reference Books:
B. Tech. (EEE) – III SEMESTER
EURRE 303 – ELECTRIC CIRCUIT THEORY AND ANALYSIS

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I:
Basic Circuit Concepts :
Complex power.

UNIT-II:
Network Theorems to DC & AC circuits:
Superposition –reciprocity – Thevenin’s – Norton’s - Maximum power transfer theorems.

UNIT-III:
Two port networks:

UNIT-IV:
Resonance and coupled circuits :

UNIT-V:
Three – Phase Circuits :
Voltage, current & Power in star connected & Delta connected systems -Solution of balanced 3- φ circuits –Types of Unbalanced loads - solution of unbalanced circuits.

Text Book :
1. “Network Analysis” M.E. Van Valkenberg, PHI

Reference Books :

*****
B. Tech. (EEE) – III SEMESTER
EUREE 304– ELECTRONICS-I

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I:
Semiconductors & diodes:

UNIT-II:
Diode circuits:
Diode as a rectifier-Half-wave, Full-wave and Bridge Rectifiers, types of Filters, Capacitor and inductor filter- zener diode as a voltage regulator, Ripple Factor and Regulation Characteristics-ideal-series and parallel clippers circuits with diodes -simple clamping circuits with diodes,

UNIT-III:
Bipolar Junction Transistor:
NPN and PNP junction Transistors, Transistor current components, CB, CE and CC Configurations and their Characteristics, Saturation, Cutoff and Active Regions, Comparison of CE, CB and CC Configurations, Maximum voltage rating, The operating point, Various Biasing Circuits and Stabilization, Bias compensation, Thermal Runaway, Thermal Stability, High frequency model of a Transistor.

UNIT-IV:
Small Signal – Low Frequency Transistor amplifier Circuits:
Transistor as an Amplifier, Simplified CE and CC hybrid models, The h parameters of the three transistor configurations, Analysis of Transistor Amplifier Circuits using h-parameters. Linear analysis of a Transistor circuit, Miller’s theorem and it’s dual, The CE amplifier with emitter resistance, Darlington pair, Analysis of Single Stage Amplifiers.

UNIT-V:
Field Effect Transistors:
JFET and its characteristics, Pinch off Voltage, Drain Saturation Current, Small Signal model of FET, MOSFET – Enhancement and Depletion Modes. The low Frequency common source and common drain amplifiers, Biasing the FET, The FET as VVR.

Text Books:

Reference Books:
B. Tech. (EEE) – III SEMESTER
EUREE 305 – D.C MACHINES & TRANSFORMERS

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

UNIT – I:

Magnetic Circuits:

UNIT – II:

D.C. Generators:
Constructional features of d.c. machines – EMF equation – armature winding fundamentals – characteristics of different types of d.c. generators – commutation and armature reaction – parallel operation of D.C. Generators.

UNIT – III:

DC Motors:

UNIT – IV:

Transformers – Principles and characteristics:

UNIT – V:

Testing of Transformers and 3-Phase Transformers:

Textbooks:

Reference Books:

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UNIT – I:

**Indicating Instruments:**

UNIT – II:

**Watt meters, energy meters and other measuring instruments:**
Dynamometer type wattmeter – Errors and compensation—measurement of 1-phase power by 3voltmeter and 3 ammeter & 3-phase power by two wattmeter method – Single phase Energy meters – single phase induction type energy meter – errors and compensation– calibration of wattmeter and energy meter – frequency meters; Mechanical & Electrical resonance type– power factor meters; Dynamometer type, Moving iron type.

UNIT – III:

**Bridges:**

UNIT – IV:

**Potentiometers:**
General principle – Vernier dial principle standardization – ac potentiometers – coordinate and polar types – application of dc and ac potentiometers.

UNIT – V:

**Instrument transformers:**

**Text Books:**

**Reference Books:**
B. Tech. (EEE) – III SEMESTER
EUREE 311: NETWORKS LAB

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

Minimum of TEN experiments to be conducted from the following:

1. KIRCHOFF’S LAW’S
2. DC SUPERPOSITION THEOREM
3. THEVENIN’S THEOREM
4. NORTON’S THEOREM
5. RECIPROCITY THEOREM
6. Z AND Y PARAMETERS
7. MAXIMUM POWER TRANSFER THEORM
8. PHASOR DIAGRAM
9. RL – LOCUS DIAGRAM
10. RC – LOCUS DIAGRAM
11. POWER FACTRO IMPROVEMENT
12. SERIES AND PARALLEL REASONANCE
13. AC SUPERPOSITION THEOREM
14. TRANSMISSION AND HYBRID PARAMETERS
15. MEASUREMENT OF ACTIVE POWER FOR STAR AND DELTA CONNECTED BALANCED LOADS
16. MEASUREMENT OF REACTIVE POWER FOR STAR AND DELTA CONNECTED BALANCED LOADS
17. DETERMINATION OF SELF, MUTUAL INDUCTANCE AND COEFFICIENT COUPLING
Minimum of TEN experiments to be conducted from the following:

1. V-I characteristics of a PN junction diode, Zener Diode & LED.
2. Zener diode Regulator.
3. Half wave Rectifier with and without capacitor filter.
4. Full wave Rectifier with and without capacitor filter.
5. Bridge Rectifier with and without capacitor filter.
7. Characteristics of CE Transistor and its h parameters.
8. Analysis of Emitter Follower
9. Drain and Transfer Characteristics of JFET.
10. Drain and Transfer Characteristics of MOSFET.
11. Switching Characteristics of BJT.
12. Single stage RC Coupled Amplifier
B. Tech. (EEE) – III SEMESTER  
EUREE 313-ADVANCED COMMUNICATION SKILLS LABORATORY

Hours per week: 3  
Credits: 2  
Sessionals: 100 Marks

UNIT - I  
Report writing: Types of reports, Writing technical reports and scientific papers. Writing a Statement of Purpose, Résumé writing, Cover letters

UNIT - II  
Presentation Skills: Make effective presentations, expressions which can be used in presentations, use of non-verbal communication, coping with stage fright, handling question and answer session, Audio-visual aids, PowerPoint presentations.

UNIT - III  
Interview Skills: planning and preparing for interviews, facing interviews confidently, use of suitable expressions during interviews.

UNIT - IV  
Group Discussion: objectives of a GD; Types of GDs; Initiating, continuing and concluding a GD.

UNIT - V  
Debate: difference between debate and group discussion, essentials of a debate, conducting a debate. Telephone Etiquette

Prescribed Text Book:  

Reference Books:  
UNIT I:
Polyphase Induction Motors:

UNIT II:
Single phase Induction Motors:
single phase induction motors – split phase type, capacitor start, capacitor run shaded pole types and constructional features – Principle of operation – equivalent circuit based on double revolving field theory universal motors.

UNIT III:
Alternators:

UNIT IV:
Performance of Alternators:
Regulation of alternators, Predetermination of regulation by synchronous impedance method, ampere turn method, Zero Power factor method Basic ideas of two reaction theory – direct and quadrature axis reactances and their determination – phasor diagram and regulation of salient pole alternators – Expression for power developed as a function of torque angle – parallel operation of alternators.

UNIT V:
Synchronous Motors:

Text Books:
3. “Performance and Design of AC Machines”, M.G.Say, Pitman, ELBS.

Reference Books:

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UNIT-I:
Control Components & Mathematical Modeling:

UNIT-II:
Linear systems:
Transfer functions of linear systems—impulse response of linear systems block diagrams of control systems—signal flow graphs (simple problems).

UNIT-III:
Time domain analysis of control systems:
Time domain analysis of control systems—time response of first and second order systems with standard input signals—steady state performance of feedback control system—steady state error constants effect of derivative and integral control on transient and steady-state performance of feedback control systems.

UNIT-IV:
Stability and Root Locus:
Concept of stability and necessary conditions for stability—Routh-Hurwitz criterion, relative stability analysis, the concept and construction of root loci, analysis of control systems with root locus (Simple problems to understand theory).

UNIT-V:
Frequency domain analysis of control Systems:
Correlation between time and frequency responses—polar plots—Bode plots—log magnitude versus phase plots—All pass and minimum phase systems—Nyquist stability criterion—assessment of relative stability—constant M&N circles.

Textbooks:

Reference books:
2. “Control Systems Components”, Gibson, J.E. & Tueter, F.B.
B. Tech. (EEE) – IV SEMESTER
EUREE 403 – ELECTRONICS-II

Hours per week: 3
Credits: 3
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I:
Feedback Amplifiers:
Concept of Feedback Amplifiers – Effect of Negative feedback on the amplifier Characteristics.
Four Feedback Amplifier Topologies. Method of Analysis of Voltage Series, Current Series,
Voltage Shunt and Current Shunt feedback Amplifiers, Design Considerations.

UNIT-II:
Power Amplifiers:
Classification of Power Amplifiers – Class A, Class B and Class AB power Amplifiers series
Fed, Single ended Transformer coupled and push pull class A and class B Amplifiers. Cross –
over distortion in pure class B power amplifier, Class AB power amplifier – Complementary
push pull Amplifier, Class C Amplifiers, Design considerations – Heat sinks.

UNIT-III:
Sinusoidal Oscillators:
Condition for oscillations – LC Oscillators – Hartley, Colpitts, Clapp and tuned collector
oscillators – Frequency and amplitude stability of oscillators – Crystal Oscillators – RC
Oscillators – RC phase shift and Wien bridge oscillators, Design considerations.

UNIT-IV:
Wave shaping circuits:
Linear & Non-Linear wave shaping circuits, Qualitative and Quantitative Discussions for all test
signals for RC circuits, Attenuators, Ringing circuit, Design Aspects of High pass & Low pass
RC circuits, Their applications.

UNIT-V:
Sweep Generators:
Voltage Time Base Generators: Different sweep circuits, Exponential charging Circuit, Miller
sweep, Boost strap sweep, Analysis & design of a VTBG. Current Time Base generators: Basic
considerations of RL circuit, Analysis & Design considerations, Applications.

Text Books:
1. Integrated Electronics Analog and Digital Circuits, Jacob Millman and Christos

Reference Books:
3. Electronic design from concept to reality - Martin s. roden, Gorden L.Carpenter,William

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UNIT I:
Signals and Systems:
- **Signals**: Classification of signals, Transformation of independent variables, Basic continuous time signals, Basic discrete time signals, properties of signals, representation of signals in terms of impulses.
- **Systems**: classification of systems, continuous time LTI systems, the convolution integral, discrete time LTI system, the convolution sum, systems described by differential and difference equations, properties of systems, causality and stability.

UNIT II:
**Fourier analysis of continuous time signals and systems**: The response of continuous LTI systems to complex exponentials, the continuous time Fourier series, convergence of Fourier series, continuous time Fourier transform of periodic and Aperiodic signals, properties of Fourier transform, systems characterized by linear constant coefficient differential equations.

UNIT III:
**Fourier analysis for discrete time signals and systems**: The response of discrete time LTI systems to complex exponentials, discrete time Fourier series, discrete time Fourier transform, properties of DTFT, systems characterized by linear constant coefficient difference equation.

UNIT IV:
**Laplace Transform Techniques**: Introduction, Region of convergence for Laplace Transforms, properties, Laplace of Transforms of typical signals- Unit-Step, Ramp and Impulse functions, Analysis and characterization of LTI using Laplace transform, Inverse Laplace transform.

UNIT V:
**Z-transform**: Introduction, region of convergence of Z-transform, Properties, Inverse Z-transform, relations between Z-transform, Fourier transform and Laplace transform.

**Text Book**:  

**References**:  
B. Tech. (EEE) – IV SEMESTER
EUREE 405 – ELECTRIC CIRCUITS SYNTHESIS

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

UNIT-I:
Time Response of Circuits using Classical Techniques:

UNIT-II:
Laplace Transforms:
Introduction - definition of Laplace Transform - properties of Laplace Transform - inverse
Laplace Transform - Application to circuits.

UNIT-III:
Network Functions:
Network functions for single port and two port calculation of network functions for ladder and
genral networks. Poles and zeros, restriction of poles and zeros for driving point and transfer
functions, time domain behavior from pole zero plot, transfer functions in terms of y and z
functions, scaling network functions.

UNIT-IV:
Synthesis of Networks:
Properties of L-C Admittance functions-Synthesis of L-C driving point Admittances-Properties
of R-C driving point Impedances – Synthesis of R-C Impedances & R-L admittances- Properties
of R-L Impedance & R-C Admittance-Synthesis of certain R-L-C functions

UNIT-V:
Introduction to SPICE:
Description of circuit elements - input files element values - nodes – sources – types of analysis

Text Book :
1. “Network Analysis” M.E. Van Valkenberg, PHI
3. “Introduction to PSPICE”, M.H.Rashid, Pearson Education

Reference Books:
   McGraw-Hill
   Engineering.

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UNIT – I:
Multidisciplinary nature of environmental studies & Natural Resources:
Multidisciplinary nature of environmental studies: Definition, scope and importance, need for public awareness. Natural Resources: Renewable and non-renewable resources, natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources: Use and over – utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT – II:
Ecosystems and Biodiversity and its conservation:

UNIT – III:
Environmental Pollution
Environmental Pollution: Definition, causes, effects and control measures of :- Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management: Causes, Effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster Management: floods, earthquake, cyclone and landslides.

UNIT – IV:
Social Issues and the Environment:
UNIT – V:
Human Populations and the Environment and Environment Production Act and Field Work:

Text Book:

References:
B. Tech. (EEE) – IV SEMESTER
EUREE 411: ELECTRICAL MEASUREMENTS LAB

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

Minimum of TEN experiments to be conducted from the following:

1. KELVIN’S DOUBLE BRIDGE
2. WHEATSTONE BRIDGE
3. MAXWELL BRIDGE
4. ANDERSON’S BRIDGE
5. SCHERING BRIDGE
6. WIENS BRIDGE
7. PARAMETERS OF CHOKE COIL.
8. MEASUREMENT OF SINGLE – PHASE POWER
9. CALIBRATION OF WATT METER
10. CALIBRATION OF ENERGY METER
11. MUTUAL INDUCTANCE
12. TWO WATT METER METHOD
13. MEASUREMENT OF THREE PHASE REACTIVR POWER WITH SINGLE PHASE WATTMETER
14. MEASUREMENT OF PARAMETERS OF ACHOKE COIL USING THREE VOLTMENT AND THREE AMMETER METHODS
Hours per week: 3
Credits: 2
Sessionals: 100 Marks

PART ‘A’
Minimum of FIVE experiments to be conducted from the following:

2. Colpitts Oscillator.
3. RC Phase - Shift Oscillator.
5. Class A Power Amplifier
7. Tuned Voltage Amplifier.

PART ‘B’
Minimum of FIVE experiments to be conducted from the following:

1. RC Differentiator & RC Integrator.
2. Clipping Circuits.
3. Clamping Circuits.
4. UJT Voltage Sweep Generator.
5. Bisatble Multivibrator
6. Monostable multivibrator
7. Astable Multivibrator
B. Tech. (EEE) – IV SEMESTER
EUREE 413: INDUSTRIAL TOUR

- The student will visit core industries like Power, Steel, Electrical engineering, Electronics engineering, instrumentation, Software engineering, etc or related research establishments
- The Industries to be visited should be from the approved list by the head of the department
- At least four Industries are to be visited by the student.
- The duration of Industrial tour would be week to ten days.
- The tour will be organized by the department in the break between two semesters of their second year of study.
- Each student will have to submit an individual report on the tour for assessment with in ten days of return from the tour.
B. Tech. (EEE) – V SEMESTER
EUREE 501 – ELECTRICAL POWER GENERATION

Hours per week: 3
Credits: 3
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
Hydro station: Selection of Site, Classification of Hydro plant and Turbines, Layout.
Steam Power Plant: Selection of Site, General Layout, Ash Handling plant, Electrostatic Precipitator, Steam generating plant, Feed water circuit, Cooling water circuit.

UNIT II:
Nuclear power Plants: Fundamentals of nuclear power, Nuclear reactors, Types, Location of plant.
Gas turbine plants: Layout, Types, Location of Plant.

UNIT III:

UNIT IV:
Wind Energy: Basic Principle of Wind Energy Conversion, Site selection considerations, Basic Components, Classification, Advantages and Disadvantages.
Energy from Biomass: Biomass energy conversion technologies, Biogas Generation, Types of Biogas Plants.

UNIT V:
Economics of Generation: Introduction, Definitions, Load Duration Curve, Cost of electrical energy, Tariffs.
Per-unit Representation: Per-Unit Quantities, Single line diagram -Impedance and Reactance Diagrams- Per-Unit impedances of single phase and three-winding transformers - The Advantages of Per-Unit Computations.

Text Books:

Reference Books:
UNIT I:
Operational Amplifiers:

UNIT II:
Operational Amplifier Applications:

UNIT III:
Other Linear IC’s:
555 Timers – Mono stable and Astable modes, 556 Function Generator ICs and their applications. Three Terminal IC Regulators, IC 566 Voltage controlled oscillators, IC 565 PLL and its Applications.

UNIT IV:
A/D & D/A Converters:
DAC characteristics D to A conversion process; multiplying DAC, 8-Bit D to A converter, microprocessor compatibility, AD 558 Microprocessor Compatible DAC. ADC characteristics, A to D conversion process. Integrating ADC, successive approximation ADC. Microprocessor compatibility, ADC’s for microprocessors, AD670 microprocessor compatible ADC, flash converters and frequency response of ADC’s.

UNIT V:
Active Filters:
LPF, HPF, BPF, BEF, All-pass Filters, Higher Order Filters and their Comparison. Switched Capacitance Filters.

Text Books:

References:
1. Microelectronics, Jacob Millman and Arwin. W. Grasel, TMH edition
2. Operational amplifiers, George Clayton, Steve winder, Newnes, 4th edition
3. Integrated electronics, Jacob Millman and Christos C. Halkias, MGH.
UNIT I:
Power Semiconductor Switches:
Power diodes, Power transistors, Power MOSFET, IGBT, GTO, SCR, Thyristor family, Triac, Diac, two transistor model of SCR, static and dynamic characteristics, Gate characteristics, Turn-On & Turn-Off methods, Series and Parallel operation of Thyristors, Gate triggering circuits, Thyristor ratings, Protection circuits of SCR.

UNIT II:
Phase Controlled Rectifiers:
Single phase and three phase – half wave, full wave and Bridge controlled rectifiers, Dual converters, effect of load and source inductances, Commutation circuits: Natural commutation, Forced commutation circuits - Self, Impulse, Resonant pulse, complimentary and external pulse commutation.

UNIT III:
Choppers:
Principle of operation, step up choppers, step down choppers, various types of choppers, Analysis of first quadrant chopper:- derivation of average load voltage, load current for continuous/discontinuous current operation, - Morgan, Jones and Oscillation choppers.

UNIT IV:
Inverters:
Classification, series and parallel inverters, single phase and three phase inverters, McMurray inverter, McMurray Bedford inverter, Voltage control in inverters, methods of Harmonic reduction - current source inverters.

UNIT V:
AC to AC Converters:
Principle of operation of Cyclo-converter - 1Φ - 1Φ Cycloconverter, 3Φ - 3Φ Cycloconverter, 3Φ - 1Φ Cycloconverter, Single phase and three phase voltage controllers using Thyristor and Triac, AC choppers.

Textbooks:

Reference Books:
B. Tech. (EEE) – V SEMESTER  
EUREE 504 – DIGITAL CIRCUIT DESIGN & MICROPROCESSORS

Hours per week: 3  
End Examination: 60 Marks  
Credits: 3  
Sessionals: 40 Marks

UNIT I:

Number Systems and Codes:
Number Systems, Conversion of bases – binary arithmetic-binary codes, weighted and non-weighted codes – Error detecting and error correcting codes.

UNIT II:

Switching Algebra and minimization of switching functions:
Postulates and theorems – canonical forms of switching functions: SOP and POS forms – simplification of functions: Karnaugh map and Quine Mc Cluskey methods – Prime implicants – minimal functions and their properties – multiple output functions.

UNIT III:

Design of Combination Circuits:
Symbols and truth tables of logic gates: AND, OR, NOT, NAND, NOR AND XOR – design using conventional gates – design using MSI and LSI devices – multiplexers, de-multiplexers, decoders and priority encoders-logic design of combinational circuits: ripple carry adder, carry look ahead adder, comparator, seven-segment display, code conversion, binary addition, subtraction, ROM, PLA, PAL.

UNIT IV:

Sequential Machine Fundamentals:
Combinational Vs Sequential circuits – memory elements and their excitation functions: basic RS latch, RS, D, JK, T,MS flip-flop – conversion from one flip-flop-classification of sequential circuits – registers, shift registers – ripple counters, synchronous counters and their design – lock out in counters.

UNIT V:

Microprocessors:

Text Books:

Reference Books:
UNIT I:

UNIT II:

UNIT III:

UNIT IV:

UNIT V:
Gas Turbines: Simple gas turbine plant-ideal cycle, closed cycle -open cycle-. Efficiency, Work ratio and optimum pressure ratio for simple gas turbine cycle. Actual cycle, analysis of simple cycles & cycles with inter cooling, reheating and Regeneration

Text Books:
1. Thermal Engineering by Rajput,Lakshmi publications
B. Tech. (EEE) – V SEMESTER
EUREE 506 – FLUID MECHANICS & HYDRAULIC MACHINES

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
**FLUID STATICS and FLUID KINEMATICS:**
FLUID STATICS: Properties of Fluid; Pressure and its measurement using Manometry; Pressure gages;
FLUID KINEMATICS: Types of flow; Velocity and Acceleration; Patterns of flow; Continuity equation; types of motion of fluid particles; Stream function and Velocity potential function.

UNIT II:
**FLUID DYNAMICS:**
Euler’s equation; Bernoulli’s equation; Momentum equation; Venturi meter, Orifice meter and Flow nozzle, Flow through pipes; Darcy – Weisbach Eqn, Pipes in series & Pipes in parallel, Power transmission through pipes and nozzles, Concepts of water hammer

UNIT III:
**IMPACT OF JETS AND PUMPS:**
Impulse momentum equation, Impact of Jet on stationary and moving vanes (flat and curved). Pumps: Types of pumps, Centrifugal pumps: Main components, Working principle, Multi stage pumps, Performance and characteristic curves

UNIT IV:
**HYDRAULIC TURBINES:**
Classification of turbines; Working principle, Efficiency calculation and Design principles for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves.

UNIT V:
**HYDRO POWER:**
Components of Hydroelectric power plant; Estimation of water power potential; Estimation of load on turbines: load curve, load factor, capacity factor, utilization factor, diversity factor, load – duration curve, firm power, secondary power, prediction of load.

**Text Books:**

**Reference Books:**
4. “Fluid Mechanics & Fluid power Engineering, Dr D.S.Kumar
5. “Water Power Engineering” M.M Desumukh
B. Tech. (EEE) – V SEMESTER
EUREE 511: DC MACHINES & TRANSFORMERS LAB.

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

Minimum of TEN experiments to be conducted from the following:

1. OCC and External characteristics of separately excited DC generators
2. Swinburne’s test on a DC shunt motor
3. OC&SC Test on single phase transformer
4. Brake Test on DC shunt motor
5. Load Test on single phase transformer
6. Scott Connection
7. Characteristics of DC Series Generator
8. Characteristics of DC Compound Generator
9. Separation of losses on DC shunt machine
10. Speed control methods of DC Shunt machines
11. Hopkinson’s Test
12. Separation Of Losses In Single Phase Transformer
13. Sumpner’s test on single phase Transformer
B. Tech. (EEE) – V SEMESTER
EUREE 512: THERMAL ENGINEERING LAB.

Hours per week: 3
Credits: 2

Sessionals: 100 Marks

Minimum of TEN experiments to be conducted from the following:

Cycle I:

1. Study of variation of Kinematic viscosity of Newtonian Fluid using Redwood Viscometer
2. Study of variation of Kinematic viscosity of Non-Newtonian Fluid using Brooke Field Viscometer
3. Valve & Port Timing diagram of I.C. Engines
4. Determine the flash point & Fire point of given Fuel sample
5. Determination of Calorific Value of Solid & Liquid fuels using Bomb Calorimeter
6. Determination of Calorific Value of gaseous fuel using Junkers Gas Calorimeter

Cycle II:

1. Determination of Boiling and Freezing point of Water
2. Conduct Morse test on high –speed four-stroke multi cylinder S.I Engine (Maruti make) to determine F.P and Mechanical Efficiency
3. Conduct Heat Balance sheet on high-speed four-stoke multi cylinder MARUTI SUZUKI make S.I Engine at ½ and ¾ loads
4. Conduct a load test on four stoke Variable Compression Engine S.I. Engine and draw various performance curves
5. Conduct a load test on computerized single cylinder four stroke diesel Engine (KIRLOSKAR make) and draw various performance curves
6. Conduct Heat Balance sheet on high-speed four-stroke multi cylinder (KIRLOSKAR make)
B. Tech. (EEE) – V SEMESTER
EUREE 513: HYDRAULIC MACHINES LAB.

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

1) Verification of Bernoulli’s Theorem
2) Calibration of Small Orifice/ Mouth-Piece by constant head method and falling Head Methods.
3) Calibration of Venturimeter / Orifice-meter/ Nozzle meter
4) Calibration of Triangular Notch/ Sharp Crested Weir.
5) Impact of Jet of water on a circular disc
6) Determination of Pipe Friction
7) Demonstration of Reynold’s Experiment
8) Demonstration of Free-Vortex Flow
9) Performance characteristics of Reciprocating Pump/ Centrifugal Pump
10) Performance characteristics of Pelton Turbine/ Francis Turbine
B. Tech. (EEE) – VI SEMESTER
EUREE 601- ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION

Hours per week: 3
Credits: 3
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
Inductance of a transmission lines: Inductance of conductor due to internal flux and external flux- single phase two wire line -flux linkages of one conductor in a group - composite conductor line - inductance of three phase lines , with unsymmetrical spacing & with symmetrical spacing - bundled conductors. Parallel circuit three phase lines, Proximity effect Skin effect.

UNIT –II:
Capacitance of a transmission lines: Capacitance of a two wire line -capacitance of a three phase line with unsymmetrical spacing & with symmetrical spacing, effect of earth on capacitance of three phase transmission lines-bundled conductors - parallel circuit three phase lines.


UNIT-III:

Insulators: Introduction, Ratings - Types of insulators, Voltage distribution across suspension insulators – Calculation of string efficiency.

Corona: Critical Disruptive Voltage, Corona Loss, Line design based on Corona, Disadvantages of Corona.

UNIT IV:
Over Head System: Effect of System voltage on transmission efficiency –choice of system voltage, conductor size, kelvin’s law, comparison of copper efficiencies of Overhead systems.

Under Ground Cables: Cable conductors - insulating materials - electrostatic stress in a single core cable - grading of cables.

UNIT V:
Distribution systems: Overview of Distribution systems, Types of DC & AC Distributors: Radial, Ring and Network systems, Voltage drop calculation with concentrated loads and uniformly distributed loads, Substation Equipment.

Text Books:

Reference Books:
UNIT I:
Basics of ‘C’ Language:
Basics, Organization and use of one dimensional two dimensional and multi-dimensional arrays – handling of character strings - string operations - concept of function, parameter passing, recursion.

UNIT II:
Structures, Pointers & Files:
Definition of structure and union - programming examples - pointer - pointer expressions - programming examples, file operations and preprocess.

UNIT III:
Linear data Structures:
Stack representation - operation - queue representation - operations – circular queues - list representation operations - double linked and circular lists.

UNIT IV:
Non-Linear Data Structures:
Trees - binary tree representation - tree transversals - conversion of a General tree to binary tree - representation of graphs.

UNIT V:
Search Techniques:
Basic search techniques - tree searching graphics - linked representation of Graphs - graph transversal and spanning trees.

Text Books:

Reference Books:
1. ‘An Introduction to Data Structures with Applications’, Trmbly & Sorenson.
2. ‘The “C” - Programming Language’, Kernighan & Ritchie; PHI.
UNIT I:
Fuses & Circuit Breakers: Fuses:

UNIT II:
Classification of Circuit Breakers & Protective Relays:

UNIT III:
Types of Relays and Equipment Protection:

UNIT IV:
Static Relays:

UNIT V:
Insulation coordination & over voltage protection:

Text Books:

References Books :
UNIT I: Compensating Techniques In Time Domain:

UNIT II: Compensating Techniques IN Frequency Domain:

UNIT III: Design of Controllers:

UNIT IV: State variable analysis:
Concept of state variables and state models – state model for linear continuous time systems – solution of state equation – state transition matrix – concept of Controllability and observability.

UNIT V: Non Linear Systems:

Text Books:

References:
1. “Automatic Control Systems”, Benjamin C Kuo; PHI.
2. “Modern Control Engineering”, Ogata, PHI.
UNIT I:
Characteristics of Electric Drives:
Concepts of electric drives, Speed torque characteristics of various types of loads and drive motors, Joint speed torque characteristics, Modified speed torque characteristics of electrical machines, starting, braking and dynamics of Electrical drives.

UNIT II:
Control of D C Drives:

UNIT III:
Control of Induction Motor Drives:
Starting of IM by thyristors, Stator voltage & frequency control, Inverters in IM rotor circuit, Rotor resistance control & Slip power recovery schemes – Static kramer and Scherbius schemes, Dynamic modeling of Induction machines – Principles of Vector control, Direct and Indirect Vector control schemes.

UNIT IV:
Synchronous Motor Control:

UNIT V:
Other Applications:
Static VAR Control, Power factor correction control of Switch mode DC Power Supplies – Selection of drives and control schemes for steel rolling mills, paper mills, lifts and cranes.

Text Books:

Reference Books:
UNIT I:
**Electrical Traction - 1:**
Introduction, systems of track electrification, speed time curve-simplified speed time curve, traction motor control –control of DC traction motors, series-parallel control, Track equipment.

UNIT II:
**Electrical Traction - 2:**
Tractive effort, power of the traction motor, Specific Energy Consumption (SEC) and factors affecting it, Mechanics of train movement, Coefficient of Adhesion.

UNIT III:
**Rating and heating of motors:**
Heating effects, loading conditions and classes of duty, determination of power ratings of motors for different applications, effect of load inertia, load equalization and fly-wheel calculations, environmental factors.

UNIT IV:
**Electric Heating and Welding:**
Introduction, Classification of methods of electric heating, Requirements of a good heating material, Design of heating element, Temperature control of resistance furnace, Electric arc furnace, Induction heating, Dielectric heating, Electric welding – Resistance welding, Electric arc welding.

UNIT V:
**Illumination:**

**Text Books:**

**Reference Books:**
Minimum of TEN experiments to be conducted from the following:

1. Load Test on single phase Induction motor
2. Load Test on three phase Induction motor
3. Regulation of alternator by emf method
4. Speed control of thee phase Induction motor by frequency control method
5. Load test on alternator
6. Study of Windings
7. No load and Blocked Rotor test on single phase induction motor
8. No load and Blocked Rotor test on three phase induction motor
9. Regulation of alternator by mmf and ZPF method
10. V and inverted V curves on synchronous motor
11. Slip Test on synchronous motor
12. Study of AC starters
B. Tech. (EEE) – VI SEMESTER
EUREE 612: POWER ELECTRONICS LAB

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

Minimum of TEN experiments to be conducted from the following:

1. SCR characteristics
2. UJT Relaxation oscillator
3. Single phase AC voltage Controller
4. Three phase AC Voltage controller
5. Single Phase Fully Controlled Rectifier
6. Three Phase half wave/ Full wave controlled Rectifiers
7. Single Phase Dual Converters
8. MOSFET based Step up/Step down Chopper
9. Three Phase PWM inverters (Three Phase Induction motor Control)
10. Single Phase PWM inverter (Single Phase Induction motor Control)
11. Voltage Commutation
12. Current Commutation
13. Complementary Commutation
14. R and RC Triggering Circuit
15. 555 Timer Circuit
16. UJT Characteristics
17. TRIAC Characteristics
18. Single Phase Series Inverter
19. Single Phase Cyclo-Converter
20. V/f Control of Three phase Induction Motor
B. Tech. (EEE) – VI SEMESTER
EUREE 613: PERSONALITY DEVELOPMENT

Credits: Non-Credit Audit Course
B. Tech. (EEE) – VII SEMESTER
EUREE 701 – DIGITAL SIGNAL PROCESSING & APPLICATIONS

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

UNIT I:
Applications of Z Transforms:

UNIT II:
Discrete Fourier Transform (DFT):

UNIT III:
Discrete and Fast Fourier Transform (DFT & FFT):
Radix – 2 Decimation in Time (DIT) and Decimation in Frequency (DIF) FFT Algorithms, IDFT using FFT - Applications of FFT in spectrum analysis and filtering.

UNIT IV:
IIR Digital Filter Design Techniques:
Design of IIR Filters from Analog Filters - Analog Filters Approximations: Butterworth and Chebyshev - Frequency Transformations - General Considerations in Digital Filter Design - Bilinear Transformation Method - Step and Impulse Invariance Technique.

UNIT V:
Design of FIR Filters:
FIR filters design using Fourier Series Method - Window Function Techniques - Comparison of IIR and FIR Filters.
Applications of DSP in Speech Processing.

Text Books:

Reference Books:
UNIT I:
Sampling:

UNIT II:
Z transforms & Applications:
Review Z transforms, Mapping between S-plane and Z-plane, inverse Z-transform, Limitations of the Z-transform, Applications of Z transforms, pulse transfer function, pulse transfer function of the zero-order hold.

UNIT III:
Stability tests:

UNIT IV:
State equations – 1:

UNIT V:
State equations – 2:
Relation between state equation and transfer function, computing the state transition matrix by the Z-transform method, Relation between state equations and high order difference equations via canonical form, Analysis of the state diagrams of the Sampled Data Control Systems.

Text Book:

Reference Books:


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B. Tech. (EEE) – VII SEMESTER
EUREE 703 – COMPUTER AIDED POWER SYSTEM ANALYSIS

Hours per week: 3
Credits: 3
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:

UNIT II:
**Symmetrical Fault Analysis:** Short-Circuit Currents and the Reactance of Synchronous Machines-Internal Voltages of Unloaded Machines and Loaded Machines under Fault Conditions - Fault Calculations using Bus Impedance Matrix- Symmetrical faults (LLL, LLLG) on an Unloaded Generators.

UNIT III:
**Unsymmetrical Fault Analysis:** Symmetrical components of Unsymmetrical Phasors-Phase shift of Symmetrical Components in star-delta Transformer Banks -Power terms of Symmetrical Components – Sequence Impedances and Sequence Networks- Unsymmetrical faults (LG, LL, and LLG) on an Unloaded Generators.

UNIT IV:
**Load flow analysis:** Formation of Load flow problem- Gauss-siedel method, Newton Raphson method, Decoupled method and Fast-decoupled method. (Numerical examples up to 3 bus system).-Comparison of load flow methods.

UNIT V:
**Power System Stability Analysis:** Concept of Stability (Steady state & Transient state) - Rotor Dynamics and the Swing Equation – Power angle Equation- Equal area Criterion - Critical clearing angle - Step-by-Step solution of the Swing curve, Factors affecting Transient Stability.

**Text Books:**

**Reference Books:**
B. Tech. (EEE) – VII SEMESTER
DEPARTMENTAL ELECTIVE-I
EUREE 721 –OPERATION RESEARCH

Hours per week: 3
Credits: 4

UNIT I:
Optimization Techniques:
Introduction, Engineering Applications of Optimization, Classification of Optimization Problem Techniques, Introduction to Linear program, General Mathematical Formulation of LP problem, mathematical formulation of LP problems, Graphical solution of 2-Variable LP problems, Graphical Solution in some exceptional cases, solution to LP problems by using simplex method, artificial variables Techniques (Big-M Method and Two Phase Method).

UNIT II:
Transportation Problem:
Introduction, Mathematical representation of transportation problem, Tabular representation of transportation problem, Initial Basic Feasible Solution by North-West corner rule inspection method (Row Minima Method), Vogel’s Approximation method; Optimum Solution; De-Generacy in Transportation problem.

UNIT III:
Assignment Problem, Project Management by Pert-CPM:
Introduction, Matrix representation, Mathematical representation of Assignment Model, Formulation and Solution of Assignment Models.

UNIT IV:
Project Management by Pert-CPM:
Introduction, Network Diagram representation, rules for drawing network diagrams, numbering the events (Fulkerson’s ‘I-J’ rule), Time calculations in networks, CPM, Pert; Probability of meeting the scheduled dates.

UNIT V:
Inventory Models and Game Theory:
Introduction, necessity for maintaining inventory, costs involved in inventory, classification of inventory models, concept of average inventory, concept of economic order quantity, inventory models: Economic lot size system with uniform demand, Economic lot size system with different rates of demand in different cycles, Economic lot size system with finite rate of replenishment, Introduction, Basic Definitions, saddle point, pure strategy, minimax (Maxmin) criterion and optimal strategy, mixed strategies, 2 x 2 games without saddle point, dominance and modified dominance properties to reduce the size of game, graphical method for (2 x N) games.

Text Books:

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B. Tech. (EEE) – VII SEMESTER  
DEPARTMENTAL ELECTIVE-I  
EUREE 722 – ELECTRICAL MACHINE DESIGN

Hours per week: 3  
End Examination: 60 Marks  
Credits: 4  
Sessionals: 40 Marks

UNIT I:  
Fundamentals of Design:  
General concepts in the design of rotating machines – Output equation – Magnetic and electric loadings – common design features of all rotating machines – conducting, insulating and magnetic materials used in electrical apparatus – mmf calculation for the magnetic circuit of rotating machines.

UNIT II:  
D.C. Machines:  
Armature winding – output equation – choice of specific loadings – choice of poles – design of conductors, winding, slot, air gap, field poles and field coils, commutator and brush.

UNIT III:  
Transformers:  
Output equation – Design of core and coils for single phase and three phase transformers – design of tank and cooling tubes – Predetermination of circuit parameters, magnetizing current.

UNIT IV:  
Induction Motors:  

UNIT V:  
Synchronous Machines:  

Text Books:  

Reference Books:  
1. ‘Performance and Design of DC Machines”, Clayton & Hancock, ELBS.  
2. ‘Performance and Design of AC Machines”, M.G.Say; Pitman, ELBS.

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**B. Tech. (EEE) – VII SEMESTER**

**DEPARTMENTAL ELECTIVE-I**

**EUREE 723 – POWER SYSTEM OPERATION AND CONTROL**

**Hours per week:** 3  
**Credits:** 4  
**End Examination:** 60 Marks  
**Sessionals:** 40 Marks

**UNIT  I :  
Economic operation and Unit commitment (Refer Text Book 1)**


Need for Unit Commitment, Unit Commitment solution methods-Priority lists method, Forward Dynamic Programming method Spinning reserve (excluding Problems)

**UNIT  II :  
Hydrothermal Scheduling (Refer Text Book 1)**

Introduction, Hydroelectric power plant models, Scheduling problems(Problems for one Iteration)-Implementation of Short term Hydrothermal scheduling problem(Excluding Problems).

**UNIT  III :  
Reactive power and Voltage Control (Refer Text Book 2 & 3)**

Basic generator control loops, Cross-coupling between control loops, Exciter types, Exciter modeling, Generator modeling, and Static performance of AVR loop.

Generation and absorption of reactive power, relation between voltage, power and reactive power at a node, single machine infinite bus systems, methods of reactive power control

**UNIT  IV :  
Automatic Load Frequency Control (Refer Text Book 2)**

Automatic Load frequency control of single area systems, Speed-governing system, Turbine generator response, Static performance of speed governor, Closing of ALFC loop, Concept of control area, Static response of primary ALFC loop, Integral control, ALFC of multi-control area systems (POOL operation), The Two-Area system, Modeling the Tie-Line, Block Diagram representation of Two-Area system, Static response of Two-Area system and Tie-Line Bias control.

**UNIT  V :  
Computer Control of Power Systems (Refer Text Book 4)**


**Text Books:**

3. **A text book on Power System Engineering”,** SGB & Chakrabartithi (Dhanpathrai & Sons)

**REFERENCE:**

UNIT I:
**Expert Systems:** An Introduction, Major characteristics of Expert systems, Rule –Based Expert Systems, Application to power systems

UNIT II:
**Fuzzy Logic:** An Introduction, Characteristics of Fuzzy Logic Systems, Fuzzy logic in Power Systems.

UNIT III:
**Artificial Neural Networks:** An Introduction, Artificial Neural Networks, Neural Network Types, Neural Networks in Power systems.

UNIT IV:
**Genetic Algorithm:** An Introduction, Characteristics of Genetic algorithm, Genetic algorithms in Power systems.

UNIT V:
**Hybrid Systems:** An Introduction, Hybrid Intelligence Techniques, Application in Power systems

Text Books:
1. Computational Intelligence Applications to Power Systems , By Yong-Hua Song, Allan Johns, Raj Aggarwal, Science Press , KLUWER ACADEMIC PUBLISHERS.

References:
1. Introduction to Artificial Intelligence and Expert systems, by D.W.Patterson, PHI 2009.
3. Modern optimization Techniques in Power systems by Yong-Hua Song, KLUWER ACADEMIC PUBLISHERS.
UNIT I:
Review of microelectronics and introduction to MOS technology:

UNIT II:
MOS and BICMOS circuit design process:

UNIT III:
Basic Circuit Concepts and Scaling of MOS circuits:

UNIT IV:
Subsystem design process:
Architectural issues – switch logic – examples of structural design (Combinational logic) – design of ALU subsystem – commonly used storage elements – aspects of design rules.

UNIT V:
Test and Testability:
Design for testability built in self test (BIST) – testing combinational logic – testing sequential logic – practical design for test guide lines – scan design techniques – etc.

Text Books:


Reference book:

B. Tech. (EEE) – VII SEMESTER
DEPARTMENTAL ELECTIVE-II
EUREE 733– HIGH VOLTAGE ENGINEERING

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
Over Voltages and Insulation Coordination:
Causes & types of over voltages – Lightning, switching, temporary over voltages – Effects of over voltages on power system components – EMI and EMC protection against over voltages – Surge diverters – Insulation co-ordination.

UNIT II:
Generation of High Voltages and High Currents:
Generation of high AC and DC, impulse and switching voltages – Generation of high impulse currents.

UNIT III:
Measurement of High Voltages and High Currents:
Measurement of high AC, DC, impulse and switching voltages using sphere gaps, peak voltmeters, potential dividers, high speed CRO and digital techniques – Measurement of high currents.

UNIT IV:
Dielectric Breakdown:
Self and non self restoring insulation – Breakdown in gases, liquids and solids – Breakdown in uniform – and non-uniform fields – partial discharges – Corona.

UNIT V:
High Voltage Testing:

Text Books:
1. “High Voltage Engineering”, Naidu M.S. & Kamaraju V.; TMH.

Reference Books:
2. “Extra High Voltage AC Transmission Engineering”,
   RD Begamudre, New Age International (p) Ltd.

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B. Tech. (EEE) – VII SEMESTER
DEPARTMENTAL ELECTIVE-II
EUREE 734 – MICROPROCESSORS AND MICRO CONTROLERS

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
8086 PROCESSOR:

UNIT II:
HARDWARE DESCRIPTION
Pin diagram 8086 – Minimum mode and maximum mode of operation. Timing diagrams – Memory interfacing to 8086 (Static RAM & EPROM). Need of DMA. DMA Data transfer method. Interfacing with 8237/8257

UNIT III:
PERIPHERAL INTERFACING
Study of architecture and programming of ICs: 8255 PPI, 8259 PIC, 8251 USART, 8279 key board display controller and 8253 timer / counter , A/D and D/A converter interfacing.

UNIT IV:
MICRO CONTROLLER 8051
Introduction to micro controllers, Functional block diagram, Instruction sets and addressing modes, Interrupt structure – Timer – I/O ports – serial communication.

UNIT V:
MICRO CONTROLLER PROGRAMMING AND APPLICSTIONS
Data transfer, manipulation, Control and I/O instructions – simple programming exercises skey board and display interface – Closed loop control of servo motor – stepper motor control.

TEXT BOOKS
2. “THE 8051 MICRO CONTROLLER ARCHITECTURE, PROGRAMMING AND APPLICSTIONS” – Kenneth J Ayala, Pearson International publishing (India)

REFERENCE BOOKS
1. “MICROPROCESSOR AND INTERFACING” Douglas V Hall
B. Tech. (EEE) – VII SEMESTER
EUREE 711: DIGITAL ELECTRONICS AND MICROPROCESSOR LAB.

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

List of Experiments

**Digital Electronics:**

1. Realization of Logic Gates (AND, OR, NOR, NAND, XOR, EXOR)
2. Realization of Flip-flops (JK, RS, T, D, Master slave)
3. Counters (Synchronous and Asynchronous) 3 – Bit and 4-Bit, Ripple counter.
5. Realization of 3-Bit, 4-Bit and 5-Bit Compensators, Multiplexers and Demultiplexers.
6. Design of 7-segment display.

**Microprocessor:**

1. Write an assembly language program to add two 8 bit numbers with and without carry.
2. Write an assembly language to multiply and divide two 8 bit numbers.
3. Write an assembly language program to move a block with overlap and without overlap.
4. a. Write an assembly language program to find smallest of n numbers
   b. Write an assembly language program to find 4th bit of a given number
5. Write an assembly language program to find even numbers and odd numbers in a given array.
B. Tech. (EEE) – VII SEMESTER
EUREE 713: PROJECT – I

Hours per week: 5
Credits: 5
End Examination: 50 Marks
Sessionals: 50 Marks

B. Tech. (EEE) – VII SEMESTER
EUREE 714: INDUSTRIAL TRAINING

Hours per week: 5
Credits: 2
Sessionals: 100 Marks

The student will undergo training in any one of the approved list of industry by the head of the department.

The duration of training should be 4 to 6 weeks in summer vacation between their 3rd and Final years of study.

The student will submit a detailed report along with the certificate from the industry where they have undergone training to the department for assessment within a month of return from the training.

The student will have to give a seminar on the training programme during the semester.
UNIT I:

UNIT II:
Cost analysis – Cost concepts – fixed and variable costs – explicit and implicit costs – out of pocket costs and imputed costs, opportunity costs – cost-output relationship – Break even analysis.

UNIT III:

UNIT IV:
Marketing functions – channels of distribution.

UNIT V:
Work study & Project Management: Work study – Basic procedure Involved in method study and work measurement. Network Analysis to project management – PERT & CPM – Application of network techniques to engineering problems.

TEXT BOOKS:
2. J.C.Pappas and E.F.Bringham, Managerial Economics
3. V.C.Mote, Samuel s nice and gupta, Managerial Economics
5. Industrial Engineering and Management by O.P.Khandel.
6. PERT/CPM by L.S.Srinath.
7. Marketing by Philips Kother.
8. Marketing by Rajan Iyer.

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B. Tech. (EEE) – VIII SEMESTER
DEPARTMENTAL ELECTIVE-III
EUREE 841 – HVDC TRANSMISSION

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

UNIT I:
General Aspects and Converter Circuits:

UNIT II:
Bridge converters – Analysis:
Assumptions – Analysis with gate control bus no overlap – analysis with gate control and overlap less than 60 degrees – Equivalent circuit for rectifier – operation of inverters – Modified equivalent circuit of HVDC link.

UNIT III:
Bridge converters – Control:
Basic means of control – power reversal – desired features of control – actual control characteristics, Basic characteristics, Modification of Control characteristics, system control hierarchy, firing angle control.

UNIT IV:
Mis-operation of Converters and Protection:

UNIT IV:
Harmonics, Filters, Corona and Radio Interference:
Characteristic and uncharacteristic harmonics – troubles due to harmonics – harmonic filters – single tuned and Double tuned filters,

Text Books:

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UNIT I: Conducting materials:
Relaxation time and electrical conductivity. Sources of resistivity of metals and alloys - electrical conductivity at high frequencies. Geometrical and magnetic field effects on electrical conductivity. Types of conducting materials.

UNIT II: Dielectric materials:
Types of electric polarization - frequency and temperature effects on polarization - dielectric loss - dielectric breakdown - insulating materials - ferro-electric materials - electrets.

UNIT III: Magnetic materials:
Types of magnetic materials - ferro and ferri magnetism - hard and soft magnetic materials - ferrites – microwave applications - magnetic bubbles.

UNIT IV: Super conducting materials:
Types of super conductors - high TC super conductors and high frequency applications.

UNIT V: Integrated circuits-Fabrication:
Crystal growth - epitaxial process - masked diffusion - fabrication of thin films - principles of IC packaging.

Text books:


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UNIT I:
**An Introduction to Data Communications**: A communications Model – Data Communications and Data Communications Networking – Protocols and Protocol Architecture.

UNIT II:
**Transmission Media**: Guided Transmission Media - Wireless Transmission.
**Data Encoding**: Digital Data to Digital Signals - Digital Data to Analog Signals - Analog Data to Digital Signals – Analog to Analog Signals.

UNIT III:
**The Data Communication Interface**: Asynchronous and Synchronous Transmission – Line Configurations – Interfacing.
**Data Link Control**: Flow Control – Error Detection – Error Control High Level Data Link Control (HDLC) – Other Data Link Control Protocols.

UNIT IV:

UNIT V:

**Text Books**:

**Reference Books**:

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B. Tech. (EEE) – VIII SEMESTER
DEPARTMENTAL ELECTIVE-III
EUREE 844: FLEXIBLE AC TRANSMISSION SYSTEMS

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
FACTS Concept and General System Considerations: Flow of Power in an AC System - What Limits the Loading Capability - Power Flow and Dynamic Stability Considerations of a Transmission Interconnection - Relative Importance of Controllable Parameters - Basic Types of FACTS Controllers - Brief Description and Definitions of FACTS Controllers

UNIT II:
Static Shunt Compensators and Applications: Objectives of Shunt Compensation - Methods of Controllable Var Generation - Static Var Compensators: SVC and STATCOM - Comparison between STATCOM and SVC - Applications

UNIT III:
Static Series Compensators and Applications: Objectives of Series Compensation - Variable Impedance Type Series Compensators - Switching Converter Type Series Compensators - Applications

UNIT IV:
Static Voltage and Phase Angle Regulators and Applications: Objectives of Voltage and Phase Angle Regulators - Approaches to Thyristor-Controlled Voltage and Phase Angle Regulators - Switching Converter-Based Voltage and Phase Angle Regulators – Applications

UNIT V:
Unified Power Flow Controller (UPFC) and Applications: Introduction - The Unified Power Flow Controller - Basic Operating Principles- Conventional Transmission Control Capabilities - Independent Real and Reactive Power Flow Control - Basic Control System for P and Q Control - Comparison of UPFC to Series Compensators and Phase Angle Regulators - Applications

Text Books:

References:
B. Tech. (EEE) – VIII SEMESTER
EUREE 812: SIMULATION & INTERFACING LAB.

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

Minimum of TEN experiments to be conducted from the following:

MATLAB Programming:
1. Program to solve three Non-linear Equations by Newton Raphson Method
2. Program to develop Bus Admittance Matrix Y bus
3. Program for Load Flow analysis by Gauss Seidel Method
4. Program for Economic dispatch problem using lambda iteration method
5. Program for Load Flow analysis by Newton Raphson Method
6. Program to develop Bus Admittance Matrix Z bus
7. Program to find the stability of given characteristics equation using Routh Stability Criterion

MATLAB Simulink:
1. Design a three phase 180° and 120° conduction mode inverters.
2. Design a single phase Dual Converter
3. Design a McMurray Bedford Full Wave Inverter
4. Design a Buck- Boost Chopper
5. Design a Different types of Choppers (Type A, Type B, Type C, Type D, Type E)
6. Conduct an Load test on a parallel connected single phase transformer
7. Control of three phase AC Machines

PSCAD:
1. Design a three phase 180° and 120° conduction mode inverters.
2. Design a single phase Dual Converter
3. Design a McMurray Bedford Full Wave Inverter
4. Design a Buck- Boost Chopper
5. Design a Different types of Choppers (Type A, Type B, Type C, Type D, Type E)
6. Conduct an Load test on a parallel connected single phase transformer
7. Control of three phase AC Machines

Spice Programming:
1. Program for a single phase Half wave and Full wave Uncontrolled Rectifiers.
2. Program for a Three phase half wave and Full wave Uncontrolled Rectifiers
3. Program for a single phase half wave and Full wave Controlled Rectifiers
4. Program for a three phase half wave and Full wave Controlled Rectifiers

MiPOWER
1. Find the Bus voltages of a given bus data using Gauss-siedel method
2. Find the Bus voltages of a given bus data using Newton Raphson method
3. Find the Bus voltages of a given bus data using Fast Decoupled Method
4. Perform a Short circuit analysis on a given systems for different fault conditions
5. Obtain the transient response of the given power systems.
B. Tech. (EEE) – VIII SEMESTER
EUREE 813: CONTROL SYSTEMS LABORATORY

Hours per week: 3
Credits: 2
Sessionals: 100 Marks

First Cycle
1. Effect of P, PI, PD and PID Controllers on a Second Order System..
2. Time response of First and Second Order Systems
3. Effect of Lag, Lead and Lead - Lag Compensators.

Second Cycle
1. Characteristics of Magnetic Amplifier
2. Design of Lag, Lead and Lead - Lag Compensators
3. Design of PID Controller for Second Order Systems
4. Effect of damping on a Second Order System.
5. DC Position Control System.
A viva voce examination is to be conducted by an external examiner at the end of the total course work. The examination should be comprehensive covering all the topics learnt by the candidate in his four year course duration of study.
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE I
EUREE 8501: REMOTE SENSING & GIS

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I:
Fundamentals of Remote Sensing:

UNIT-II:
Fundamentals of GIS:
Introduction, Elements of GIS, Vectorization, Rasterization, Geo-referencing, Map Projections, Digitization Process, Data Base handling, Types of data structures, overlay analysis, surface terrain models - Digital elevation model (DEM), Triangulated irregular network (TIN), and Slope models.

UNIT-III:
RS & GIS Techniques for Natural resources Management:
Land use/land cover classification systems, Forest cover, and agriculture and wasteland Management. Water resources management.

UNIT-IV:
RS & GIS Techniques for Infrastructure Planning and Management:
Urban utilities, cadastral mapping and transport network. GPS Navigation system for various applications.

UNIT-V:
RS & GIS Techniques for Natural Disasters Management:
Earthquakes, Landslides, cyclones and Floods - Hazard Zonation, Risk assessment, Relief and Rehabilitation measures.

TextBooks:
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE I
EUREE 8502: DATABASE MANAGEMENT SYSTEMS

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
Introduction to DBMS - Overview, File system vs DBMS, Advantages of DBMS, Storage data, queries, Transaction Management, DBMS Structure

UNIT II:
E-R model Entities, Attributes and Entity sets, Relationship and Relationship sets, Features of ER model, Conceptual database design with ER model.

UNIT III:
Relational model - integrity constraints over relations and enforcement, Querying relation data, Logical database design, views, destroying/altering tables and views. Relational algebra and calculus

UNIT IV:
SQL - Basic SQL, Query, union, interest, except, Nested Queries, Aggregated Operation, Null values, Embedded SQL, cursors, ODBC and JDBC, Triggers and Active database, designing active databases

UNIT V:
Transaction management, concurrency control & crash recovery - Transaction concept, transactions and schedules, concurrent execution of transactions, lock ~based concurrency control, crash recovery.

Case Study: OracleOi (SQL, PL/SQL & Triggers)

Text Book:
1. Database Management Systems - Raghu Ramakrishnan and Johannes Gehrke McGraw-Hill

Reference Book:
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE I
EUREE 8503: SOFTWARE ENGINEERING

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I:
Introduction - Software problem - Software Engineering Problem - Software Engineering Approach

UNIT II:

UNIT III:
Software Requirements Analysis & specification - Software Requirements - Problem Analysis - Requirements Specifications - Validation - Metrics

UNIT IV:
Planning a Software Project - Cost Estimation - Project Scheduling - Staffing & personnel Planning - Software Configuration Management plans - Quality Assurance Plans

UNIT V:

Text Book:
An Integrated Approach to Software Engineering by Pankaj Jalot - Narosa Publishers

Reference Book:
Software Engineering a practitioner's approach by Pressman
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE I
EUREE 8504: SYSTEMS MODELING & SIMULATION

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I
SYSTEM MODELS:
Concept of a system, System Environment, Stochastic activities, continuous and Discrete Systems, System Modeling, Physical and Mathematical Models for Systems, Static and Dynamic Categorization of these physical and mathematical Models. Principles used in modeling.


UNIT-II
CONTINUOUS SYSTEM SIMULATION:


UNIT-III
PROBABILITY CONCEPTS IN SIMULATION:


UNIT-IV
INTRODUCTION TO GPSS: GPSS Programs, General Description Action Times, Succession of Events, Choice of Paths, Simulation of a manufacturing Shop, Conditional Transfers, Control Statements, Functions, Simulation of a Super Market, Transfer modes, GPSS Model of a Simple Telephone system

UNIT-V
RANDOM ACCESS SYSTEMS:
Aloha, Slotted Aloha, Carrier Sense Multiple Access, Delay Calculations in CSMA! CD, Performance comparisons, Reservation Techniques.


Text Books:

References: Geoffrey Gordon
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE I
EUREE 8505: SOFTWARE PROJECT MANAGEMENT

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

Unit I:
Conventional Software Management, Evaluation of Software Economics.

Unit II:
Improving Software Economics.

Unit III:
The old way and the new, Life-Cycle Phases.

Unit IV:

Unit V:
Project Organizations and Responsibilities, Process Automation. Project Control and Process Instrumentation, Tailoring the process.

Prescribed Text book
Software Project Management by Royce

Reference Text Book:
1. Software Project Management, A real world guide to success by Joel Henry.
2. Software Project Management in practice by Pankaj Jalote
3. Quality Software Project Management by Futrell
UNIT I:
Introduction to Artificial Intelligence, Artificial Intelligence Problems, Artificial Intelligence Techniques, problems, problem space and search-defining the problem as a state space search, Production System, Problem Characteristics.
Heuristic Search Technologies Generate & Test Hill Climbing, Best First search, Problem reduction, Constraint satisfaction, Means Endo Analysis

UNIT II:
Knowledge Representation Knowledge using predicate logic representing simple facts in logic, representing instance and is relationship, computable functions and predicates resolution.

UNIT III:

UNIT IV:

UNIT-V
Weak & Strong Slot and Filler Structures Sematic nets, Frames, Conceptual dependencies, Scripts

Reference Book: Artificial Intelligence structures and strategies complex problem solving George F-Lugar Pearson Education.
UNIT-I
Static Characteristics of instruments:
Accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, input impedance - loading effect generalized mathematical model of measurement systems - dynamic characteristics - operational transfer function - zero, first and second order instruments - impulse, step, ramp and frequency responses of the above instruments.

UNIT-II

UNIT-III

UNIT-IV
Piezoelectric transducers - piezoelectric crystals - accelerometer - Hall effect transducers - Thermocouple transducers - IC sensors for temperature and pressure - Introduction to fiber optic and intelligent sensors.

UNIT-V

Text Books:
1. Mechanical measurements and instrumentation, A.K.Sawhney, Dhanpat Raj
2. Industrial instrumentation, D.Patranabis, TMH

Reference:
1. Practical Instrument Transducers, F.G Oliver, Pitman Publishing Ceo
2. Transducers Engg. S. Rangathan, Allied Publishers
UNIT I: Bioelectric Signals and Electrodes:
Origin of bioelectric signals - action potentials, Recording electrodes - Skin - contact impedance - Electrodes for ECG - Electrodes for EEG - Electrode for EMG - Electrical conductivity of electrode jellies and creams - microelectrodes.

UNIT II: Physiological Transducers:
Pressure transducers, Transducers for body temperature measurement - Pulse sensors - Respiration sensors.

UNIT III: Biomedical recorders:
Electrocardiograph - Block diagram, ECG leads, effects of artifacts on ECG recordings; Phonocardiograph; Electroencephalograph - Electromyograph - Preamplifier, filters, delay circuits, stimulators.

UNIT IV: Biomedical telemetry:
Wireless telemetry - single channel telemetry systems - Temperature telemetry system - Multichannel wireless telemetry system - Multipatient telemetry - Implantable telemetry systems - Transmission of analog physiological signals over telephone lines.

UNIT V: Patient safety:
Electric shock hazards - Leakage currents - Test instruments for checking safety parameters of biomedical equipment.

Text Books:
1. R.S.Khandpur, Hand Book of Biomedical Instrumentation, TMH, New Delhi, 2001

Reference:
UNIT-I
Project Management Systems, Organization, Scope of construction management, Significance, concept of scientific management, qualities of manager, organization - authority policy, recruitment process and training.

UNIT- II
CPM and PERT: Introduction of Pert and CPM, Planning scheduling and controlling, Bar charts, Pert and CPM networks.

UNIT-III

UNIT-IV
The role of Management and Leadership in Project environment - Individual Skills and Attitudes - Individual Motivation - Structural implications for Project managers-Cultural Implications - Management Style - Development of Management Thinking.

UNIT-V
Project Review - Project Completion & Handover - Long term Project audit and re-view - Continuous improvement - Bench Marking of Performance and Process - The role of Project Leader in the World Class Projects.

TextBook:
Harvey Maylor, Mac Millan India Ltd., Delhi

Reference Book:
Punmia: Laxmi Publications
UNIT-I
Fundamentals of artificial Neural Networks - Biological neurons and their artificial models, Neural processing, learning and Adaptation, Neural Network Learning Rules - Hebbian, Perceptron, delta, widrow - hoff, correlation, winner - take - all, outstar learning rules.

UNIT-II
Single Layer Perceptions - Multi player Feed forward Networks - Error back propagation training algorithm, problems with back propagation, Boltzmann training, Cauchi training, Combined back propagation / Cauchy training.

UNIT-III
Hopfield networks, Recurrent and Bi-directional Associative Memories, Counter Propagation Network, Artificial Resonance Theory (ART)

UNIT-IV

UNIT V:
Applications of neural networks - cerebellar model articulation controller, Robot kinematics, Expert systems for Medical Diagnosis.

TextBooks:

References:
2. Neural Networks IUPID fuzzy Systems, Bart Kosko, Prentice Hall, NJ, (~2)
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE I
EUREE 8512: INTRODUCTION TO MICRO ELECTRO MECHANICAL SYSTEMS (MEMS)

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT I

UNIT II
MUMPs (Multi User MEMS Process): IDS Uniphase MUMPs processing sequence and design rules. Design rules; applications; micro hinges and deployment actuators. CMOS MEMS: CMOS foundry processes, integrated IC/MEMS, MEMS post processing, applications.

UNIT III

UNIT IV
Wireless MEMS: mechanical and electrical resonators, Q-factor, switches, filters Power for MEMS: thin film batteries, micro fuel cells, energy fields, MEMS Packaging and Assembly: microassembly: serial and parallel, deterministic and stochastic; microgrippers: HexSil process; packaging techniques

UNIT V
The future of MEMS: Biomems - neural implants, gene chips, diagnostic chips; MEMS in space; mechanical computers; invisible and ubiquitous computing

Text Books:
4. MEMS & Microsystems TMGH 2002 by Tai-ran Hsu
UNIT I
INTRODUCTION:
Meaning, importance, benefits of Entrepreneurship-characterizes, factors of Entrepreneurship- Barriers of Entrepreneurship-Difference between Entrepreneurship and management-Evolution of the concept of entrepreneur-Difference between entrepreneur and entrepreneur. Motivational aspects of entrepreneur (McClelland theory)

UNIT II
PROJECT IDENTIFICATION AND SELECTION:
Meaning, classification of projects-Factors involved in project identification. Selection-significance contents, formulation of a project report - specimen of a project report-planning commission's guidelines for formulating a project-Basics of capital budgeting-Payback period. Net present value. Internal Rate of Return

UNIT III
SOURCES OF FINANCE:
Cost of capital-importance of a capital-Basic concepts, rational assumptions-cost of debt, reference, equity capital-source of finance-internal, external sources-institutional finance to entrepreneurs and institutional support to entrepreneurs.

UNIT IV
PROJECT APPRAISAL:
Concept project appraisal-Methods of project appraisal, Economic analysis, financial analysis, Market analysis Technical feasibility and Managerial competence (assessment of working and fixed capital Govt. Policies, qualitative methods of market analysis, Life cycle segmentation).

UNIT V
OWNERSHIP STRUCTURES & EVALUATION OF EDPS:
Ownership structures-sole trader, partnership (Partnership deed) types of partnership-Joint stock companies-Difference between private and a public company - Advantage and disadvantages of the ownership structures - Distinction between MDP and EDP -Training methods and Role playing (Games).

Text Books:
5. Dr Patel y.a Seven Business Crisis, Tata McGraw Hill

References:
B. Tech. (EEE) – VIII SEMESTER  
INTERDEPARTMENTAL ELECTIVE II  
EUREE 8601: ENVIRONMENTAL IMPACT ASSESSMENT

Hours per week: 3  
End Examination: 60 Marks  
Credits: 4  
Sessionals: 40 Marks

UNIT I:  
Introduction to EIA. Definition of EIA and EIS. C.E. Guidelines in USA, preparation of EIS, Elements of EIA.

UNIT II:  
Agency Activities, Environmental setting. Environmental attributes, air, water, soil, ecology, noise Socio-Economic aspects, Culture and human aspects (Human settlements - rehabilitations)

UNIT III:  
Environmental impacts, Identification measurement, Aggregation, Secondary and Cumulative Impacts.

UNIT IV  

UNIT V:  
Case studies, Economic impact analysis energy production impact analysis, cost benefit analysis, Environmental impact mitigation and control measures.

Reference Books:
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE II
EUREE 8602: OPERATING SYSTEMS

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

UNIT I:
Introduction:
Operating systems: Fundamentals Definition, Types of O.S, Batch Processing Systems, multiprogramming batch systems, time sharing systems, distributed systems, real time systems, services, system calls, system programs.

UNIT II:
Operating system:

UNIT III:
Deadlocks:
Characterization, handling, Prevention, Avoidance, Detection & Recovery.

UNIT IV:
Storage management:

UNIT V:
Case study:
UNIX: Fundamental Concepts in UNIX, MS-DOS: Fundamental Concepts in MS-DOS


Reference: Modern Operating Systems - Andrew S. Tanenbaum, PHI.
B. Tech. (EEE) – VIII SEMESTER  
INTERDEPARTMENTAL ELECTIVE II  
EUREE 8603: WEB TECHNOLOGY

Hours per week: 3  
Credits: 4  
End Examination: 60 Marks  
Sessionals: 40 Marks

UNIT I  
Introduction to Web Technology:  
Internet, WWW, Web Browsers, Web Servers, URL.

UNIT II  
Introduction to HTML & DHTML:  
Syntax, Forms, Cascade Style Sheets

UNIT III:  

UNIT IV:  
Introduction to Java Servelets Programming, Introduction to Applet Programming.

UNIT V:  
Structure of Web Application, Deploying Web Application

Text Books:
1. Programming the World Wide Web by Robert W Sebesta  
2. Professional Java Servelets 2.3 by John Bell Wrox Publical  
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE II
EUREE 8604: INDUSTRIAL ELECTRONICS

Hours per week: 3  End Examination: 60 Marks
Credits: 4  Sessionals: 40 Marks

UNIT I:
Thyristors:

UNIT II
Uni Junction Transistor:
Basic structure. Potential divider equivalent Static emitter characteristics. Gate cir-cuit of SCR. Two SCRs connected back-to-back. Delayed firing of SCR by phase shifted A.C. wave. Delayed firing of SCR by UJT.

UNIT III
Polyphase Rectifiers:
Three-phase half-wave delta-wave rectifier with resistive load. Six-phase star half-wave rectifier with resistive load. Delta-to-double wye half-wave rectifier with inter phase transformer and with resistive load. Three-phase delta-wye bridge rectifier with resistive load. General m-phase rectifier. DC power outputs, efficiencies and ripple factors, Transformer utility factor. Rectifier performance. Communication in polyphase rectifiers.

UNIT IV
Resistance Welding & Heating:

UNIT V
Controller Rectifiers (Outlines of Topics Only):
Electronic Speed Control of Motors (outlines of topics only):
UNIT I
Fundamentals of CAD - Introduction - The design process- Application of computers for design - Operating systems - Hardware in CAD: The design work station - II o Devices - CAD system configuration - Creating database for manufacturing :- benefits of CAD.

UNIT II

UNIT III
Introduction to finite element Analysis - CAD techniques to finite element data preparation - Automatic mesh generation - presentation of results - 3-dimenisional shape description and mesh generation - CAD applications of FEM.

UNIT IV
CAD applications and Exposure to CAD packages: Simple examples of computer aided drafting, design and analysis - introduction to simple machine elements - Analysis of cross sectional area, centroid & moment of inertia-Kinematics of crank-slider mechanism and other simple design applications. Introduction to CAD packages like ANSYS, NASTRON, NISA - II.

UNIT V
Introduction to Artificial Intelligence Introduction to Artificial Intelligence - Applications of AI in design and CAD.

Textbooks:

References:
2. Elements of Computer Aided Design 7 manufacturing, byY.C. Rao,
5. computer Aided Analysis & Design by S. Ghosal, Prentice Hall of India.
6. CAD/CAM/CIM by Radhakrishna, New age international
UNIT I
Introdution: Historical robots, robots in science fiction, future trends of robots, definitions of robots, present application status.
Robot End Effectors: Classification of end effectors, drive systems for grippers, mechanical grippers, magnetic grippers, vacuum grippers, adhesive grippers, hooks, scoops and miscellaneous devices, active and passive grippers.

UNIT II
Robot Drives Actuators and Control: Functions of drive system, general types of control, Pump classification, and introduction to pneumatic systems, electrical drives, DC motor and transfer function, stepper motor, drive mechanisms.

UNIT III
Robot Kinematics: Forward and reverse kinematics of 3 DOF arm, forward and reverse kinematics of 4 DOF arm, Homogeneous transformation, kinematics equations using homogeneous transformations.

UNIT IV
Robot Sensors: Need for sensing systems, types of sensor, robot vision, robot tactile system, proximity sensors.

UNIT V
Robot applications: Capabilities of robots, material handling, machine loading and unloading, machining and fettling robot assembly, welding, future applications. Introductory concepts.

Text Books:
1) Robotics Technology and Flexible Automation by S.R. Deb
2) James L. Fuller
UNIT I:
Mechatronics System Design:
Introduction to Mechatronics: What is Mechatronics, Integrated design issues in mechatronics, Mechatronics key elements, The mechatronics design process, Advanced approaches in mechatronics.

UNIT II:
Modelling and Simulation of Physical systems:
Simulation and block diagram, Analogies and impedance diagrams, Electrical Systems, Mechanical Translational systems, Mechanical rotational systems, Electromechanical coupling, Fluid systems

UNIT III
Sensors and Transducers:

UNIT IV:
Signals, systems and controls:
Introduction to signals, systems and controls, System representation, Linearization of nonlinear systems, Time delays. Real time interfacing: Introduction, Elements of a data acquisition and control system, Overview of the I/O process, Installation of the I/O card and software.

UNIT V:
Advanced applications in mechatronics:
Sensors for condition monitoring, Mechatronic control in automated manufacturing, Artificial intelligence in mechatronics, Microsensors in mechatronics.

Text Book:

Reference:
1. Mechatronics by W. Bolton, Pearson Education.
UNIT I:
Research methodology: An Introduction - meaning of research - objectives of re-search - motivation in research - types of research - research approaches - significance of research - research methods versus methodology - research and scientific method - importance of knowing how research is done - research process criteria of good research - Defining the research problem - selecting the problem - necessity of the defining problem - technique involved in defining a problem - an illustration.

UNIT II:
Research design: meaning of research design - need for research design - features of a good design-important concept relating to research design - different research de-signs - basic principles of experimental designs.

UNIT III:
Interpretation and report writing: Meaning of interpretation - why Interpretation? -technique of interpretation - precaution in interpretation - significance of report writing - different steps in writing report -layout of the research report - types of reports-oral presentation - mechanics of writing a research report - precautions for writing research reports.

Text Books:

2. Research in Education, Best Pearson
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE II
EUREE 8609: PROFESSIONAL ETHICS

Hours per week: 3  
End Examination: 60 Marks
Credits: 4  
Sessionals: 40 Marks

Ethics, nature and purpose; ethical theories; ethics in business and management, ethics in engineering, global ethical issues, Professional Ethics concerns one's conduct of behavior and practice when carrying out professional work. Such work may include consulting, researching teaching and writing, codes of Ethics are concerned with a range of issues, including:

1. Academic Honesty
2. Adherence to confidentiality Agreements.
3. Data Privacy
4. Handling of Human Name of the Courses
5. Impartiality in data analysis and professional consulting
6. Professional accountability

Reference: http://www.is.cityu.edu.hk/research/resourceslisworld/ethics/
B. Tech. (EEE) – VIII SEMESTER
INTERDEPARTMENTAL ELECTIVE II
EUREE 8610: NANOTECHNOLOGY

Hours per week: 3
Credits: 4
End Examination: 60 Marks
Sessionals: 40 Marks

UNIT-I
Introduction
Evolution of science and technology, Introduction to Nanotechnology, Nanotechnology - Definition - Difference between Nanoscience and Nanotechnology, Feynman predictions on Nanotechnology, Moores law, Role of Bottom up and top down approaches in nanotechnology, challenges in Nanotechnology.

UNIT-II
Nano materials
History of materials, Nanomaterials - Definition, Classification of Nanostructured materials, cause of interest in nanomaterials, some present and future applications of nanomaterials.

UNIT-III
Synthesis and processing of nano powders:
Processes for producing ultrafine powders - mechanical milling, wet chemical synthesis, gas condensation process, chemical vapour condensation, laser ablation.

UNIT-IV
Special nanomaterials, characterization and tools:

UNIT-V
Nanoelectronics
Introduction to micro, nano fabrication: Optical lithography, Electron beam lithography, Atomic lithography, Molecular beam epitaxy, MEMS: Introduction, Principles, Types ofMEMS:- Mechanical, Thermal, Magnetic MEMS; Fabrication of MEMS.

Text Book:

Reference Books: